



Linkages Between Community, Environmental, and Conflict Management: Experiences from Northern Kenya

GUYO O. HARO

GTZ/GEF Indigenous Vegetation Project, Marsabit, Kenya

GODANA J. DOYO

Arid Lands Resources Management Project, Marsabit, Kenya

and

JOHN G. MCPEAK *

Syracuse University, Syracuse, NY, USA

Summary. — There is increasing interest in community-based approaches to the management of natural resources in Africa. Pastoral areas present particular challenges and opportunities to community-based management programs. We consider an example where there are multiple definitions of the community that uses a resource, and these definitions are both nested and overlapping. Working at multiple levels of social organization and in multiple sites was critical for overall program success. We find addressing conflict can be a measure to address resource scarcity. We conclude noting signs that reduced insecurity has established the preconditions under which sustainable resource management can be accomplished.

© 2004 Elsevier Ltd. All rights reserved.

Key words — community management, resource management, conflict management, Africa, pastoralism

1. INTRODUCTION

There has recently been a great deal of attention paid in the literature to the issue of local participation in natural resource management in Africa (Barrett, Brandon, Gibson, & Gjertsen, 2001; Environment & Natural Resources Team, 2002; Ingles, Musch, & Qwist-Hoffman, 1999; Kellert, Mehta, Ebbin, & Lichtenfeld, 2000; Moore *et al.*, 2000; Ribot, 2002; Turner, 1999). These studies illustrate that community participation is a critical component of efforts that attempt to cause positive economic and ecological change in African communities. This study contributes to the growing literature on community management of natural resources by presenting information on such a program

in a pastoral area of northern Kenya. It illustrates how local participation led the natural resource management project to take an unexpected route to achieving positive economic and ecological change by encompassing issues of conflict management.

This study also contributes to the literature on common property management in risky

* This paper was prepared for the conference “Reconciling Rural Poverty Reduction with Renewable Resource Conservation: Identifying Relationships and Remedies” Cornell University, Ithaca, NY, May 1–3, 2003. We thank participants at this conference for their helpful comments and criticisms. Final revision accepted: 16 July 2004.

production environments. As is increasingly understood, the finding that common property management regimes function best with clearly defined boundaries and membership (Ostrom, 1990, 1992) is in conflict with the finding that such clear definitions can be welfare reducing in highly variable environments (Goodhue & McCarthy, 2000; Nugent & Sanchez, 1999; van den Brink, Bromley, & Chavas, 1995; Velded, 1998). This has led to a recent and growing interest in pastoral development efforts that strengthen management structures while still providing for flexibility in land use patterns (Fernandez-Gimenez, 2002; Niamir-Fuller & Turner, 1999; Turner, 1999). This study identifies some of the promise and notes some of the challenges of conducting such an effort to build land use management plans on existing social structures.

This study also contributes to a growing literature on the relationship between environmental variables and conflict. It is recognized in the literature that natural resource management and conflict management are closely related (Castro & Nielsen, 2003; FAO, 2000, 2001; Lind, 2002; Lind & Sheikh, 2001). The literature to date has largely focused on how environmental scarcity leads to increased conflict and how natural resource management plans can be designed to manage conflict (Homer-Dixon, 1991, 1994; Lind & Sturman, 2002). The current study provides a different perspective on the relationship between environmental variables and conflict as it illustrates how conflict management can be a precondition for implementing a resource management plan. This approach also reflects some of the findings in the recent literature on development efforts in insecure pastoral areas. It is increasingly recognized that addressing insecurity is a critical first step for any development efforts designed to improve pastoral welfare in such areas (Galaty, 2002; Kenya Human Rights Commission, 2000; Kratli & Swift, 1999; Lind, 2002; Odhiambo, 2000). As we will illustrate below, what began as a program to improve the well-being of pastoral populations through improving resource management evolved to become a program that focused on reducing insecurity, thus both enhancing well-being and allowing the potential for improved environmental management.

An important element of the case study we present is that adoption of a community driven approach led the implementing agency to confront issues of conflict management that they

had not anticipated in their original program design. The study illustrates that flexibility and adaptability are not only relevant to understanding the behavior of pastoralists, but also critical to designing effective participatory approaches for community natural resource management.

In the following section we briefly describe the study area. This is followed by a section that places community management of natural resources by pastoral populations in a historical context. In section 4 we describe the management structure of natural resources in the study area, with specific emphasis placed on ambiguities arising over geographic boundaries. Section 5 discusses insecurity in the study area. In section 6, we focus specifically on environmental management efforts in Marsabit District, and place specific focus on the evolution of a German Donor agency (GTZ) funded project in the area. We close in section 7 with a discussion of the prospects for the future with this effort, and also summarize the larger themes of policy relevance illustrated by the case study.

2. THE STUDY AREA

Marsabit District is in the Eastern Province of Kenya. It borders Ethiopia and Moyale district to the north, Lake Turkana and Turkana District to the west, Samburu District to the south and Wajir and Isiolo Districts to the east. The District is the second largest in the country after Turkana District. The estimated population is 125,000. Approximately 75% of the district is classified as rangelands and main mode of land use is extensive grazing. The district is a home to a number of ethnic groups such as Boran, Gabra, Rendille, Samburu, Ariaal, Turkana, Burji and Dassenetch. Alliances and hostilities vary from community to community and change over time.

The pastoral groups considered in this paper live in the arid and semiarid areas of this district and are interrelated in a variety of ways. Rendille and Gabra tend to specialize in camel, goat and sheep pastoralism, and their livestock are highly mobile. Boran, Samburu, and Ariaal focus more on cattle production in higher rainfall areas, and are less mobile than camel based pastoralists. Gabra, Rendille, and Boran are Cushitic languages and Samburu and Turkana are Nilotic languages. Rendille and Gabra share cultural practices and clan histories.

Rendille and Samburu are linked by a history of cooperation, the outgrowth of which is seen in the Ariaal group who combine elements of both Rendille and Samburu culture (Fratkin, 1991; Spencer, 1973).

All groups in Marsabit district have faced severe challenges in the past 30 years. Beginning around 1970, there has been a growth of population in permanent settlements in this district that have grown up around water points. Households that were nomadic prior to 1970 have settled for a variety of reasons. One is the loss of animals in droughts that were experienced in 1969–73, 1980, and 1984 leading to household herd sizes insufficient for maintaining mobility. A second reason is the increased provision of public services in towns, such as health centers, schools, and food aid as well as the increased economic opportunities offered by towns. Finally, insecurity has led to settlement and concentration of grazing in areas around towns as regions that were formerly used as grazing areas are no longer possible to use given the threat of armed raids. People settle in and around towns to provide mutual security.

3. COMMUNITY MANAGEMENT OF NATURAL RESOURCES IN PASTORAL AREAS

The ability of pastoral populations in east Africa to manage their own resources has long been viewed with skepticism. In large part, this skepticism results from the view that pastoral production is the cause of degradation and desertification, due to the inherent incentive problems of common property production and the cultural values of pastoralists (Doran, Low, & Kemp, 1979; Jarvis, 1980; Pratt & Gwynne, 1977). Due to the nature of the production system and the cultural context of production, it has been proposed that herders will accumulate more animals than is optimal from an environmental perspective.

Policies influenced by this view were common in the colonial and early post-independence period. Sobania (1979) quotes colonial era documents from the 1930s arguing that since pastoralists in northern Kenya own far too many animals from an environmental point of view, veterinary programs will be counterproductive. Rather, the document suggests "...a bit of disease now and then is to be encouraged in their stock provided it doesn't reach epidemic form"

(p. 180). Lipscomb (1955) summarizes the problems of the pastoral livestock sector of Kenya in one word—overstocking—and describes controlled grazing schemes to address this problem. Brown (1971) suggests the objective of conservation can be met by combining destocking with the partial removal of human populations from semiarid areas to ease population pressure and with change in the diets of those who remain behind.

As the nature of pastoral production is posited as the underlying cause of degradation, this perspective holds out little hope that the pastoral population will be capable of addressing rangeland degradation. Barnes (1979) argues

The future of large tracts of Africa thus depends, in the first instance, on drastic changes in traditional attitudes towards land-use among relatively unsophisticated and uneducated indigenous peoples. The can only be brought about by concerted and well-planned programs of rural reform and education... (p. 51).

Walker (1979) supports the view that such programs will require direction from outside the pastoral sector. He argues that since people with initiative and high capabilities are attracted away from semiarid regions to higher potential zones,

...semi-arid ecosystems have, therefore, often been managed by a segment of the population which constitutes the least capable, least innovative group, often disinterested in what they are doing, but not capable of changing their circumstances (p. 3).

These views influenced the design of development programs in pastoral areas. In a review of World Bank pastoral development schemes, de Haan (1994) describes the development efforts arising from this approach as falling into the "Ranching Phase." This phase began in the colonial period and lasted until the mid 1980s. It involved the transfer of western technology to arid African rangelands, and involved a high degree of capital investment and direction by expatriate staff (Moris, 1998). The objective was to transform pastoral production into commercialized ranching, which it was believed would simultaneously increase human welfare by commercializing livestock production systems and reverse environmental degradation by addressing common property incentive problems.

The outcome of these efforts was disappointing (Sandford, 1983; World Bank, 1985). Scoones describes the experience of development efforts in pastoral areas as one of "unremitting

failure...millions of dollars have been spent with few obvious returns and not a little damage" (1995, p. 3). Baxter (cited in Brandstrom, 1985) states he pleaded in vain "...for someone to cite just *one* pastoral development project which had been even partially successful, so that we might learn from success if we refused to do so from failure..." (p. 41). One of the main lessons learned from this failure, albeit slowly, was that the projects implemented during this era lacked support of the affected population (de Haan, 1994; Lusigi, 1981). Marty writes: "The vast investment poured into the livestock sector has failed to achieve anything, because of the exclusively technical definition of the activities and the indifferent participation of the producers" (quoted in Sylla, 1995, p. 135).

Frustration with the failure of development efforts led to a growing appreciation of the need to involve pastoral organizations in program design (de Haan, 1994; Sylla, 1995). In the first phase of this effort, pastoral organizations were largely viewed as institutions through which a project message would be disseminated. This extension oriented approach was designed as a means of delivering information to producers via these organizations (Butcher, 1994).

These efforts have been modified over the past 10–15 years to place increased emphasis on natural resource management by pastoral organizations (de Haan, 1994; Pratt, Le Gaal, & de Haan, 1997). In part, this reflects the overall move in the field of development to participatory methods (Chambers, 1997). Growing emphasis has been placed on understanding traditional environmental management practices (Oba, 1992). Increased appreciation for traditional management practices often developed when pastoral extension officers found that their work among pastoral populations led to an increased appreciation of traditional pastoral practices on the part of the extension agent, rather than adoption of the extension message by the pastoralists (Akabwai, 1992).

4. LAND USE MANAGEMENT, MOBILITY, AND BOUNDARIES IN THE STUDY AREA

While the various ethnic groups differ in the details of their social organization, crosscultural comparison suggests that are common themes to the pattern of decision-making authority over natural resources within pasto-

ral communities. All of the groups in this area have some form of a nested decision-making structure that is not characterized by a clear hierarchy of authority. The smallest decision-making group is the household. Households make decisions over managing their labor force, specific grazing route, and house and livestock enclosure maintenance.

The next level of decision making takes place at the camp level. A collection of households settled in the same immediate area makes decisions as a camp related to issues such as managing local drinking water sources, the watering order at water points, maintenance of water points, the direction in which animals will be taken to graze, and defense against human and wildlife predation.

Representatives from different camps using a given area are sometimes called together to make decisions at a level that can be thought of as neighborhood associations. Neighborhood groups deal with many of the same issues as camp level decisions, but focus on coordinating and managing the efforts of multiple camps using many of the same resources.

Finally, community decision making also takes place in meetings where neighborhood representatives discuss issues related to the grazing area used by residents of different neighborhoods. As households and livestock are mobile, the grazing area can be thought of as the area within which a household can potentially move their household and animals. Such meetings discuss issues such as long-range migration strategies, the management of dry season reserve areas, and issues of conflict with herders from other grazing areas, of the same tribe or other tribes.

These different decision-making structures defined at differing levels of social organization within a community may have overlapping rights to make decisions impacting a single resource. For example, a single water pan or grove of trees can have household, camp, neighborhood, and grazing area decision makers draw on cultural precedent to support their right to make decisions over how the resource should be managed. This presents a challenge to community management of environmental resources, as it is not always clear which particular level of decision making is the most effective or appropriate for addressing management issues of a particular resource.

This challenge is further exacerbated by the fact that for a given decision-making structure defined by the level of social organization, multi-

ple groups at this level both within and across ethnic groups may claim rights to a single resource. Strict definitions of geographical boundaries are not emphasized by pastoral groups. The concept of a "boundary" does not have a simple analog for the pastoral cultures of northern Kenya (Schlee, 1990). When describing the land associated with a particular group, the discussion focuses on a specific location associated with the group (the physical camp, a water point, a geographical formation) rather than an area with clearly delineated boundaries.

Oba (1992) and Robinson (1985) describe how this ambiguity over geographic boundaries at the ethnic level is present within ethnic groups. Subgroups within Rendille and Gabra have specific geographical migration routes that they tend to follow. However, a particular groups association with a route does "...not preclude movement of other clans into the same grazing area" (Oba, p. 42). Schlee describes the ambiguity in boundaries across ethnic groups. When he asked a Rendille elder what constituted "Rendilleland," the elder described a set of places where Rendille can currently be found. When asked explicitly what constituted the boundaries of "Rendilleland" in northern Kenya, the elder responded that the only real boundary was "one of fear" (p. 24); where one had gotten too close to hostile neighbors. When pressed to compare the concept of administrative boundaries (Marsabit District as compared to Samburu District) with the concept of boundaries between Rendilleland and the land belonging to the neighboring Samburu, the elder responded these were different concepts. He described Rendilleland and Sambururand as "inside each other. . .they are mixed up" (p. 24). The "land of the Rendille" was a separate concept in his mind from the clearly defined boundary separating administrative districts, which was viewed as a concept introduced during the colonial era and carried through to the present day.

Whether the issue is multiple claims to the wood from a fallen tree across camps, multiple claims on a water point across neighborhoods, or multiple claims to a dry season reserve area across grazing areas, overlapping management authority both within socially defined levels of organization and across spatially defined areas presents a challenge to community management of the environment. We now turn to one prominent aspect of this challenge that occurs when there are unclear boundaries across ethnic frontiers.

5. INSECURITY

A major issue to be confronted when working in pastoral areas of east Africa is insecurity. Galaty (2002) finds that addressing insecurity in northern Kenya is critical due to the impact of escalating local cycles of conflict. Kratli and Swift (1999) discuss alternative theories about the source of this violence, noting a gradual erosion of elders' authority, the failure of the state to provide security, the proliferation of small arms, and greater integration into the national political and economic sphere. While conflict between ethnic groups in this area has always been present (Robinson, 1985; Sobania, 1979), there has been a qualitative transformation in this conflict from battles among spear wielding warriors into indiscriminate assaults on populations using semiautomatic weapons over the past 30 years (Galaty, 2002; Kenya Human Rights Commission, 2000; Kratli & Swift, 1999; Lind & Sheikh, 2001). This change in the nature of conflict in Marsabit District has contributed to a climate of fear and insecurity in the region, and left a legacy of hostility and mutual suspicion.

Lind (2002) notes that overall in Africa, "there is an expanding recognition that peace and security are fundamental to Africa's social and economic renewal" (p. 1). This is increasingly being realized by donors active in pastoral areas. Odhiambo (2000) describes the experience of a development project trying to work in an insecure pastoral area of Uganda. The program began by trying to address other development needs in an insecure area, but was eventually led to the realization that to meet these other needs they had to directly address the issue of insecurity.

Confronting the issue of insecurity is particularly important for programs attempting to address environmental issues. As is increasingly recognized, rangelands in northern Kenya are characterized by localized rather than widespread overstocking. Total rangeland resources are more than adequate to support the aggregate livestock herd, but the majority of the rangeland is either underused or completely unused due to insecurity. Environmental change occurs due to the poor spatial distribution of animals rather than the absolute number of animals owned by the herders (McPeak, 2003; Milimo, Olukoye, & Moindi, 2002; O'Leary, 1987; Schwartz, Shaabani, & Walther, 1991).

Community management of natural resources thus takes place in an environment

where the boundary of the resource area is often defined as "one of fear." This presents both an opportunity and a challenge to such management structures. The opportunity arises from the fact that positive environmental change can be brought about by reducing the level of fear so that grazing pressure is spread to areas currently underused due to insecurity thus allowing currently overused areas to recover. The challenge is that communities are often not able to stop the cycle of violence in which they find themselves, and may need outside facilitation. We describe a case study of how environmental management programs in northern Kenya faced these opportunities and challenges.

6. ENVIRONMENTAL MANAGEMENT IN MARSABIT DISTRICT

(a) *The integrated resource assessment and management plan*

The Integrated Project for Arid Lands (IPAL) was a UNESCO-funded project operating in Marsabit District, Kenya during 1976–86. The project was established with a focus on "the arid lands of Kenya both for the support of their indigenous people and in the economy of the country as a whole, and because these lands were gravely threatened by desertification through misuse" (Lusigi, 1981, p. 7). The objective of the project was to develop a series of management steps that could be demonstrated and extended to the pastoral population through training and education. A variety of studies were produced during the life of this project covering a broad spectrum of topics such as the soils, hydrology, vegetation, livestock, history, social and economic organization of the study area.

The culmination of the project was an integrated resource assessment and management plan produced in 1984. The management plan describes in detail how the natural resources of the southwestern portion of Marsabit District should be managed in light of the scientific evidence gathered over the life of the project. The rangelands of the project area were divided up into distinct rangeland units based on vegetation, and differing management plans for each rangeland unit were defined. The plan explicitly stated that addressing the priorities of the pastoral population was critical for project success. A list of priority interventions ex-

pressed by the community was noted in the plan, with water development, market development, improved health care, veterinary service, improved security, improved leadership, and drought assistance identified as the most important issues to be addressed. But, the plan says that while these are important

... some items of obvious importance are absent from the people's list primarily because they have no experience of their value. Such are the need for grazing control, means of storing wealth other than "on the hoof" (i.e., banking facilities, and the registering of tribal rangelands in order to put them on a firm legal basis) (Lusigi, 1984, p. 486).

Recognizing that "the success of the plan depends on the attitude [the pastoralist people] adopt towards the whole plan" (p. 499), the plan describes an extension component with the following objectives (p. 617):

- (a) to maintain direct contact with the Rendille pastoralists;
- (b) to help the pastoralists to develop an understanding of the management program, and thus predispose them to effective cooperation;
- (c) to teach them the need to conserve and rehabilitate their environment;
- (d) to gather and evaluate educational programs.

Outside of a few small-scale efforts to implement plan components, the management plan was never enacted. To some extent, this resulted from a series of struggles between project personnel and local politicians both due to debate about the distribution of benefits of the program and the resources of this area and trepidation on the part of the political elite about the implications of raising community awareness. In addition, donors were hesitant to fund a wide-ranging management plan that simultaneously embraced livestock, pasture, human health, forestry, water, agriculture, education, security, leadership development, alternative income and marketing components. But perhaps the most important reason for the limited impact of the plan was the lack of integration of the target population in designing a management plan for their own future. The plan was premised on the view that the local population could be given proper incentives and education that would allow them to live in harmony with their environment. The design largely reflected the research findings of the project staff and little role was accorded to

the local population in defining their own future. While there was some effort to incorporate the goals and aspirations of the community, the extension program described above largely viewed the population as a group that needed to be convinced of the validity of a scientifically derived plan.

That the pastoralists would have to have explained to them items of obvious importance they had not previously considered such as grazing controls was a particularly ambitious objective for an extension program. Oba (1985) reports that only 16% of respondents from his survey of 167 elders and herders in the study area believed it possible for humans to cause soil degradation. Similarly, only 16% believed droughts were related to overgrazing. There was a major disconnect between the perceptions of the population and the view of the designers of a management plan that was to protect lands "gravely threatened by desertification through misuse."

(b) *Intraethnic environmental management committees*

The German donor agency GTZ designed a successor to IPAL called the Marsabit Integrated Development Program (MIDP) in 1990. MIDP (later shortened to MDP) defined four main areas of intervention: livestock production and marketing; natural resources management; human resources development; and farming systems development. We focus in this study on the natural resource management component.

Within the natural resources component the main areas of focus were: provision of appropriate water sources in the underutilized grazing areas; demonstrating and supporting rangeland rehabilitation; and promoting application of useful traditional grazing practices. With regard to this final objective, MDP commissioned a study to identify and assess traditional grazing systems and to elaborate an extension and education plan for the pastoral population (Oba, 1992).

Following completion of this study, MDP embarked on promotion of useful grazing practices targeting local administrative and civic leaders, traditional leaders and primary school teachers at the neighborhood level during 1993–94. The hope was that the prominent leaders who participated in workshops would disseminate the importance of the practices through traditional channels of communica-

tion. This would lead neighborhoods to define caretaker committees charged with the responsibility of day to day management of environmental matters within their neighborhoods.

The approach of targeting key leaders who would then disseminate useful practices proved unable to respond to intricacies of community decision-making authority discussed previously. Local residents were expected to define action plans to implement environmental management programs at neighborhood levels. Neighborhood leaders however found it extremely difficult to implement these plans. One reason was that within a community, there was no widespread acceptance of the legitimacy of the committee since there was no cultural precedent for such rule-making and enforcement. Further difficulties arose when by-laws initiated in a specific neighborhood were not respected by pastoralists from other neighborhoods. Pastoralists originating from other neighborhoods areas did not accept the legitimacy of rules defined for a given neighborhood, as there was no traditional precedent for a neighborhood to have exclusive claim to the resources in their area. Given the multiple layers at which individual herders felt they had rights to a particular area, ambiguity about what were the spatial boundaries of a given area, and questions about whether local residents had a legitimate right to make decisions over natural resources, the efforts of neighborhood leaders to impose resource management regimes began to appear more of a spark to resource use conflict than a measure to address land degradation.

MDP reassessed its effort to design neighborhood level natural resource management plans in 1995 due to these problems. A review of the program was initiated to identify the underlying causes of natural resource degradation, deliberate on how to improve existing local-level resource management structures, and initiate a consultative process on community driven sustainable use of common resources through consensus building. Participants in these discussions were drawn from two administrative divisions covering 11 adjacent neighborhoods in southwest Marsabit District.

The results of this review built on previous work at the neighborhood level, but also addressed the growing issue of resource use conflict across neighborhoods that had resulted from attempting to implement neighborhood level management plans. The main recommendations were the following: establish and support specifically designed Environmental

Management Committees (EMCs) composed of elders, traditional leaders, women and youths within all identifiable neighborhoods; mobilize and raise environmental awareness for user communities in all neighborhoods; support workshops to elaborate and disseminate environmental management protocol within their neighborhoods; initiate and support interneighborhood discussions aimed at minimizing natural resources related conflict between user groups; and facilitate participatory assessment of all implemented measures.

During 1996–98 MDP started implementing these recommendations. The project area was zoned into management units corresponding to traditional definitions of neighborhoods. Community environmental awareness field days were conducted in each neighborhood using posters depicting time-series environmental changes and degradation of known areas around them. The objective of conducting these field days were to: analyze with neighborhood residents specific changes in land use patterns; identify the causes and effects of such changes; identify the course of action to take to address these changes; and identify individuals from each camp who would form the Environmental Management Committee (EMC) charged with managing the resources of the neighborhood and would be viewed by residents as legitimate authorities.

By 1998 a total of 29 neighborhood-based EMCs had been formed. A total of 10,150 households (out of 21,602 households in the whole area) were in some way involved in the formation of these management committees. The established EMCs had a total membership of 588, and 40% of committee members were female.

Each EMC was assigned the task of defining an environmental management action plan for the resources in their neighborhood. In the course of defining these plans, a common set of issues emerged. First, in spite of efforts to clarify borders between neighborhoods, there was continued confusion over which management committee was granted authority over particular resources due to the overlapping nature of resource use patterns for traditional definitions of neighborhoods. Second, and related to this, there was poor integration between EMCs in different neighborhoods; rules set by one group were not necessarily the same as those set by another group. This was especially problematic when the inconsistent rules were being applied to a resource for which there were

overlapping claims. Third, there was apprehension about sanctioning members of one's own neighborhood group, commonly expressed as a fear of curses. Fourth, there was no tangible incentive for members of the committees. In fact, they were being put in situations where they had to make decisions and risk angering their neighbors; if anything this created an incentive to not be a member of the committee. Fifth, the legal status of the management committee was unclear, particularly as related to formal government rules and institutions.¹

In response to these issues, during 1998–99 MDP's activities were mainly concentrated on bringing together representatives from different neighborhoods to harmonize resource management protocols. The 29 management units with their distinct EMCs were clustered into four larger management units corresponding to the idea of a grazing area. Meetings were convened for EMCs and elder leaders of each neighborhood within a grazing area. Through a series of consultative meetings each of the larger grazing area units, EMC's and elder leaders identified problems that had emerged in implementing the neighborhood specific management plans. Again, they noted poor coordination and consultation among the EMCs had resulted in an escalation of internal community resource use conflict. In addition, they noted neighborhood specific plans were still not able to cope with herders from other neighborhoods who came into the area.

A harmonized natural resources management protocol detailing the procedures and penalties (based mainly on traditional customary laws) was drafted for enforcement at the grazing area level. Notable items in this protocol are how to:

- (i) Manage water resources.
- (ii) Manage grazing land use by local residents.
- (iii) Manage grazing land use by nonresidents.
- (iv) Manage use of tree species.
- (v) Establish rules over charcoal making.
- (vi) Manage wild fires.
- (vii) Manage movement of diseased livestock.
- (viii) Develop communication mechanisms and dialog with the local community.
- (ix) Develop communication mechanisms and dialog with neighboring communities.
- (x) Develop communication mechanisms and dialog with formal administrative structures.
- (xi) Protect wildlife.

Participants in these meetings however argued that this harmonized management protocol did not address one of the main issues impeding environmental management efforts, that of insecurity. Insecurity had led populations to converge into more secure areas, leaving vast areas of the rangeland unused. Participants argued that addressing mismanagement without also addressing insecurity would ultimately be futile, as rest and rehabilitation of overused areas as called for in the management protocol required access to areas currently underutilized due to insecurity.

This placed the MDP staff in an interesting situation. By virtue of the wide geographical area they had worked in, they had built up trust and confidence with members of neighboring ethnic groups who had little trust and confidence in one another. They had also developed a familiarity with the prevailing issues driving current conflicts. But, the program was neither designed nor mandated to deal with conflict resolution. With some trepidation, the environmental management program turned to issues of conflict management as they agreed with the assessment of the grazing area meetings—addressing conflict was a critical component of environmental management.

(c) *Interethnic conflict management by peace committees*

The Kenyan government's recognition that the capacity of formal security services to address interethnic conflict was limited led to calls by government officials for cooperation between the administration, the police, the development agencies, and the communities to reduce interethnic conflict. Notably, the District Commissioner of Marsabit called on the local community in 1999 to cooperate with the administration to help address crime and insecurity in the district. Programs targeted at addressing interethnic conflict in Marsabit involving a variety of institutions; governmental, nongovernmental, and religious responded with vigor (Kenya Human Rights Commission, 2000).²

MDP began activities in this area during 1999–2002 with a series of consultative meetings to identify sources of conflict and define means to address conflict (Haro, 1999a, 1999b). These meetings were held in collaboration with district level government authorities, local government authorities, other nongovernmental organizations (NGOs) active in the

district, traditional authorities, and EMC members. Resource management units were clustered around common resources regardless of their ethnic identity. The territory relevant to these clusters corresponded to areas used by the respective resource management units, regardless of ethnic and administrative boundaries. This latter characteristic was important as antagonistic groups used movement across administrative (including international) boundaries to attack other groups from an area in which they did not reside. This would often lead to retaliatory attacks on the resident community, causing counterattacks, fueling a cycle of violence which the formal administrative structure was not well designed to stop. For the cross-ethnic peace initiative to succeed it became necessary to bring on board all communities relevant to the use and management of a resource area, regardless of formal administrative boundaries.

Each group of community representatives was given an opportunity to describe its situation. The format for this presentation was that it was a presentation to the facilitators in front of the other community representatives, and was allowed to be presented uninterrupted by the other community representatives. The role of the facilitators was made clear to the participants. The facilitators were not judges or arbitrators to find out who was wrong and who was right. Rather the role of the facilitators was confined to helping parties find amicable solutions since what they were going to discuss were their problems and they were the only ones who could determine acceptable solutions to the problems.

The community representatives were then divided into their ethnic groups and were requested to brainstorm on the conflict issues and their underlying causes. Each party was given time to present their deliberations. Over the course of these presentations, it began to be evident that participants realized they were all faced with similar problems. This in itself was an important insight that helped to tone down the tension between them. The following is summary of the conflict issues that were identified:

- (i) Conflict over use and management of water.
- (ii) Conflict over use of grazing areas.
- (iii) Banditry, theft and murderous activities.
- (iv) Unclear boundaries between neighbors.
- (v) Lack of co-operation among local leaders.

- (vi) Lack of discipline among herders and warriors.
- (vii) Over-utilization of natural resources (trees and wildlife).
- (viii) Lack of discipline among Kenya Police Reserves.

Having agreed on the pertinent issues and their causes, the participants were again divided into working groups defined by ethnicity to deliberate on and elaborate strategies to solve the identified problems. It was emphasized that the proposed solutions should be within their own means to implement, should be defined for themselves rather than for other groups to abide by, and should be acceptable to the other parties. Each group presented their propositions in plenary.

After long deliberations, the participants agreed on a set of rules that addressed the eight sources of conflict enumerated above. The agreement reached was then translated into all local languages and sent to all resource management units. It was then communicated to different categories of user groups (herders, warriors, women and children, chiefs and local elders, police reserves). For all EMCs falling into a common administrative location, members selected representatives for Peace Committees to oversee the implementation of the agreement.

(d) *Current status of environmental and conflict management efforts*

Community management efforts for both environmental and conflict-related issues continue to this date. We briefly describe some of the accomplishments and challenges facing each type of effort.

Environmental management efforts have achieved some success. As noted above, management of trees was defined as an environmental issue to be addressed by both the intraethnic and interethnic groups. Control over use of acacia species, doum palm, and cedar has been particularly successful, as evidenced by the increased regeneration of these trees around the settlements in Marsabit district. Milimo *et al.* (2002) conducted an in depth study of environmental issues in North Horr town where an EMC was active. They report that by 1999 the majority of residents surveyed accept the authority of the EMC and agree that the committee is contributing to environmental rehabilitation in the area. They note that the EMC has

been active in encouraging natural vegetation regeneration for sand dune stabilization, operating tree nurseries, and tree planting activities.

In addition, efforts at reserving dry season grazing areas have been undertaken in a variety of neighborhoods, although these have had limited success as of yet due to the drought of 2000–01 (these have been periods when use of the reserves was needed, so it is difficult to evaluate whether they will be set aside as reserves in nondrought years). A few other accomplishments have been that wildlife poaching has been reduced with respect to gazelles and one community has forbidden the use of plastic bags in local shops.³

Many of the issues identified at the intraethnic EMC meeting continue to be problems confronting effective community management of natural resources. Coordination among neighboring EMCs continues to be a problem, as does the issue of nonneighborhood residents being unaware of or not respecting resource management rules defined by the EMC. Concerns about the legitimacy of EMC rules within the neighborhood also continue to be voiced. Although neighborhoods designed these as rule-making bodies, the limited cultural precedent for such clearly defined rule-making groups leads some neighborhood residents to refuse to accept the authority of the EMC as final. The formal authority of the EMC relies in most cases on the local Chief, who may not always be willing to enforce EMC rules and sanctions.⁴ In addition, EMCs are struggling to address the charge that their efforts are only addressing environmental issues around settlements, and do not have an impact on the extensive grazing areas.

Interethnic grazing cooperation has been successful at opening up areas unused previously due to insecurity, and allowed formerly hostile groups to inhabit the same area. MDP staff suggests that prior to the program's effort roughly 60% of Marsabit District rangelands were underutilized or unused due to insecurity, compared to the current estimate of 25%. Community-level research on land use changes conducted in 2002 in the Marsabit communities of North Horr, Kargi, and Logologo supports the contention that there are fewer rangeland areas unused due to insecurity.⁵ Access to previously unused rangeland areas was described as particularly useful during the recent drought, as there were some areas of Marsabit district that received rain and had

abundant pasture that would have been unused in previous years due to insecurity. The presence of herders from different ethnic groups in the same area without any violence breaking out was seen as an important accomplishment that would not have occurred prior to the interethnic meeting.

Follow-up meetings have been conducted after the initial 1999 workshops to monitor the progress of crisis prevention and conflict management activities. The purpose these follow-up meetings is to assess the progress and also document how conflict issues between groups were managed by the established peace committees what could be improved in the future. Two main successes that were identified in these meetings are worth noting here. Revenge attacks did not occur when a Samburu herdsman murdered a Turkana herdsman in May of 1999. After a long meeting, the Samburu elders agreed to compensate the family of the Turkana victim through the payment of livestock, and the case was resolved. Similarly, when a Gabra killed a Samburu boy in November 2001 the case was resolved without further violence. Again, after a meeting of elders, a payment in terms of livestock to the victim's family was agreed upon. While it would be preferable to prevent such loss of life from occurring in the first place, it was clear that the peace committees were able to prevent descent into a new spiral of violence.

A variety of issues confront conflict management efforts as they go forward. The most serious is the issue of collective retribution. In essence, if one of "them" attacks "us," "we" attack "them" in revenge regardless of whether the individuals attacked in revenge had anything to do with the initial attack. One manifestation of this is the complaint that EMC's are ill equipped to handle raiders from outside the district who share a common ethnic identity with neighborhood members when they launch an attack from within a neighborhood with an EMC. Such attacks threaten the fragile peace between neighborhoods who share resource areas but not a common ethnic identity. In a related fashion, conflict between ethnic groups in adjacent neighborhoods is influenced by conflict outside of their area due to this principle of collective retribution. Conflict such as the ongoing Turkana—Samburu conflict in Samburu district, and Boran—Rendille conflict in the highlands of Marsabit threaten the peace between the groups that have managed to

establish peace committees in other areas. News of an atrocity against one's own ethnic group by members of another ethnic group leads to calls for revenge attacks in any area where the two groups are in close proximity. Such spillover effects work the other way as well, as individuals and groups who have an interest in preventing alliances between other ethnic groups may actively seek to undermine the efforts at conflict resolution to advance their own interests.

Conflict management committees also must confront ambiguities about the legitimacy of the resolutions reached by the peace committees in reference to formal administrative structures. While the terms of the agreement defined during the interethnic meetings calls for turning over an accused murderer to the police, local residents appear to have less confidence in the objectivity of formal legal structures in this area than they do in their own deliberations. In both cases of murder, traditional restitution in the form of livestock was agreed to by the traditional authorities in each community, and in the latter case the traditional agreement was reached conditional upon no formal legal proceedings being pursued. The government of Kenya took an initial step toward addressing issues of legitimacy and legality of conflict management committees at a meeting convened by the Provincial Administration in Mado Gashe, Kenya in 2001. The aim of this meeting was to harmonize the by-laws of different conflict management committees in different areas of northern Kenya and to put in place machinery to enforce these by-laws across administrative boundaries.

7. CONCLUSIONS

When there are multiple users who can exert a claim on a natural resource, management of the resource will almost inevitably require addressing conflicts arising from these multiple claims. Community management of natural resources does offer promise, but must explicitly consider the linkages between community management, environmental management, and conflict management.

We have highlighted issues arising when there are multiple nested and overlapping definitions of community who have claims on a given resource. Ambiguity in decision-making authority provides great flexibility for production in an uncertain environment, but also raises real

challenges for resource management plans. The nested structure of social organization allows some possibility of achieving harmonization of management plans by calling together groups who share membership of a common larger social structure, as was illustrated by the MDP case. This allows harmonization of rules without formally allocating any one level of social organization exclusive decision-making authority, thus preserving aspects of flexibility without conflicting with cultural precedents. In addition, borders between communities may be ambiguous. Reconciling multiple claims within a single management protocol requires facilitating dialog across decision-making authorities in different areas who have claims on a given resource. Dividing up rangeland into range management units based on vegetation type is often done in pastoral development plans, but the neat lines on the map may have little meaning to communities that have claims of varying strength on resources within different range units. Working with existing definitions of resource areas introduces some ambiguities, but also appears to offer some promise.

This study also illustrates that conflict management may be important for environmental management even if the conflict is not primarily due to contestation over a particular resource. While there is undoubtedly some element of resource competition involved in northern Kenya's insecurity, the cycle of violence and retribution has taken on a life of its own. Conflict management in this case was required to provide adequate security within which environmental management efforts could be undertaken.

Importantly, we find that communities are able to improve security by entering into dialogue with each other. What was required was facilitation to bring groups together and allow them to sort out their problems, and to define their own plan of action. It should also be noted that the success of these efforts were obtained due to the encouragement of formal

administrative structures early in the process and the eventual ratification of the outcome by government institutions.

A different issue illustrated by this study is that community participation can lead development agents to become involved in issues that differ from their original program focus. MDP's original focus on environmental management required program staff to become involved in conflict management. Working together with the formal administration, other development agents, traditional leaders, and community members, they were able to modify their program to address conflict management directly. Again, we would stress that the support of the government agencies grew over time and contributed to the current success of these efforts.

Overall, we find that improvement in the well-being of residents of pastoral areas is possible by working with pastoral communities and allowing them to define their own plans. The accomplishments to date of the MDP project have not resulted in a transformation of pastoral society, but rather build on the existing structure of pastoral society. Learning from the lessons of the MDP effort offers promise for efforts to improve environmental management and human welfare in other pastoral areas. This study has illustrated both the potential and limits of community management of natural resources. We document that there are ways to establish and enforce rules in a common property production setting characterize by uncertainty without undermining flexibility in resource use patterns. We note that while it is well understood that resource scarcity can lead to conflict, it is also possible that conflict management can be an important element of addressing resource scarcity. Communities can identify solutions to both environmental degradation and insecurity if given facilitative support, which suggests there is reason to be cautiously optimistic about pastoral development efforts which adopt this approach.

NOTES

1. The original intent was for community-level EMCs to function under the authority of the government appointed District Environmental Officer (DEO). But, as the DEO position was vacant during the period of

EMC formation, EMCs instead sought legal authority from other government departments and/or the chiefs of the respective village who had authority through the Chief's Act (Milimo *et al.*, 2002).

2. It should be noted that some of these institutions had been working on conflict resolution for many years prior to this statement by the government and the commencement of MDP activities aimed at conflict resolution.
3. Beyond being visually unpleasant, residents of this area also complained that animals were eating the bags and dying because of ensuing intestinal complications.
4. Milimo *et al.* (2002) provide another example of enforcement problems as they report that local police in North Horr were reluctant to punish local charcoal makers in spite of the fact that the local police and the EMC had signed a memorandum of understanding that obligated the police to arrest law-breakers identified by the EMC as the police relied on charcoal as an energy supply.
5. This research was conducted by one of the co-authors of this study (McPeak) as part of the USAID funded GL-CRSP Pastoral Risk Management Project.

REFERENCES

- Akabwai, D. (1992). *Extension and livestock development: experience from among the Turkana pastoralists of Kenya* Pastoral Development Network Paper 33b. London: Overseas Development Institute.
- Barnes, D. (1979). Cattle ranching in the semi-arid savannas of east and southern Africa. In B. Walker (Ed.), *Management of semi-arid ecosystems* (pp. 9–54). Amsterdam: Elsevier Scientific.
- Barrett, C., Brandon, K., Gibson, C., & Gjertsen, H. (2001). Conserving tropical biodiversity amid weak institutions. *BioScience*, 51(6), 497–502.
- Brandstrom, P. (1985). Do we really learn from experience. In A. Hjort (Ed.), *Land management and survival* (pp. 41–56). Uppsala: Scandinavian Institute of African Studies.
- Brown, L. (1971). The biology of pastoral man as a factor in conservation. *Biological Conservation*, 3(2), 93–100.
- Butcher, C. (1994). *Extension and pastoral development: past, present and future* Pastoral Development Network Paper 37d. London: Overseas Development Institute.
- Castro, P., & Nielsen, E. (2003). *Natural resource conflict management case studies: an analysis of power, participation and protected areas*. Rome: FAO.
- Chambers, R. (1997). *Whose reality counts*. London: ITDG Publishing.
- de Haan, C. (1994). *An overview of the World Bank's involvement in pastoral development* Pastoral Development Network, # 31b. London: Overseas Development Institute.
- Doran, M., Low, A., & Kemp, R. (1979). Cattle as a store of wealth in Swaziland: implications for livestock development and overgrazing in east and southern Africa. *American Journal of Agricultural Economics*, 61, 41–47.
- Environment & Natural Resources Team (2002). *Nature, wealth and power: emerging best practice for revitalizing rural Africa*. Sustainable Development Office (AFR/SD), USAID/USAID Development Experience Clearinghouse (DEC)/Development Experience System (DEXS).
- FAO (2000). *Proceedings electronic conference on addressing natural resource conflicts through community forestry* Prepared by D. Chandrasekharan. Community Forestry Unit, Forests, Trees and People Program, Forestry Department. Rome: FAO.
- FAO (2001). *Integrating conflict management considerations into national policy frameworks* Community Forestry Unit, Forests, Trees and People Program, Forestry Department. Rome: FAO.
- Fernandez-Gimenez, M. (2002). Spatial and social boundaries and the paradox of pastoral land tenure: a case study from postsocialist Mongolia. *Human Ecology*, 30(1), 49–76.
- Fratkin, E. (1991). *Surviving drought and development: arid pastoralists of northern Kenya. Conflict and social change series*. Boulder, CO: Westview Press.
- Galaty, J. (2002). Vue sur la violence: les frontieres du conflit pastoral au Kenya. *Anthropologie et Societes*, 26(1), 107–126.
- Goodhue, R., & McCarthy, N. (2000). Fuzzy access: modeling grazing rights in sub-Saharan Africa. In N. McCarthy, B. Swallow, M. Kirk, & P. Hazell (Eds.), *Property rights, risk, & livestock development in Africa* (pp. 155–190). Washington, DC: IFPRI.
- Haro, G. (1999a). *Inter-ethnic environmental management committees and leaders conference on resource use dispute management—Loiyangalani*. MDP-GTZ in collaboration with the Kenyan Ministry of Agriculture, Marsabit, Kenya.
- Haro, G. (1999b). *Inter-ethnic environmental management committees and leaders conference on resource use dispute management—Maikona*. MDP-GTZ in collaboration with the Kenyan Ministry of Agriculture, ITDG, and PISP, Marsabit, Kenya.
- Homer-Dixon, T. (1991). On the threshold: environmental change as causes of acute conflict. *International Security*, 16(2), 76–116.
- Homer-Dixon, T. (1994). Environmental scarcities and violent conflict: evidence from cases. *International Security*, 19(1), 5–40.
- Ingles, A., Musch, A., & Qwist-Hoffman, H. (1999). *The participatory process for supporting collaborative management of natural resources: an overview*. Rome: FAO.
- Jarvis, L. (1980). Cattle as a store of wealth: comment. *American Journal of Agricultural Economics*, 62(3), 606–613.

- Kellert, S., Mehta, J., Ebbin, S., & Lichtenfeld, L. (2000). Community natural resource management: promise, rhetoric, and reality. *Society and Natural Resources*, 13, 705–715.
- Kenya Human Rights Commission (2000). *The forgotten people revisited*. Nairobi: KHRC.
- Kratli, S., & Swift, J. (1999). *Understanding and managing pastoral conflict in Kenya: a literature review*. Mimeo. Institute for Development Studies, University of Sussex.
- Lind, J. (2002). Report of the consultative session and regional conference on the ecological sources of conflict in sub-Saharan Africa. *Eco-conflicts 2:1*. African Center for Technology Studies, Nairobi.
- Lind, J., & Sheikh, N. (2001). Armaments, environments: small arms and the control of natural resources. *Eco-conflicts 1:3*. African Center for Technology Studies, Nairobi.
- Lind, J., & Sturman, K. (Eds.). (2002). *Scarcity and surfeit, the ecology of Africa's conflicts*. Pretoria: Institute for Security Studies.
- Lipscomb, J. (1955). *White Africans*. London: Faber and Faber.
- Lusigi, W. (1981). *Combating desertification and rehabilitating degraded production systems in northern Kenya: an IPAL case study and summary of results so far*. Nairobi: UNESCO.
- Lusigi, W. (1984). *Integrated resource assessment and management plan for western Marsabit District, northern Kenya*. Nairobi: UNESCO.
- McPeak, J. (2003). Analyzing and addressing localized degradation in the commons. *Land Economics*, 79(4), 515–536.
- Milimo, B., Olukoye, G., & Moindi, D. (2002). *The human dimension of desertification with special reference to people's participation in dune stabilization measures in North Horr (northern Kenya)*. Eschborn/ Germany: GTZ.
- Moore, K., Bertelsen, M., Diarra, L., Kodio, A., Cisse, S., & Wyeth, P. (2000). *Natural resource management institution building in the decentralizing context of West Africa: the SANREM CRSP approach*. Working Paper 01–02. Office for International Research and Development, Virginia Tech, Blacksburg, VA.
- Moris, J. (1998). *Under three flags: the policy environments for pastoralists in Ethiopia and Kenya*. SR/ GL-CRSP Pastoral Risk Management Project Technical Report 04/99. Utah State University, Logan, UT.
- Niamir-Fuller, M., & Turner, M. (1999). A review of recent literature on pastoralism and transhumance in Africa. In M. Niamir-Fuller & M. Turner (Eds.), *Managing mobility in African rangelands: the legitimation of transhumance* (pp. 18–46). London: Intermediate Technology Publications.
- Nugent, J., & Sanchez, N. (1999). The local variability of rainfall and tribal institutions: the case of Sudan. *Journal of Economic Behavior & Organization*, 39, 263–291.
- Oba, G. (1985). Local participation in guiding extension programs: a practical proposal. *Nomadic Peoples*, 18, 27–45.
- Oba, G. (1992). *Traditional grazing systems of the Rendille & Ariaal pastoralists: changing strategies and options in the southern district of Marsabit, northern Kenya*. Marsabit Development Programme. Marsabit, Kenya: GTZ.
- Odhiambo, M. (2000). *Oxfam Karamoja conflict study: a report*. Mimeo. Kampala: Oxfam.
- O'Leary, M. (1987). Changing responses to drought in northern Kenya: the Rendille and Gabra livestock producers. In P. Baxter (Ed.), *Property, poverty and people: changing rights in property and the problems of pastoral development*. Department of Social Anthropology and International Development Center, University of Manchester.
- Ostrom, E. (1992). *Crafting institutions for self-governing irrigation systems*. San Francisco: Institute of Contemporary Studies.
- Ostrom, E. (1990). *Governing the commons: the evolution of institutions for collective action*. Cambridge: Cambridge University Press.
- Pratt, D., & Gwynne, M. (Eds.). (1977). *Rangeland management and ecology in east Africa*. London: Hodder and Stoughton.
- Pratt, D., Le Gaal, F., & de Haan, C. (1997). *Investing in pastoralism: sustainable resource use in arid Africa and the Middle East*. World Bank Technical Paper # 365. Washington, DC: World Bank.
- Ribot, J. (2002). *Democratic decentralization of natural resources: institutionalizing popular participation*. Washington, DC: World Resources Institute.
- Robinson, P. (1985). *Gabra Nomadic pastoralism in nineteenth and twentieth century northern Kenya: strategies for survival in a marginal environment*. Unpublished Ph.D. Dissertation, Department of History, Northwestern University.
- Sandford, S. (1983). *Management of pastoral development in the Third World*. New York: John Wiley & Sons.
- Schlee, G. (1990). *Policies and boundaries: perceptions of space and control of markets in a mobile livestock economy*. Program Working Paper #133, Sociology of Development Research Center, Africa, Universitat Bielefeld.
- Schwartz, J., Shaabani, S., & Walther, D. (1991). *Range management handbook of Kenya Volume II-1, Marsabit District*. Republic of Kenya, Ministry of Livestock Development, Nairobi.
- Scoones, I. (1995). New directions in pastoral development. In I. Scoones (Ed.), *Living with uncertainty: new directions in pastoral development in Africa* (pp. 1–36). London: Intermediate Technology Pub.
- Sobania, N. (1979). *Background history of the Mt. Kulal Region of Kenya*. Nairobi: UNESCO.
- Spencer, P. (1973). *Nomads in alliance: symbiosis and growth among the Rendille and Samburu of Kenya*. Oxford: Oxford University Press.
- Sylla, D. (1995). Pastoral organizations for uncertain environments. In I. Scoones (Ed.), *Living with uncertainty: new directions for pastoral development in Africa* (pp. 134–152). London: Intermediate Technology Publications.
- Turner, M. (1999). Conflict, environmental change, and social institutions in dryland Africa: limitations of the community resource management approach. *Society and Natural Resources*, 12, 643–657.

- van den Brink, R., Bromley, D., & Chavas, J.-P. (1995). The economics of Cain and Abel: agro-pastoral property rights in the Sahel. *The Journal of Development Studies*, 31(3), 373–399.
- Vedeld, T. (1998). State law versus village law: law as exclusion principle under customary tenure regimes. In E. Berge & N. Stenseth (Eds.), *Law and the management of renewable resources*. San Francisco: Institute of Contemporary Studies.
- Walker, B. (1979). Introduction. In B. Walker (Ed.), *Management of semi-arid ecosystems* (pp. 3–5). Amsterdam: Elsevier Scientific.
- World Bank (1985). *The smallholder dimension of livestock development* Operation and Evaluation Department. Internal Report. Washington, DC: The World Bank.

Available online at www.sciencedirect.com

