



PASTORAL RESOURCE MANAGEMENT INSTITUTIONS
IN NORTHERN TANZANIA

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Abstract

This paper aims to provide a theoretical framework for examining the use and management of common pool, rangeland resources by stock keeping groups in Tanzania. Such resource use regimes are driven by a wide variety of factors. These can range from local, indigenous environmental knowledge to the impact of international aid and development organizations. The number and diversity of factors affecting pastoral resource use regimes requires the construction of a coherent theoretical framework so that these various factors can be cataloged and their relative impact evaluated.

This paper argues that the best approach to this conceptual requirement is the construction of a hierarchical model of the various social, political, and economic institutions, organizations, and meta-institutions which ultimately affect resource use decisions at the level of indigenous resource management institutions. The use of a hierarchical approach allows the elements of the various levels involved to be differentiated, and the nature of the connections between the levels to be evaluated. The natural environment, in this case the arid and semi-arid savanna of northern Tanzania, is also an important element of the model. The primary aim of this model is to examine the horizontal and vertical linkages between its various levels and elements. These linkages transmit constraints and opportunities to adjacent and lower-level actors. The result is a framework which, while not totally deterministic, does play a large role structuring the possibilities of individual choice and institutional change.

In order to demonstrate the utility of this model, three northern Tanzanian pastoral or agro-pastoral groups will be comparatively evaluated. These are the Kuria of the eastern Mara Region, the Maasai of the Ngorongoro Conservation Area, and Barabaig of the Hanang District. Each of these groups face slightly different external economic, political, and social forces. As such they illustrate well different aspects of the model. Vertical elements, the Tanzanian state and international actors, are critical in the cases of the Maasai and the Barabaig, while horizontal forces, the immigration of the Sukuma from areas to the south, are more important in the case of the Kuria.

"THE PASTORAL QUESTION"

During a discussion with Mr. R. N. Muheto, the Principal Natural Resources Officer of the Tanzanian National Environmental Management Council, about issues of environment and politics in Tanzania, he suddenly suggested, "What about the pastoral question?" In Tanzania, as in many other developing countries with significant pastoralist component to their rural, subsistence populations, this phrase, "the pastoral question", can cover a broad range of issues and problems. First there are the questions of resource use and management, which were foremost in the mind of Mr. Muheto. However, there are numerous other dimensions to this question including the nature of the relationship between the state and society, differing conceptualizations of "development" and "progress", and the role of international actors such as aid agencies or conservation groups.

This paper focuses on the resource use and management dimension of the pastoral question. It starts with the observation that pastoral and agro-pastoral peoples have historically possessed common property management regimes for the rangeland that supports themselves and their herds.¹ The key questions

¹Kjekshus (1977) provides a fascinating and informative survey of pre-colonial resource use and management practices in what is now Tanzania. His basic thesis is that these practices were generally very effective and sustainable. However, the process of colonization with its accompanying violence destroyed many of these arrangements to the detriment of the people and environment of Tanzania.

then are, how are these management regimes faring in contemporary Tanzania? How have they been affected by their incorporation into, and usually subordination by, larger social structures such as the modern state, a market economy, and the international system? Finally, how has the process of regime change, for change they certainly have, affected the people and natural resources they are meant to regulate?

Unfortunately the answer to all of these questions is "badly." Indigenous resource management regimes have either broken down entirely or have been weakened to the point that they are no longer effective. A critical cause of this problem has been these regimes' vulnerability to larger and more powerful social forces and interests. At times, indigenous regimes have been directly targeted for elimination or replacement because they are not considered to be "modern" or "efficient". Finally, regime failure has most often placed major burdens on local populations and rangeland resources. Even when attempts have been made to replace indigenous regimes, the replacements have not proved to be adequate for the job.

With roughly equal populations of people, 24.5 million, and grazing animals, 24.2 million cows, sheep, and goats, as well as a large stretches of arid and semi-arid rangeland, it is clear that pastoralism is a critically important part of the Tanzanian agricultural sector (Economist Intelligence Unit, 1990, pp. 5, 13, and 11). At the same time there has been a great deal of work done on the extent and causes of resource degradation; soil

erosion, deforestation, and loss of wild species habitat among others; in areas occupied by pastoral groups (see, e.g, Makacha et al., 1983; Ministry of Lands, Natural Resources, and Tourism, 1989; and Talbot, 1986). These facts make this study, and others of its sort, increasingly relevant to the people of Tanzania as well as to the academic community interested in such issues.

A study of all the pastoral or agro-pastoral groups in Tanzania is beyond the scope of this paper. Therefore, three groups from northern Tanzania; the Kuria of the eastern Mara Region, the Maasai of Ngorongoro Conservation Area, and the Barabaig of the Hanang District; have been selected to provide empirical examples. All of these groups possess common property management regimes that have been seriously affected for the worse in recent years. Further, the result has been both human suffering and environmental damage in all of the cases. However, these cases are not identical in terms of their original situations, recent pasts, or specific outcomes. This allows for a study of a variety of the many problems faced by such communities.

The paper is divided into two major sections which are pre-viewed below. The first section is concerned with the construction of a theoretical model that can incorporate the many forces, actors, and structures that affect indigenous resource management regimes. This model attempts to impose some sort of theoretical order and create the conditions for a systematic and comparative examination. The best way to create such order is

through the construction of a hierarchical-institutional model of resource use. Much of the following section on theory is concerned with fleshing this idea out. However, it would be useful at this point to give some idea of what such a model entails. First, all resource management regimes can be described as either social institutions, actual organizations, or, more usually, some combination of the two. Second, these regimes are situated in a hierarchy, usually at or near the bottom, which consists of a variety of actors and social forces. Those components at the top create the social, political, and economic environment for those below. Certain possibilities at the lower levels are either ruled in or out depending on the constraints and opportunities coming from higher up the model. This arrangement does not entirely rule out lower level elements having an impact on those above. Such feedback loops are indeed possible and often quite common. However, higher level elements are more likely to affect lower level elements rather than the other way round.

Following a fuller theoretical discussion of this model, there is an attempt to use it to examine the state of indigenous resource management regimes possessed by the three ethnic groups; Kuria, Maasai, and Barabaig; mentioned above. This comparative examination does not attempt to be a complete and totally comprehensive study of these cultures, their present situation, and past histories. Rather, it focuses on certain key resource use issues facing these peoples and their natural environments

and looks to see what differences and/or similarities they share. At the same time, this empirical examination demonstrates the utility of the proposed model.

In the case of the Kuria, the emphasis is on the environmental damage resulting from a breakdown of state level institutions and the resulting increases in inter- and intra-ethnic violence over scarce resources. Horizontal influences can also have a negative impact on resource regimes, especially when vertical controls are absent. The Maasai case, set in the Ngorongoro Conservation Area, will illustrate the problems and opportunities that can arise from the state's pursuit of the often divergent goals of development and natural habitat preservation. It also illustrates how the state's goals and resources are shaped by institutions and interests at the international level. Lastly, the Barabaig are included to show how resource degradation problems arise when the state and foreign aid agencies attempt to impose "modern" styles of agriculture upon an unwilling population and unsuitable natural environment.

THEORETICAL ISSUES OF PASTORAL RESOURCE USE

There are three main theoretical currents that are merged to create a hierarchical-institutional model. The first is that of common property management arrangements (see, e.g., Bromley and Cernea, 1989; Ostrom, 1990; and Runge, 1986). The second is

concerned with the dynamics of state-society relations in contemporary Africa (see, e.g., Chazan, 1988; Hyden, 1992; and Migdal, 1988). The third comes primarily from the study of ecology. Here, the concern is with the impact of scale and the interaction of different items at different levels of hierarchically organized systems (see, e.g., Holling, 1986; Lowrance et al., 1986; O'Neill et al., 1986; and Walker et al., 1981). However, this concern is not limited to the study of ecology and can also be found in some work on political institutions (Kiser and Ostrom, 1982). This paper will go over each of these currents, and some related literature, and consider what can usefully be transferred to an institutional-hierarchical model of resource management.

There have been other examples of similar models examining similar problems (see, e.g., Conway, 1985; and Sanderson, 1991). However, this particular application should be useful on two related counts. One, it will demonstrate the generalizability of this approach by applying it the specific issues of pastoralism in Tanzania. Second, by focusing on a particular type of resource management in a particular area, pastoralism in Tanzania, it will be possible to construct a model that is sensitive to the needs of the empirical situation.

Common Property Management

One of the more common, and one of the earliest, ideas about

resource use in pastoral societies comes from Hardin's (1968) notion of the "tragedy of the commons." Any resource open to all comers will eventually be totally degraded as each individual seeks to squeeze the maximum possible value out of it without regard for long term considerations. The fragile East African rangeland that supports almost all pastoral economies would seem to be the quintessential example of the commons described by Hardin. The only solutions are a strong, coercive political force that can regulate access for the good of all or privatization of the resource to ensure individual accountability.

This first form of organization was tried, with a great lack of success, during the late 1960's and 1970's among the Maasai of northern Tanzania with a program of creating *Ujamaa* [socialist/collective production] ranches under state control. These attempts, which were were funded by the World Bank and U.S. Agency for International Development, generally failed due to the conflicting goals of the aid organizations, the Tanzanian government, and the Maasai themselves. In addition, the external actors showed a great deal of ignorance about local environmental conditions and management practices (Bennett, 1984; and Moris, 1981).

Over the years, both theoretical and empirical research has demonstrated that Hardin's sweeping characterization of the

nature of common pool resources² only describes one possible case. The tragic commons is an example of an open access property rights regime (Bromley and Cernea, 1989, pp. 19-20; and Feeny et al., 1990, pp.4). The view that has emerged shows that there are a number of possible management regimes for common pool resources. These are generally in the form of endogenously generated regimes that regulate access to and use of common pool resources without recourse to state control or privatization³.

Up to now the word, regime, has been used as a label for management systems without any attempt to define it. A regime, for the purposes of this paper, is a cluster of institutions and/or organizations devoted to a specific functional task. Other authors (see, e.g., Young, 1989, pp. 12-13) see regimes as equivalent to social institutions. If this were in fact the case, then the only function of regime would be to provide a synonym for a previously existing concept. A regime is thus conceptually broader in scope than the institutions and organizations which comprise. This provides us with a concept that has greater theoretical utility and which more accurately describes real-world situations where multiple institutions

²At all times it is important to distinguish between resources; rangeland, forests, water, etc.; and management regimes; public, private, common property, or open access (see, e.g., Feeny et al., 1990, pp. 3-5; and Oakerson, 1986).

³There are a wide variety of examples of this type of resource management institutions. McCabe (1990) and Wade (1987) provide empirical examples drawn from widely cases, Axelrod and Dion (1988) offers a purely game theoretical view, while Ostrom (1990) draws on both approaches.

and/or organizations may contribute to the task of resource management.

What then of the institutions and organizations that make up these regimes? The differences between the two and their possible relationships are described by both Young (1989, pp. 32-37) and Uphoff (1986, pp. 8-10). Basically, institutions are the intangible stuff of human relationships: patterns of behavior, values, roles, etc. On the other hand, organizations represent the tangible: tables of organizations, budgets, and actual personnel. Institutions and organizations can be either strong or weak. This strength or weakness is determined by the actual effect that they have on human behavior. They can either overlap, i.e., an organization with an institutional dimension, or they can exist independently of one another, though this second situation is very unlikely. There is a certain degree of complementarity, as those that do overlap tend to be strengthened by the presence of the other.

These theoretical bases set the stage for the greater challenge of locating such regimes, and the institutions and organizations which they are composed of. Then comes the task of disaggregating them into their specific components that regulate, or not as the case may be, the use of common pool resources such as grazing land. These can range from complicated formal agreements resulting from litigation and/or negotiation (Ostrom, 1990, pp. 111-126) to deeply held social values and beliefs whose relevance to resource management may not be immediately obvious

(Rigby, 1985, pp. 48-64). In between these two poles can be found all sorts of formal and informal rules, legal codes, organizations, and social attitudes. One example of these intermediate forms would be the "traditional"⁴ systems of pasture rotation and coordinated herd movement used by the Maasai (Ndagala, 1990, pp. 176-8; and Sperling and Galaty, 1990, pp. 81-2). Such a system involves negotiation and discussion among various family-based production units, extensive local knowledge, and flexibility in the face of environmental variation, as well as the ability to change over time.

One of the most important challenges faced by any resource management regime is change. Rarely are the natural, political, or economic environments of resource management regimes static. Dryzek (1987) recognizes the importance of responding to environmental change in his theoretical discussion of "ecological rationality." He argues that "social choice mechanisms," his conceptualization of regimes, must possess either "robustness" or "flexibility" to handle changing environmental factors (pp. 51-2).

This ability to change, flexibility, or to simply absorb the effects of environmental variations or changes, robustness, is especially critical for the pastoral and agro-pastoral regimes of this study. A key feature of the arid and semi-arid environments

⁴ Tradition is a best a problematic concept. It tends to imply a static quality when, in fact, it often represents, or is a result of, innovation and dynamic change mixed with the ideological or symbolic trapping of a perceived past (Abrahams, 1987, pp. 194-196).

that provide rangeland for herds is their extreme climatic variability. This is caused by apparently random variation in rainfall from year to year, as well as the existence of longer period rainfall cycles (Pratt and Gwynne, 1977, pp. 13-18). As a result successful rangeland and herd management regimes make provision for this variation. Such strategies can include the "following" of cattle (Coughenour et al., 1985, p. 622) or, in times of extreme crisis, moving from one's own ethnic group to another which is less threatened (Waller, 1988).

The aim of such strategies is to produce a condition of regime "resilience" in the face of environmental variability (Walker et al., 1981). Such strategies make a virtue of environmental instability and accept frequent small to medium size changes in order to ensure the continued existence of the broad contours of the system. Attempts to maximize output, such as introducing more productive grass varieties, at the expense of resilience frequently fail in the face of environmental variation (pp. 491-494).

State-Society Relations

Of course, many of the changes that must be faced by local resource management regimes are societal in nature. Into this category must be placed the expansion of state power and the "modern" economy in Tanzania during the 20th century, both during the colonial period and afterwards. The relationship between the

state and society in the developing countries of Africa has been the subject of much debate and discussion, as has the proper role of the state in promoting economic development (see, e.g., Hyden and Bratton, 1992; Migdal, 1988; and Rothchild and Chazan, 1988).

It is the importance of this category of problems that makes the political handling of environmental and resource issues in the developing world fundamentally different from similar problems in the advanced industrial countries of Europe, North America, and Japan.⁵ In developing countries such as Tanzania, issues of state capability and legitimacy are often still open questions. Trying to provide environmental policy, either by itself or as a component of other developmental schemes, can be complicated by the fact that the targets of such policy may reject such efforts as illegitimate or against their interests, and have the capacity to successfully thwart the implementation of policy, either fully or wholly.

The problems raised by the inclusion of the state as a variable seem to resolve themselves along two dimensions, state presence and state effectiveness. The degree of state presence indicates whether the state is indeed an important factor in resource management regimes. Some sorts of regimes, such as private property rights, require the state as a guarantor of last

⁵ On a ecological level, the primary difference between Northern and Southern environmental problems lies in the nature of the resource being degraded and the manner of degradation. In developing countries, especially in rural areas, the resource in question is usually of vital importance, such as fertile soil or useable water supplies, to the continued physical survival of the population (Durning, 1989, pp. 40-50).

resort or to be actively involved in the creation of resource use regimes along with local actors (Feeny et al, 1990, pp. 6-9 and Ostrom, 1990, pp. 185-92). If there is insufficient state presence then such a resource management regime might well fail.

If the state is in fact present, then there is the question of state effectiveness. The state may possess the capability to impose policies upon a population, but the policies may make no sense in terms of local interests or the characteristics of natural resources. This sort of problem was referred to above in the short discussion on *Ujamaa* ranches. Environmental policy can be very complicated, especially if pre-existing local resource management practices must be taken into account. Many times developing states lack the capability to fully investigate and cope with all the nuances of environmental issues (Ascher and Healy, 1990, pp. 159-80). This problem is often enhanced when a developing state is working with an international aid agency. There is often a bias on the part of the aid agency to import an inappropriate development or management model and impose upon an area or population (Moris, 1981). Fortunately some donors such as the World Bank are beginning to recognize and, perhaps, deal with this problem (Bromley and Cernea, 1989).

Levels and Hierarchy

The discussion of the distinction between state and society implicitly raises the ideas of levels and hierarchy. This sets the stage for the next phase of the theoretical discussion which will provide a bridge between the previous two sections on common property management and state-society relations. Grouping variables with common characteristics together as levels distinct from other sets of variables provides a framework for organizing the model. Sorting the regimes, institutions, and organizations according to spatial scale, from inter- and transnational down to local level, is a common way of doing this. This is an example of hierarchy at its simplest, "the levels-of-organization concept" (O'Neill et al., 1986, pp. 71).

To this will be added the slightly more sophisticated idea of "hierarchies of processes" (O'Neill et al., 1986, pp. 159-85). This allows us to incorporate process into the model and to develop a hierarchy based on cause and effect between the various levels. Kiser and Ostrom (1982) develop a similar hierarchy when they divide institutions into three levels; "constitutional choice", "collective choice", and "operational." The first two levels serve as meta-institutions which provide rules, norms, precedents, etc. for the levels beneath them. These meta-institutions provide both opportunities and constraints for lower levels. A local level resource management regime would generally consist of collective choice and operational level institutions.

Above these two levels would be found various constitutional choice institutions. The nature of these upper level institutions would set certain parameters on the institutions that comprised the management regime.

Yet another way of sorting regimes and institutions has to do with people's views of them. Both Spooner (1987) and Kikula (1989) have illustrated a clear distinction between "insiders and outsiders", or "planners and the planned." This relates to the earlier idea of endogenously created resource management regimes, as distinct from those imposed by outside forces. "Inside" regimes are more likely to depend on norms and affective elements for their continued effective operation. "Outside" regimes often require some sort of coercion or exertion of power before they are accepted, if indeed they ever are. In addition, "outside" regimes often run the risk of misunderstanding local environmental conditions or pre-existing resource management arrangements.

Lowrance et al. (1986) provide an interesting bridge between the realms of ecology, agronomy, and agricultural economics with their "hierarchical approach to sustainable agriculture." They integrate a wide range of items at various levels into their model. These range from the "field system," the agronomic component, at the base, to the "national or regional system," the macroeconomic component at the apex (p. 170). Their scheme utilizes both ecological and economic notions of hierarchy.

The Model

(See Figure 1)

The resulting model contains six elements on five levels. These are, from top to bottom, the trans- and international level, the national, regional, and district level, "outside" resource use regimes, the "inside"/indigenous common property management regime, competing regimes and communities, and the natural environment/resource base.

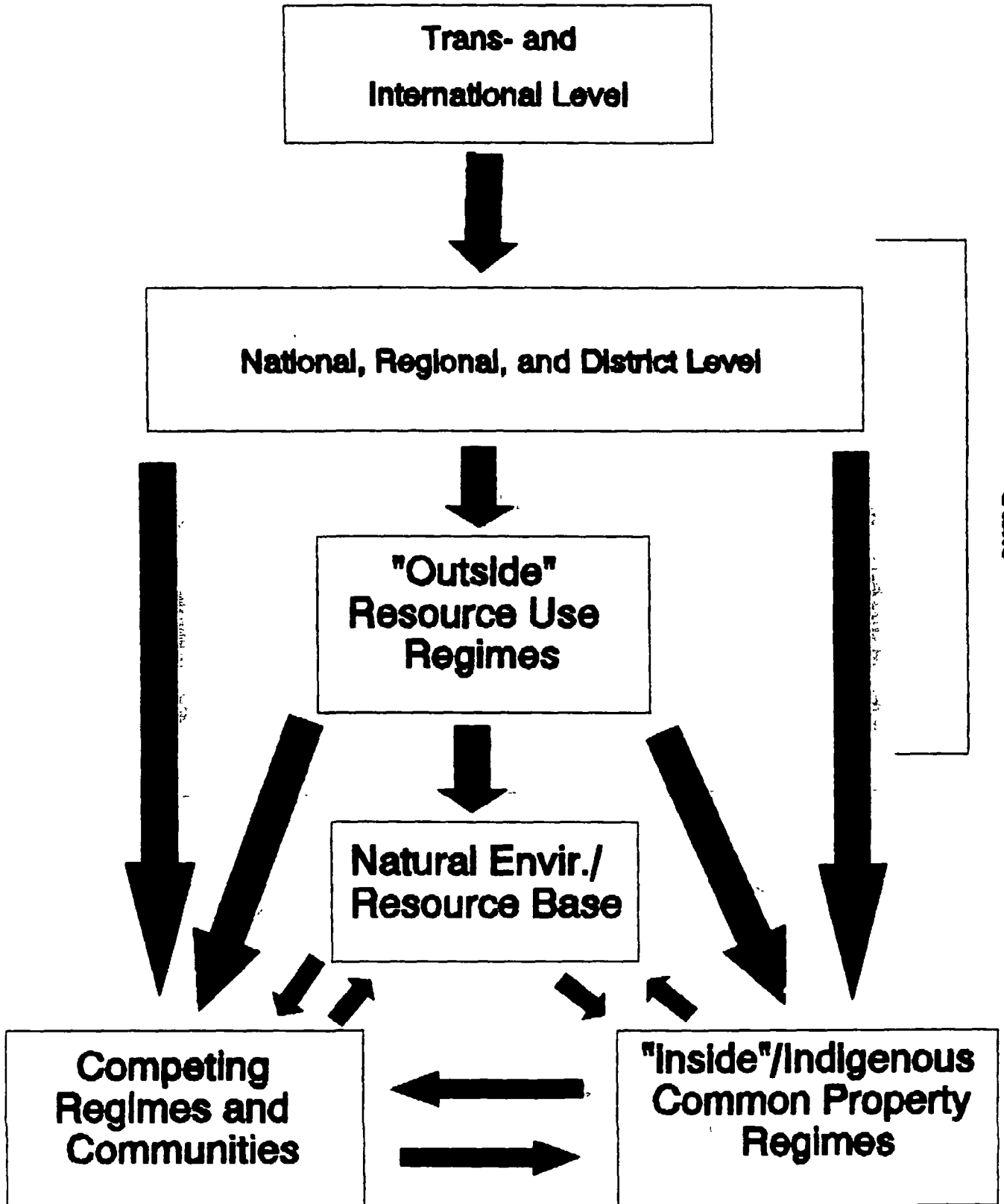
The arrows denote flows of effect. The broader arrows, all of which go from top to bottom, denote an unbalanced effect. The slimmer arrows, which link the three elements at the bottom of the model, denote a more reciprocal effect. Generally, effects flow from top to bottom. There is usually little or no opportunity for feedback except among the bottom three elements of the model.

The first two levels are considered to be meta-institutions. These components significantly shape the options available to lower level elements. This shaping can take the form of constraints which preclude certain types of action, or opportunities which encourage. The constraints and opportunities can take a multitude of forms. These could include, but are not limited to, market forces, transfers of preferences or ideologies, development aid, political stability or chaos, and/or constitutional choice mechanisms.

The state occupies the second and third levels. It is

Hierarchical-Institutional Model

(Figure 1)



composed of the national, regional, and district level, and "outside" resource use regimes. In the case of Tanzania most "outside" regimes, ranches or development projects for example, have been closely tied to the state. This has been changing in recent years, but it is still essentially true in the cases studied in this paper. In another setting, this particular part of the model could be described as both the state and formal sector.

The natural environment/resource base is located between the state and the local level. The feedback arrows from this element to the local level elements are of a reciprocal nature. Local level, indigenous regimes tend to be more aware of and sensitive to the condition of their immediate natural environment. This comes about for two reasons. One, these regimes tend to have a fund on local knowledge and experience in using and managing the resource. Two, these regimes, and the communities they support, are often very dependent on the condition of their resource base. When the condition of the resource base changes, the management regime is usually quick to adapt. This is part of what was discussed in the section on flexibility and resilience above. However, pressures from further up the model can inhibit this flexibility and lead to inappropriate or unsustainable use of the resource base. It is this sort of problem that will reoccur frequently in the case studies which follow.

The bottom, the local level, consists of two elements; competing regimes and communities, and "inside"/ indigenous

common property management regime; linked horizontally by a reciprocal relationship. The management regime of primary interest rarely exists in a vacuum at the local level. Usually it is located adjacent to another group or community with its own resource use practices and regimes. Often the territories of these groups overlap, and there can be a very high level of interaction between them. The nature of these interactions depends on a number of factors, but one of the more important is the mediating influence of the state. In its capacity as a meta-institution, the state can provide parameters for inter-group interactions.

General models of this sort have one generic defect. Their attempts to provide for every eventuality often means the inclusion of elements which are unnecessary for specific cases. This particular model is intended more as a heuristic tool rather than an exact description of each of the cases. Not every element or linkage will be of equal importance in every empirical situation. What this model can do is to suggest the general context inhabited by indigenous common property management regimes. Then, in each of the cases, it is possible to see which elements of the model are particularly significant and which are less so.

THREE CASES

As has been noted, the three case studies to be discussed here are not designed to be the final word on either these peoples or their natural environmental settings. Hopefully, certain patterns of interaction among the various levels of the model can be discovered and illustrated in light of the above theoretical discussion. This methodology is quite consciously patterned after the work of Ostrom (1990) and her similar, but far more varied, efforts. This effort is illustrative rather than comprehensive. To a great degree this results from the case studies' dependence on secondary sources. Only in the case of the Maasai is there a great body of available literature and data.

The use of ethnic groups as the unit of analysis arises because of the interest in indigenous regimes. In the context of Tanzanian pastoralism, such regimes are almost always manifested as the cultural traits of particular ethnic groups. Such traits can include inheritance or marriage practices, or even the vocabulary used to describe cattle or the environment (Klima, 1970, pp. 5-6). Smith and Reeves (1989) refer to the idea of the "socionatural region as the unit of analysis" (pp. 10-15). Such a region is comprised of a well defined, man-inhabited ecosystem, along with a cohesive set of institutions related to the natural environment. These ethnic groups, the land they occupy, and their resource regimes comprise just such units of analysis.

The Kuria of Eastern Mara Region ⁶

The Kuria are an agro-pastoral people who live in the highlands that run along the Kenyan-Tanzanian border to the east of Lake Victoria. The highlands are the site of their permanent agricultural communities while cattle are grazed in the more arid rangelands that lie to the south in Tanzania. What makes the case of Kuria interesting, and tragic, are the very serious problems of violent conflict and resource degradation, particularly deforestation, which afflict this area.

In traditional Kuria culture, the "inside" institutions of bride-price with cattle as currency, and male age-group sets were important components of the resource management regime and were used to maintain equitable access to cattle and to organize labor and resource use. In recent years several changes at the national meta-institutional level have occurred which have radically altered the nature and effect of these institutions. The result has been similar to, though subtly different from, the "tragedy of the commons" envisioned by Hardin as the previous communal property regime has broken down.

The major changes have been increased immigration of other people such as the Sukuma into the rangelands south of the Kuria highlands, the increasing economic rewards for smuggling cattle

⁶The following section is based on Abrahams (1989), Christiansson and Tobisson (1989), Dobson (1954), Ruel (1962), and Tobisson (1986).

into Kenya, and the easy availability of military style weapons following the 1979-80 Tanzania-Uganda War. This takes the form of decreasing state presence at the national meta-institutional level, an increase in powerful "outside" institutions, and an ever greater and more violent level of interaction with a competing community. The result has been the transformation of the rangeland into an open access resource as demands for cattle and pasture have outpaced the evolutionary capability of the previous "inside" resource management regime. The male age-group organization has even facilitated the escalation of violence and the degradation of resources as it provides a ready made framework for military-style organization. Even the appointment of an army officer as the district commissioner in Serengeti District, that part of Mara Region most affected by this violence, has failed to halt this destructive pattern of change. In fact, this appointment is symptomatic of the failure of national meta-institutions to provide a stable framework for resolving local level common pool resource conflicts and/or guaranteeing management regimes.

This is not to say that intra- and inter-ethnic violence was unknown until recently. The previously mentioned male age-group system was always partially military in nature, and there is a strong tradition of raiding and cattle theft among both the Kuria and the Sukuma. What is new is the intensity and effect of the violence, and its relationship to higher level structure such as the Tanzanian state and the area's proximity to the Kenyan-

Tanzanian border.

The subtle, but important, difference between the tragedy of the Mara Region and Hardin's commons lies in the manner of resource degradation. Instead of direct resource utilization, overgrazing for example, being the cause of resource degradation, it is the conflict over access to resources that has resulted in loss of access to and degradation of resources. Three important resource problems in this area are the loss of woodlands, the overuse of local water resources, and loss of rangeland to tsetse fly infested brush. All result directly from violent conflict. Wood has been extensively harvested to construct, or to repair, cattle corrals and to secure temporary homesteads on the rangeland. Such homesteads are now much more concentrated spatially to afford greater physical security. This has resulted in the contamination and exhaustion of local water resources in some areas, as well as the return of brush and shrubs to those areas no longer maintained by grazing or other techniques. As competition for common pool resources increases the nature of the strain on such resources often changes and intensifies.⁷

⁷ As an interesting side note, it should be pointed out that similar though less severe problems of cattle raiding and violence have effected the Mwanza and Shinyanga Regions to the southwest. There, the Sukuma have developed an effective self-help security system known as *Sungusungu* [swahili for a very vicious species of army ant] (Abrahams, 1987). It is unknown if a similar system might arise in Mara Region or if it would be effective.

The Maasai of the Ngorongoro Conservation Area (NCA) of
Southern Ngorongoro District⁸

For the Maasai of the NCA the primary national meta-institutional issue is not state presence but rather state effectiveness. At the same time, there is the problem of how transnational environmental attitudes effect local-level institutions. How does the state's and the international community's pursuit of preserving wildlife and its habitat coexist with the resource management institutions of the Maasai? The answer is mixed and turns on the problems of natural environment variability in semi-arid regions and the nature of state-level, "outside" regimes designed to pursue both rural development and wildlife conservation.

A key element in the partial success of the NCA lies in its unique political nature. The NCA Authority, the area's formal governing body, is not a part of either the National Parks system or the normal Tanzanian system of local government. The NCA has been explicitly designated as a "joint land use area" for both Maasai pastoralists and the preservation of wildlife. The uniqueness of the NCA Authority illustrates how higher level institutions only provide parameters of action for lower level elements rather than deterministically create particular outcomes. The NCA Authority was not the only possible arrangement

⁸The following section is based on Homewood and Rodgers (1984), Homewood et al. (1987), Mascarenhas (1983), Parkipuny (1975), Rigby (1985), and Rodgers and Homewood (1986).

for governing the area. Nonetheless, it was certain that whatever arrangement was chosen would have a strong wildlife conservation orientation. The resulting mixed system has allowed the Maasai to continue their "traditional" grazing and habitation patterns to ensure continued access to rangeland resources. The result was, up until the drought of 1982-3, the successful coexistence of the Maasai, their cattle, and wildlife without degrading the resource base.

The 1982-3 drought exposed the key weakness of the NCA Authority, which was its exclusion of the Maasai from the political process and lack of flexibility in the face of variation and change in the natural environment. The NCA Authority had an idealized, "outside" image of the Maasai resource use regime and would permit only certain types of behavior and institutional adaptation on the part of the Maasai. Further, almost all of the data that had been gathered on the ecology of the NCA was related solely to wildlife. The NCA Authority is, unfortunately, a perfect example of a regime that lacks adequate feedback so as to be able to adapt to changing circumstances. The result was that the Maasai lost over half their cattle and 75% of their nutrient base due to the drought, and they were not allowed to attempt previously used adaptive strategies such as grain cultivation or changing grazing patterns.

Since the drought the material conditions of the Maasai have not fully recovered and there is still a great deal of conflict

between the pastoral inhabitants of the NCA and the Authority. To meet their food needs through purchases of grain products, the Maasai are forced to sell off unsustainably high numbers of cattle and to engage in poaching. This first strategy increases their vulnerability if there is another drought, and the second certainly works against the very aim of the NCA. One suggested solution has been the takeover of the NCA by the National Parks system, probably to be followed by the expulsion of the Maasai. Another has been to introduce technical fixes in the form of boreholes or chemical pest control to improve the productivity of the Maasai herds. These two suggestions seem to represent transnational level institutions concerning the importance of wildlife preservation and the unfailing utility of "outside" technology. Sadly, there seems to be no attempt to broaden political participation in the NCA Authority so as to create more of an "inside" resource management regime.

The Barabaig of the Hanang District⁹

Similar to the Maasai of the NCA, the "inside" level resource regime of the Barabaig have been seriously affected by higher level elements and problems of state effectiveness. However, in the Hanang District the results have not been mixed, instead they have been uniformly bad. The primary feature of state and international involvement in this area has been the

⁹This section is based on Klima (1970) and Lane (1990).

Tanzania Canada Wheat Program (TCWP). The TCWP attempted to transplant the mechanized agricultural techniques of the temperate plains of Canada to the tropical semi-arid rangeland of Tanzania with only minor modifications. The result, predictably, has been environmental and economic disaster both in the area of the TCWP and in the surrounding areas that remained to the Barabaig after they lost grazing land the TCWP.

The key to the Barabaig's previously successful management of their rangeland resources had been a complicated systems of pasture rotation and herd mobility. Different types of pasture were used at different times and in various ways to ensure that no single resource flow was overused and degraded. Herd sizes were regulated and equity maintained through cattle transfers at times of marriage and death. It was a self-contained system with only limited contact with external actors. This should not be taken to mean that the Barabaig were static or unchanging.

This situation started to change with the imposition of German, and later British, colonial rule and the placing of restrictions on the mobility of the Barabaig. However, these changes were gradual and the Barabaig resource regime adapted by increasing contact and economic exchanges with neighboring agricultural groups. They were able to substitute an increased number of economic opportunities, trading cattle for grain and other foodstuffs, for decreased mobility in grazing. All this represents an incremental response of "inside" institutions to the changing constraints and opportunities of the meta-

institutional level.

The TCWP has proven to be too much for Barabaig's slowly adapting resource management regime to cope with. The project occupies 12% of the land in Hanang District, and, even more importantly, it uses almost all of the *muhajega* forage areas, shallow depressions that retain water during at least part of the dry season and contain very fertile soils. This land alienation tore the heart out of the Barabaig pasture rotation regime and the result has been unsustainable stress on the other areas for grazing.

Ironically, the TCWP has been uneconomical and unsustainable in its own right. Neither the natural environment, nor national level institutions or local level ones were at all suitable for Canadian-style mechanized wheat farming. While both the Canadian and Tanzanian governments have finally admitted the failure of the TCWP, Tanzanian state agencies such as the Ministry of Agriculture and Livestock Development continue to blame Barabaig overstocking for natural resource degradation in the Hanang District. This illustrates the all too common persistence of upper level institutions, even in the face of strong feedback from lower down the hierarchy.

CONCLUSION

Local, "inside" institutions lie at the heart of any successful pastoral resource management regime. The primary

natural resource, rangeland for grazing, can not be practically privatized given existing patterns of herd mobility, nor do previous attempts at state management give much hope for that route in Tanzania. As the case of the Kuria notes, the state does have a role to play in maintaining a stable and peaceful meta-institutional structure. The case of the NCA indicates that state institutions can be created that meet at least some of the needs of pastoral peoples and resource management. However, both that case and that of the Barabaig show the importance of local political involvement in any state structures, be they meta-institutional or "outside" institutions directly concerned with resource management.

There are a number of issues in this paper which have been touched upon, but have yet to be satisfactorily resolved. One, there are some theoretical problems with specifying a particular element of the model, indigenous regimes for example, as the dependent variable given the interconnectedness of the model. Two, there needs to be an adequate mechanism for "testing" the various linkages in the model. How much impact does one element have on another, and is that impact really reciprocal or one way only? Three, there is the problem of operationalization and methodological technique. Since this paper is serving as a guide for a proposed research project this is perhaps the most important of these final caveats.

REFERENCES

- Abrahams, Ray. (1987). Sungusungu: Village Vigilante Groups in Tanzania. African Affairs, 86, 179-196.
- Abrahams, Ray. (1989). Law and Order and the State in the Nyamwezi and Sukuma Area of Tanzania. Africa, 59, 356-370.
- Ascher, William and Healy, Robert. (1990). Natural Resource Policymaking in Developing Countries. Durham: Duke University Press.
- Axelrod, Robert and Dion, Douglas. (1988). The Further Evolution of Cooperation. Science, 242, 1383-1390.
- Bennett, John W. (1984). Political Ecology and Development Projects Affecting Pastoralist Peoples in East Africa (Research Paper Number 80). Madison, WI: Land Tenure Center.
- Bromley, Daniel and Cernea, Michael M. (1989). The Management of Common Property Natural Resources (World Bank Discussion Papers 57). Washington: The World Bank.
- Chazan, Naomi. (1988). Patterns of State-Society Incorporation and Disengagement in Africa. In Donald Rothchild and Naomi Chazan (Eds.). The Precarious Balance: State and Society in Africa (pp. 121-148). Boulder: Westview Press.
- Christiansson, Carl and Tobisson, Eva. (1989). Environmental Degradation as a Consequence of Socio-Political Conflict in the Eastern Mara Region. In Anders Hjort af Ornas and M. A. Mohamed Salih (Eds.). Ecology and Politics. Uppsala: Scandinavian Institute of African Studies.
- Conway, Gordon R. (1985). Agroecosystem Analysis. Agricultural Administration, 20, 31-55.
- Coughenour, M.B., Ellis, J.E., Swift, D.M., Coppock, D.L., Galvin, K., McCabe, J.T., and Hart, T.C. (1985). Energy Extraction and Use in a Nomadic Pastoral Ecosystem. Science, 230, 619-625.
- Dobson, E.B. (1954). Comparative Land Tenure of Ten Tanganyika Tribes. Journal of African Administration 6, 80-91. L/A
- Dryzek, John S. (1987). Rational Ecology. Oxford: Basil Blackwell.
- Durning, Alan. (1989). Poverty and the Environment: Reversing the Downward Spiral (Worldwatch Paper 92). Washington: Worldwatch Institute.
- Economist Intelligence Unit. (1990). Tanzania Country Profile 1990-91. London: Author.

- Feeny, David, Berkes, Fikret, McCay, Bonnie J., and Acheson, James M. (1990). The Tragedy of the Commons: Twenty-Two Years Later. Human Ecology 18, 1-19.
- Hardin, Garrett. (1968). The Tragedy of the Commons. Science, 162, 1243-1248.
- Hollings, C. S. (1986). The Resilience of Terrestrial Ecosystems: Local Surprise and Global Change. In W.C. Clark and R. E. Munn (Eds.). Sustainable Development of the Biosphere (pp. 292-317). Cambridge: Cambridge University Press.
- Homewood, K. M. and Rodgers, W. A.. (1986). Pastoralism and Conservation. Human Ecology, 12, 431-441.
- Homewood, Katherine, Rodgers, W. A., and Arhem, K. (1987). Ecology of Pastoralism in Ngorongoro Conservation Area, Tanzania. Journal of Agricultural Science, 108, 47-72.
- Hyden, Goran. (1992). Governance and the Study of Politics. In Goran Hyden and Michael Bratton (Eds.). Governance and Politics in Africa (pp. 1-26). Boulder: Lynne Rienner Press.
- Hyden, Goran and Bratton, Michael (Eds.). (1992). Governance and Politics in Africa. Boulder: Lynne Rienner Press.
- Kikula, Idris S. (1989). Possible Implications of the Similarities and Differences in Perception of Land Degradation Between Planners and the Planned (Research Paper No. 19). Dar es Salaam: University of Dar es Salaam Institute for Resource Assessment.
- Kiser, Larry I. and Ostrom, Elinor. (1982). The Three Worlds of Action: A Metatheoretical Synthesis of Institutional Approaches. in Elinor Ostrom (Ed.). Strategies of Political Inquiry (pp. 179-222). Beverly Hills: Sage Publications.
- Kjekshus, Helge. (1977). Ecology Control and Economic Development in East African History. Berkeley: University of California Press.
- Klima, George J. (1970). The Barabaig: East African Cattle-Herders. New York: Holt, Rinehart and Winston.
- Lane, Charles. (1990). Barabaig Natural Resource Management: Sustainable Land Use Under the Threat of Destruction (Discussion Paper 12). Geneva: United Nations Research Institute for Social Development.
- Lowrance, Richard, Hendrix, Paul F., and Odum Eugene P. (1986). A Hierarchical Approach to Sustainable Agriculture. American Journal of Alternative Agriculture, 1, 169-173.
- McCabe, J. Terrence. (1990). Turkana Pastoralism: A Case Against the Tragedy of the Commons. Human Ecology, 18, 81-103.

LA/A

- Makacha, Stephen, Msingwa, Michael J., and Frame, George W. (1983). Threats to the Serengeti Herds. Oryx, 16, 437-444.
- Mascarenhas, Adolfo. (1983). Ngorongoro: A Challenge to Conservation and Development. Ambio, 12, 146-152.
- Migdal, Joel. (1988). Strong Societies and Weak States. Princeton: Princeton University Press.
- Ministry of Lands, Natural Resources, and Tourism. (1989). Tanzania Forestry Action Plan 1990/91-2007/08. Dar es Salaam: Author.
- Moris, Jon R. (1981). Managing Induced Rural Development. Bloomington: International Development Institute.
- Ndagala, Daniel K. (1990). Pastoral Territoriality and Land Degradation in Tanzania. In Gisli Palsson (Ed.). From Water to World Making: African Models and Arid Lands (pp. 175-187). Uppsala: The Scandinavian Institute of African Studies.
- Oakerson, Ronald J. (1986). A Model for the Analysis of Common Property Problems. In Proceedings of the Conference on Common Property Resource Management (pp. 13-30). Washington, National Academy Press.
- O'Neill, R. V., DeAngelis, D. L., Waide, J. B., and T. F. H. Allen, T. F. H. (1986). A Hierarchical Concept of Ecosystems. Princeton: Princeton University Press.
- Ostrom, Elinor. (1990). Governing the Commons. Cambridge: Cambridge University Press.
- Parkipuny, M.L. ole. (1979). Some Crucial Aspects of the Maasai Predicament. In Andrew Coulson (Ed.). African Socialism in Practice (pp. 136-157). Nottingham: Spokesman.
- Pratt, D.J. and Gwyne, M.D. (Eds.). (1977). Rangeland Ecology and Management in East Africa. Huntington, NY: Robert E. Krieger Publishing Company. LG/A
- Rigby, Peter. (1985). Persistent Pastoralists. London: Zed Books.
- Rodgers, W. A. and Homewood, K. M. (1986). Cattle Dynamics in a Pastoralist Community in Ngorongoro, Tanzania, During the 1982-3 Drought. Agricultural Systems, 22, 33-51.
- Rothchild, Donald and Chazan, Naomi (Eds.). (1988). The Precarious Balance: State and Society in Africa. Boulder: Westview Press.
- Ruel, M.J. (1962). Kuria Generation Classes. Africa, 32, 14-36.
- Runge, C. Ford. (1986). Common Property and Collective Action in Economic Development. In Proceedings of the Conference on Common Property Resource Management (pp. 31-60). Washington, National Academy Press.

- Sanderson, Steven. (1991). Institutional Dynamics Behind Land Use Change. Paper prepared for the Global Change Institute on Land Use/Cover, Snowmass, CO, July 29-August 9, 1991.
- Smith, Sheldon and Reeves, Ed. (1989). Introduction. In Sheldon Smith and Ed Reeves (Eds.). Human Systems Ecology (pp. 1-18). Boulder: Westview Press.
- Sperling, Louise and Galaty, John G. (1990). Cattle, Culture, and Economy: Dynamics in East African Pastoralism. In John G. Galaty and Douglas L. Johnson, eds. The World of Pastoralism (pp. 69-98). New York: The Guilford Press.
- Spooner, Brian. (1987). Insiders and Outsiders in Baluchistan: Western and Indigenous Perspectives on Ecology and Development. In Peter D. Little, Michael M. Horowitz, and A. Endre Nyerges (Eds.). Lands at Risk in the Third World: Local-Level Perspectives (pp. 58-68). Boulder: Westview Press.
- Talbot, Lee M. (1986). Demographic Factors in Resource Depletion and Environmental Degradation in East African Rangeland. Population and Development Review, 12, 441-451.
- Tobisson, Eva. (1986). Family Dynamics Among the Kuria. Goteborg, Sweden: Acta Universitatis Gothoburgensis P. O.
- Uphoff, Norman. (1986). Local Institutional Development: An Analytical Sourcebook With Cases. West Hartford, CT: Kumarian Press.
- Wade, Robert. (1987). "The Management of Common Property Resources: Collective Action as an Alternative to Privatization or State Regulations." Cambridge Journal of Economics, 11, 95-106.
- Walker, B. H., Ludwig, D., Holling, C. S., and Peterman, R. M. (1981). Stability of Semi-Arid Savanna Grazing Systems. Journal of Ecology, 69, 473-498.
- Waller, Richard. (1988). Emutai: Crisis and Response in Maasailand, 1883-1902. In Douglas Johnson and David Anderson (Eds.). The Ecology of Survival (pp. 73-112). Boulder: Westview Press.
- Young, Oran. (1989). International Cooperation. Ithaca: Cornell University Press.