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Collective Action and Property Rights for Sustainable Rangeland Management

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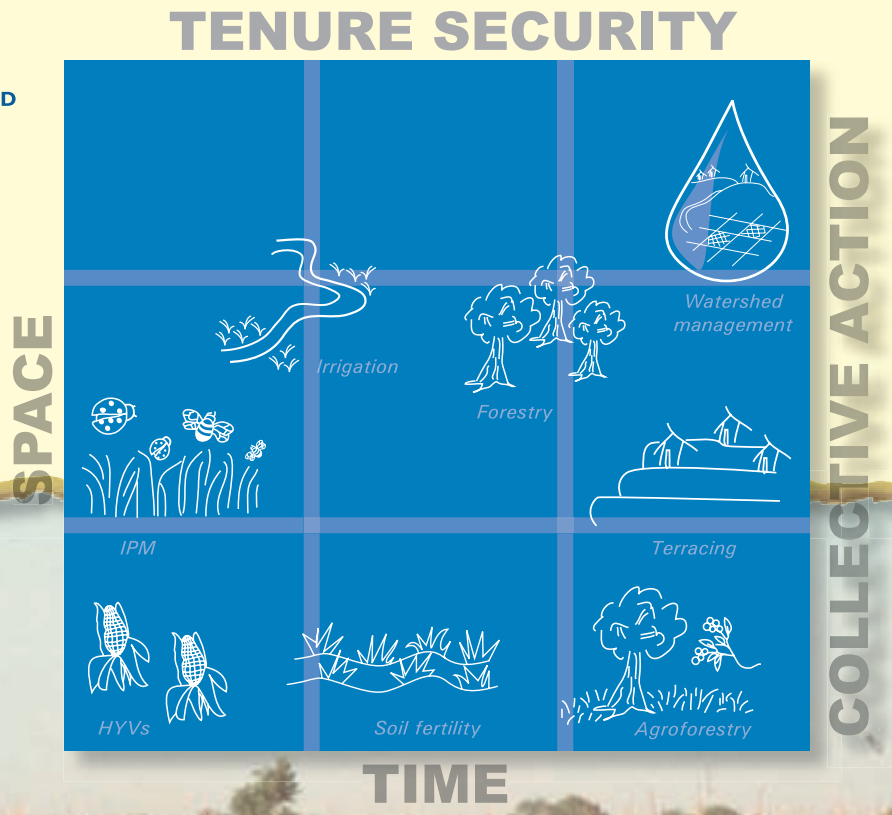
CGIAR System-wide Program on
COLLECTIVE ACTION AND PROPERTY RIGHTS



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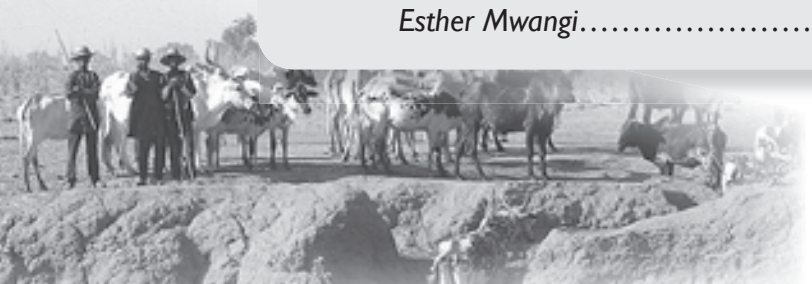
February 2005



Introduction

Esther Mwangi

This set of research briefs presents a summary of research work undertaken jointly by the International Livestock Research Institute, the International Food Policy Research Institute, and the University of Göttingen. It also includes contributions from other authors who share a similar interest in the sustainable use and management of rangeland resources.

The research had the following objectives:

- To better understand how environmental risk affects the use and management of resources under various property rights regimes
- To identify circumstances under which different pathways of change in land use and property rights are followed
- To identify how policy and other external interventions can help communities achieve desirable pathways and mitigate negative impacts of undesirable pathways

It focused on drier parts of the semi-arid regions of Africa in Burkina Faso, Ethiopia, Kenya and Niger where extensive livestock production or low input cultivation are dominant livelihood strategies. Many of these areas are characterized by competition for land and related resources between pastoralists and cultivators, as well as between different pastoral groups. These competitions have occurred and continue to occur under the influence of national land policies that have encouraged exclusive tenure systems, often favoring cultivation over pastoralism.

Most contributions to this set have been abbreviated from the edited volume: Property Rights, Risk and Livestock Development in Africa that was co-authored by colleagues in ILRI and IFPRI. Each summary presents the key points addressed by the research, as well as the policy implications. A list of additional readings is presented for those who are interested, including the email contact of each contributing researcher.

The United Nations Food and Agriculture Organization estimates that up to 40% of people in Africa, south America and Asia live in dryland environments, and that about 1 billion people in 110 nations earn their livelihoods directly from drylands resources. In Africa alone, 21 countries have up to 30% of their lands classified as drylands. As the populations in these different regions increase and productive land per capita diminishes, drylands assume an even greater significance for sustainable livelihoods and poverty reduction. Land tenure and related institutions for sustainable resources management are especially critical. Governments, donors, civil society organizations and drylands residents are now engaging in how to design and implement appropriate and effective policies that take into account the ecological, economic and cultural complexities that characterize drylands systems. Identifying key resource access issues in the drylands, and the necessary elements of equitable, efficient, and effective land tenure policies remains a challenge for researchers and practitioners.

CGIARs systemwide program on Collective Action and Property Rights (CAPRi) provides a heuristic tool for the analysis of institutions and incentives for natural resources management. CAPRi's underlying premise is that collective action and property rights are important for the sustainable management of rangelands, watersheds and for technological innovation and adoption. Investments in rangelands restoration for instance will require that individuals and groups are assured of long-term security to the use of the resource, and the necessary authority to protect their restored rangeland. In addition, the high spatial and temporal variability that is characteristic of range resources necessitates cooperation among diverse groups of users, including pastoralists, agro-pastoralists and cultivators.

The collection of research presented in this brief explores the roles of collective action and property rights in influencing incentives for rangeland management. At the same time, research presented here also highlights the role of both external and internal factors in influencing the evolution of property rights and the collective capacities of groups to manage natural resources within the context of environmental variability. Both dimensions of research provide a deeper reflection on how policies can be crafted to enhance rural livelihoods while sustaining the rangeland resource base.

Understanding Property Rights

RUTH MEINZEN-DICK, RAJENDRA PRADHAN, AND MONICA DI GREGORIO

Collecting firewood from a forest or water from a stream, grazing a herd, felling trees, preventing entry to a protected area, and making decisions about who should or should not have rights to collect firewood or water are all expressions of the exercise of property rights to natural resources. Property rights govern who can do what with resources. They specify the claims and related obligations of different actors—individuals or groups—to the benefits of a resource. The assigned set of rights and obligations shape the authority and incentives structure of the rights holder.

MANY TYPES OF RIGHTS

People often think about property rights in a narrow sense as ownership—the right to completely and exclusively control a resource. But property rights are better understood as overlapping "bundles" of rights. There are many combinations of such rights, but they can often be grouped as

- use rights, such as the right to access the resource (for example, to walk across a field), withdraw from a resource (pick some wild plants), or exploit a resource for economic benefit; and
- control or decisionmaking rights, such as the rights to management (plant a crop), exclusion (prevent others from accessing the field), and alienation (rent out, sell, or giveaway the rights).

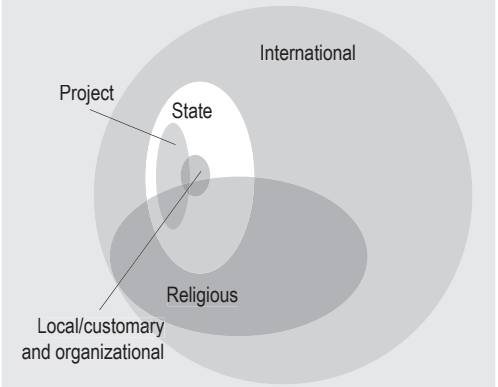
These rights may also be conditioned by the amount, timing, and other aspects of resource use and management. Several individuals or groups may have different kinds of rights over the same resource. For example, all members of a community may be allowed to bathe in a river or collect drinking water, but only certain farmers may be allowed to draw water for irrigating fields and to decide how to distribute that water in the dry season, while the state may claim ultimate "ownership" of the water, including the right to reassign it to others. Even on land declared as state forest land, individuals from a community may have the right to collect medicinal plants or fallen branches for firewood (use), local groups may have the right to plant trees (management) and guard them (exclusion), but the state may retain the right to approve any felling of trees and to collect revenue from users.

LEGAL PLURALISM: MANY SOURCES OF RIGHTS

To recognize property rights in practice,we need to look beyond state-issued titles to the resource. As illustrated in the figure,
there are multiple sources of property rights, including:

- international treaties and law;
- state (or statutory) law;
- religious law and accepted religious practices;
- customary law, which may be formal written custom or living interpretations of custom;
- project (or donor) law, including project or program regulations; and
- organizational law, such as rules made by user groups.

Coexisting Multiple Sources of Property Rights



To understand this complexity, it is useful to start from people's experiences with access to and control over resources. From this vantage point it is clear that people draw upon a range of strategies for claiming and obtaining resources, depending on their knowledge and assessment of which best suit their situation.

The coexistence of these laws does not mean that all laws are equal or equally powerful. Each is only as strong as the institution that stands behind it. Often state law is more powerful and used by government officials, for example, to declare and enforce forests as state property. Statutory law is also used by powerful outsiders, such as logging companies with concessions in customary lands, to claim resources in ways that are not locally recognized as legitimate. On the other hand, actions of local communities, such as petitions, demonstrations, and roadblocks, are ways of claiming locally recognized rights as well as seeking recognition of their rights by the state.

In some cases state law, although important, is not as relevant as the village, ethnic community, or user group in determining property rights on the ground. For example, state laws on inheritance are often ignored in favor of religious laws or

Multiple legal frameworks provide flexibility for people to maneuver in their use of natural resources.

local custom. Research has shown that state titling programs do not always provide stronger security than customary rights and may even be a source of insecurity for women and households with less information or fewer connections to obtain government land registration. While legal pluralism can create uncertainty because rival claimants can use a large legal repertoire to claim a resource, multiple legal frameworks also provide flexibility for people to maneuver in their use of natural resources.

PROPERTY RIGHTS AS FLEXIBLE AND DYNAMIC SYSTEMS

Often the more variable the resource, the more flexible are the property rights that develop over it. Water rights are particularly fluid, changing by season and year, depending on the availability of the resource and demands for water. Similarly, many customary rangeland management systems negotiate access rights depending on factors like weather and the social relations between the groups.This flexibility provides a measure of security in times of drought or other disasters, by creating reciprocal expectations of resource sharing between groups. Another source of change in property rights comes from the interaction between types of law. The different legal frameworks do not exist in isolation, but influence each other.

Changes in state law can influence local custom, but changes in customary practices can also lead to changes in state law. For state law to be effective on the ground, it must be implemented effectively. Legal literacy programs may be needed to inform the public—and even government officials—about changes in the laws.

How exactly these different legal orders influence each other depends on power relationships between the "bearers" of different laws. Power relationships also determine the distribution of rights and whether people can effectively claim their rights.Actual rights to natural resources are therefore a product of locality, history, changes in resource condition and use, ecology, and social relationships and are subject to negotiation. Thus, in practice, property rights are not cast in stone or in title deeds, but negotiated.

PROPERTY RIGHTS, RESPONSIBILITIES, AND DEVOLUTION PROGRAMS

Effective resource management entails balancing benefit entitlements and responsibilities of property rights. After failing to effectively manage natural resource systems centrally, many governments are now undertaking decentralization and devolution programs to transfer responsibility for resource management to local governments and user groups.

Unfortunately, many such programs emphasize the transfer of responsibilities without transferring the corresponding rights. As a result, user groups may lack the incentive, and even the authority, to manage the resource.

When devolution programs do transfer rights over resources to a user group or local government, that institution becomes the gatekeeper determining individuals' rights over the resource. Effective voice in those organizations becomes essential to exercising any decisionmaking rights over the resource. This situation can be especially problematic for women when formal rules limit membership to the "head of household" or when social norms make it unacceptable for women to speak up in public. Because strengthening control rights of some means restricting the use rights of others, those who are not members of the group in question may have less access to the resource. Thus, while effective transfers of rights and responsibilities from centralized government agencies to local organizations can lead to more sustainable resource management, authorities must give due attention to the equity outcomes, especially noting who loses access to resources.

IMPLICATIONS

Although property rights have a powerful influence on human welfare and natural resource management, this key institution is complex. Property rights do change over time, but legislative reform alone is unlikely to change the manifestation of property rights on the ground. Rather, change occurs through the social and power relations and negotiations between different groups, which may appeal to a variety of legal bases for claiming property rights. Instead of looking for simple "solutions" to property rights issues, it is more useful to try to understand the complexity. This approach involves looking at the claims and the bases of the claims made by individuals, groups, or government entities to different bundles of rights over the resource and at the different types of law that pertain to the use or management of the resource. Security of tenure is important, but so is flexibility to respond to changing conditions that affect resource use and property rights.

Further reading:

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Managing Mobility in African Rangelands

Maryam Niamir-Fuller

BACKGROUND

In arid and semi-arid lands in Africa, livestock mobility is one way pastoralists manage uncertainty and risk and access a range of markets. Mobility enables opportunistic use of resources and helps minimize the effects of droughts. Benefits include lower-cost fodder at minimal labor cost and increased resistance of animals to diseases. Other benefits are ecological: continuous, sedentary grazing in the wet season may result in lower pasture palatability and productivity, higher soil compaction and lower water infiltration, ultimately leading to pasture degradation. Undergrazing of remote pastures or undergrazing in protected areas can lead to invasion of unpalatable plants, lower vegetation cover, and lower diversity of plants, and can sometimes be a more serious problem than overgrazing. Many areas used by pastoralists over millennia are now considered as "grazing dependent" and mobile pastoralism can therefore be bio-friendly.

The scale and magnitude of persistent environmental decline in dryland Africa—and how livestock grazing has affected such changes—appear to have been overestimated. Indeed, the pattern of anthropogenic land degradation is much more severe around permanent settlement sites than in open rangelands. Mobility can contribute to pasture sustainability and improvement, since mobile (or transhumant) pastoralists can modify herds and access alternative areas while waiting for degraded pastures to regenerate.

MOBILITY VS. SEDENTARIZATION

Mobile pastoral systems also appear to be more economically efficient than sedentary ones and commercial ranching. If flexible access to different habitats and resources is ensured, higher populations of herbivores can be maintained in any given area. The mobile system involves common-property regimes that share the risk and spread the burden in arid lands, where uncertainty is high and the risks of production and survival are higher. Though sedentarization has positive results—such as access to education and health—benefits are not evident for all.

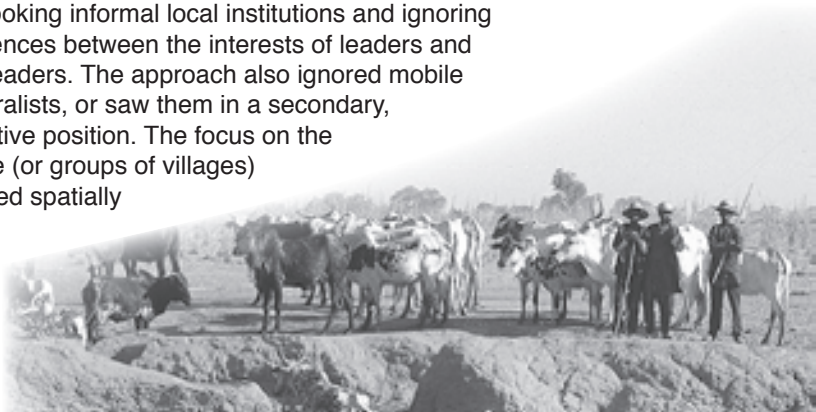
High rates of sedentarization and declining mobility have been driven by a combination of factors, including major droughts, increased individualization and disruption of political structures within pastoral societies, the growing economic vulnerability of transhumant groups, increased competition and conflicts over land, and increased land ownership by investors outside the pastoral sector. In particular, government policies have upset the economic balance between crops and livestock by favoring crops and agricultural encroachment onto rangelands. Governments have discouraged investments in the range and livestock sector and claimed "vacant" pastoral land for national parks and government-owned farms.

THE IMPACT OF DEVELOPMENT ASSISTANCE PROJECTS

Projects in Africa have long sought to develop livestock productivity rather than enhance livelihoods. Drawing on the classical ranching model from the United States, interventions encouraged sedentarization, destocking, and water development. However, they did not increase livestock productivity, and some were very destructive. In Francophone West Africa, failed, underfunded efforts were made to create official transhumance routes, with permits, supervised crossborder movements, watering points, and quarantine stations. The early 1980s saw the advent of integrated rural development projects, which were less coercive, more service-oriented, and had a nodding appreciation for local perspectives. However, this approach continued an implicit sedentarization agenda. It gave way to natural resource management projects that addressed land degradation. However, the blueprint approach persisted, and land-use "guidelines" were discussed with land-users only after their creation. Nevertheless, there were attempts to modify institutional structures for natural resource management. Legally registered pastoral associations were created and given the responsibility of managing (but not owning) a defined land area. But because the new institutions had undefined relationships to customary ones, ineffectiveness or further breakdown of customary institutions resulted.

The fundamental design principles related to managing institutions for mobility are nested property rights, fluid boundaries, inclusivity, flexibility, reciprocity, negotiation, and priority of use.

Development assistance projects then pursued natural resource management at a more localized scale, and were strongly influenced by common property theory. Such projects were partially successful in building local-level institutions for natural resource management, but they have been critiqued for overlooking informal local institutions and ignoring differences between the interests of leaders and non-leaders. The approach also ignored mobile pastoralists, or saw them in a secondary, receptive position. The focus on the village (or groups of villages) seemed spatially



myopic, and the promotion of exclusionary mechanisms in land-tenure systems evidenced under-appreciation of the variability of resource endowment in dryland areas. In the 1990s, community-based natural resource management projects attempted to allocate common-property tenure to local institutions and facilitate more participatory forms of development, though very few included mobile pastoralists. Mobility was still seen as a problem to be eliminated, not a trump card to be strengthened.

RECOMMENDED REMEDIES

Livestock need to be seen as an integral part of conservation and development in Africa, since transhumance may even be a necessary precondition to sustainable development in arid lands. Mobile pastoralism is not a "backward" means of livelihood – our laws, policies and procedures should be considered as backward since they do not recognize the ecological and economic value of mobile pastoralism. A clearer understanding of common property regimes and a holistic analytical framework for pastoral development activities are also required—to build capacity, develop and strengthen rules and regulations for common property management, manage key sites, and develop socioeconomic safety nets and drought-contingency measures.

The fundamental design principles related to managing institutions for mobility are nested property rights, fluid boundaries, inclusivity, flexibility, reciprocity, negotiation, and priority of use. This means that the pitfall of most projects must be avoided: rigidly and arbitrarily defining the boundaries of a community and then ignoring the participation by surrounding people. Instead, what is needed are definitions that classify people into an agreed-upon set of sociogeographical communities. A nested hierarchy of sociogeographical units—reflecting the nested nature of communal property—would ensure that a series of institutional structures are in place to accommodate the needs of mobility. Exclusive and inclusive land tenure can then be assigned accordingly. Reform that increases the security of transhumant claims to land is also needed, along with serious consideration for livestock mobility, common property management, and the roles more informal institutions have played in providing controllable but flexible resource access in arid rangelands.

However, resource holders need to retain authority to grant temporary use rights to secondary and tertiary users. Flexibility can be maintained by the legal recognition and development of appropriate legal language. This entails developing local administrative and judicial institutions to manage common property that recognize temporary rights of usage, establish—through local dialogue and participation—the principles and guidelines for judging claims, create the means and procedures for enforcing rules, and develop appropriate conflict-resolution mechanisms that fill gaps left by disintegrating customary systems and inappropriate western systems.

In recent years, there has been strong momentum toward "co-management," or systems of common-property regimes that combine government decentralization with community participation. Though the approach is far better suited than any other to mobile pastoralism, it needs to deal with large-scale management of contiguous land. Management of livestock mobility also requires multiple institutions working at multiple spatial scales, authorities, and functions. To modify or create the institutional structure for a legitimate, locally controllable transhumance, the function—not just the structure—of new institutions must be addressed.

RESEARCH TOPICS TO PURSUE

The research community can assist pastoral advocacy groups in Africa by investigating

- how transhumants monitor variability of primary productivity and track resources and how mobility contributes to sustainability
- the true cost of plowing rangelands and adequate compensation for herders whose land is expropriated
- the nature and functions of informal institutions for common-property management
- nested hierarchy of institutions for common-property regimes, degrees of inclusivity and exclusivity, priority of use, overlapping claims, and buffer zones, multiple-use mapping, and how multiple claims, rights, and entitlements over resources—both spatial and temporal—can be translated into substantive and procedural laws adapted to the local level
- how traditional and modern conflict-management mechanisms function, perceived gaps, conflict prevention, and conflict resolution
- how modern services, such as education, health, credit, legal aid, telecommunications, insurance, etc. can be effectively made available to mobile pastoralists

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Further reading:

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Fuzzy Access: Modeling Grazing Rights in Sub-Saharan Africa

Rachael E. Goodhue, Nancy McCarthy and Monica Di Gregorio

BACKGROUND

As a strategy to deal with rainfall variability in arid and semi-arid regions of sub-Saharan Africa, pastoralists value transhumance, which entails large tracts of land that are open to common grazing. However, such access does not closely correspond to the traditional economic concept of common property, where some fixed number of members of a common-property user group has equal and complete access to available forage. Instead of well-defined grazing areas, access is instead flexibly or "fuzzily" defined; in this paper we determine that such rights may be preferable in areas of particularly high rainfall variability.

Many Sub-Saharan Africa land-management systems provide herders with flexibility to respond to adverse rainfall shocks. Clans maintain access to different pastures through their own actions and through alliances with other clans. Such alliances function as a mutual insurance mechanism; it is often observed that clans adjust their use of forage on the basis of relative rainfall shocks to their grazing areas and those of affiliated clans. To understand these mechanisms and to develop hypotheses to be tested with empirical data, we developed a mathematical model based on fuzzy set theory.

DEFINING, AND MODELING, FUZZY ACCESS RIGHTS

Conventional common-property and open-access models do not capture the complexity of access to various pastures, including those held in common. Grazing-area boundaries are rather imprecise, as is membership in an access group for a given pasture. Some clans may use a pasture consistently from year to year, but for different lengths of time. Other clans may use it only occasionally, and their use may depend on conditions in other parts of their grazing range.

The mathematical concept of "fuzzy sets" captures these attributes of grazing-access rights by focusing on imprecision, in contrast to standard economic models that treat uncertainty as due to an underlying random variable which fails to capture the flexibility of the concept of access in these systems. In the model, we first assume that each group has a fuzzy access right to their "core" pasture; the strength of this right is determined by historical claims to the pasture. This group also has access to another group's core area, but that right is not only a function of both a (relatively low) basic historical claim plus relative rainfall realizations in the grazing area as a whole. This latter means that if this group's core area receives relatively little rainfall relative to the other group, then their access right to this second pasture increases. The same pattern holds for the other group, so that each has a partial claim to the other's core pasture that is dependent on relative rainfall realizations. Note that this system is based on reciprocity; having access to more pastures certainly reduces your exposure to rainfall variability, but others' having access to your pastures too increases your exposure to rainfall variability.

We then determine how groups will move their herds depending on three different rainfall realizations, and under what conditions fuzzy grazing rights are preferred to either full access to both areas for both groups, or enforcing exclusive access to each group on their own core areas only. Results indicate that fuzzy access rights are particularly important when rainfall realizations are idiosyncratic -- that is, when spatial variation in rainfall is particularly pronounced. In areas of more generalized rainfall patterns, enforcing full access for both clans generally leads to significantly increased use of the pasture, creating relatively large negative externalities that outweigh the direct gains of increased access. We note that the latter holds true even when both groups tend to face drought conditions simultaneously -- we expect mobility to be lower in these cases because there is no scope for "mutual insurance" if everyone tends to receive poor rainfall at the same time. Additionally, mobility will be lowest when a drought hits both areas; that is, mobility is higher both under idiosyncratic realizations and when rainfall is uniformly higher. Full access for both is almost never preferred; though, it may be preferable if herders are very risk averse. Exclusive access by each group to their own core is more often preferred where spatial variation is relatively low. Secondly, fuzzy access rights are generally preferred where each group has very strong rights to their core resources, and others' have mid-level rights to their own resources, and vice versa. If the other group's

If the variance of herder income is a policy concern, governments may wish to favor an access regime that does not necessarily have the highest expected value. Under some conditions, the traditional fuzzy access results in higher total returns than for conventional common access.

access rights are too strong, then overall returns will be lower and returns will be more variable since the other group now accesses your core pasture with relatively high frequency. If access rights to others' pastures are very weak, however, the risk-reducing role of flexible rights may not be great enough to compensate for when returns are lower when other's use your core area.

These results give to concrete guidelines for policymakers when considering regulatory frameworks for tenure in pastoral areas. Facilitating the movement towards more well-defined boundaries will yield benefits where the spatial distribution of rainfall across the relevant range of mobility is fairly homogeneous (as might be the case where pastoralists no longer engage in long distance mobility), or in cases where access rights are either extremely unequal or perfectly symmetric (e.g. an open access situation). Even in the latter cases, an alternative option may be to promote the concept of "primary" managers and establishing core grazing areas.

HERD MOBILITY IN NORTHERN KENYA

We used the insights from the fuzzy model to determine observed patterns of herd mobility in Northern Kenya, using data collected by the Utah State-led BASIS CRSP. We hypothesized that herd mobility would be higher when rainfall realizations are more favorable across the relevant region within which herds migrate, and that mobility will be greater when there is greater spatial and seasonal variability across the region. However, given the dataset, it was not possible to evaluate the different "strengths" of access rights in the study region.

To undertake the analysis, we used data collected on household-level herd mobility in six different regions of northern Kenya during the drought year of 1991-1992 and the "normal" rainfall year of 1999-2000. Herds are separated into two types, those that engage in long-distance and short-distance mobility. To proxy rainfall and its distribution, we used information on normalized difference vegetation indices (NDVI's). We constructed measures of average NDVI, as well as measures of spatial and seasonal variation in NDVI. Whereas average NDVI's are indeed higher in the non-drought year for all communities, interestingly, there is no simple relationship between spatial and seasonal variation and drought vs. non-drought conditions. Results indicate that mobility is indeed greater in the normal vs. drought year. This has implications for the management of mobility since most external observers tend to focus exclusively on mobility during drought years. Additionally, longer-distance mobility is greater precisely in those areas where NDVI indicates greater spatial variability -- irrespective of whether the year was a relatively "good" or "bad" year.

Policies that aim at either increasing tenure security or directly improving resource management need to consider the trade-offs between flexible access and the hoped-for improvements in pasture management. As other researchers have noted, there is little evidence of "overgrazing" across the region as a whole, but rather such problems arise specifically in settlement areas where short-distance herds tend to graze. Our evidence also suggests that mobility of these herds is limited particularly drought years. Policies to improve tenure security and resource management should first focus on settled areas. Perhaps more interesting in the short term, evidence suggests a potentially valuable use of satellite image information to help target areas where mobility is limited by the distribution of rainfall, e.g. those areas receiving not only generally low rainfall but also where the distribution of that rainfall is spatially homogeneous

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Can Pastoral Institutions Perform Without Access Options?

Tidiane Ngaido

BACKGROUND

The development of access options is driven by local-resource scarcity in pastoral communities in dryland areas. Access options—to land, animal, and water resources—are risk-sharing devices that buffer against socioeconomic, demographic, environmental, and political pressures. Because local grazing resources suffice for only three or four months of a year, pastoral communities developed free grazing strategies, mainly obtained through reciprocal institutional arrangements. However, increasing appropriation and encroachments on tribal lands are threatening the capacity of local institutions to provide secure production strategies for members, enforce resource management rules and win the support of members.

When tribal leaders and institutions have the capacity to arrange access to extra resources, redistribute land, and ensure the welfare of all community members, their roles are strengthened. When the system breaks down, encroachment or distribution of marginal areas is the only alternative response to land demands. Loss of control over common lands leads to the loss of institutional access-options based on reciprocity, weakens traditional resource management systems, and fosters increased disputes. But regardless of the degree of community control over resources, institutional inefficiencies occur in any system of common-property. Factors leading to such inefficiencies can be evaluated by drawing comparisons between experiences in dryland areas of Niger and Morocco, where integrated crop-livestock is the dominant production system, common property is the land-tenure system, and where governments have opted to empower pastoral communities to manage their common pastoral resources.

THE IMPACT OF LAND POLICIES ON LOCAL INSTITUTIONS

In Morocco, tribal and common-property rights have been recognized since 1912, and the government has strengthened tribal institutions and given them control of resources. However, the neglect of access options between tribes and tribes' redistribution of land to community members has led to loss of common pasture and the loss of institutional access options based on reciprocity. New forms of access options based on market relations have emerged, especially in cropping areas. Herders are increasingly settling in pastoral lands and reverting to agricultural production as their main source of income.

Herders have also settled in pastoral land in Niger, where the land-tenure situation was quite different. In the 1960s, the government undertook the regulation of access to and use of pastoral resources. Its policies induced open access and land encroachment because local agricultural authorities hold the bundles of rights over pastures, while pastoral authorities are beset with bundles of obligations to be enforced. The lack of capacity of local pastoral institutions to ensure the livelihood strategies of their tribal members has also pushed many cattle owners to develop their own networks for accessing grazing areas or cultivable lands.

In Niger and Morocco, pastoral authorities are increasingly losing control over their communities. Individual community members have favored individual over collective welfare, boundaries between pasture and cultivated lands have hardened, use and access rights are being transformed into more secured tenure, grazing rights are being transformed into cropping rights, and more disputes over common resources are occurring. In both countries, the drive for individual appropriation of common resources highlights the loss of capacity of local institutions to govern resource use.

There are two institutional-reform pathways for the development of pastoral systems: privatization and common property. The role of the state is crucial in both cases.

ALTERNATIVES FOR MANAGING PASTORAL RESOURCES

Among alternatives considered or implemented to stimulate better resource management are tribal pastoral cooperatives in Morocco and the redefinition of pastoral rights in Niger. However, projects in eastern Morocco that use tribal affiliations as the base of membership in pastoral cooperatives and involve communities in decision-making and constrained by the heterogeneity of local institutions and the continued neglect of traditional access options. In Niger, attempts to redefine pastoral rights and counter the shortcomings of the country's rural code confront the complexity of the country's tenure issues, as well as the fact that ethnicity plays an important part in the way people perceive resources and ownership.

A third alternative is the development of market-based access options, to replace reciprocal access and sustain livestock production. The experiences of Morocco and Niger differ considerably in this regard. In Morocco, herders and livestock owners are making their own access-option arrangements with farmers or community leaders, as supplementation is important.

Frequent drought, the high cost of shepherding, and the shift to individually cultivated lands from collective pastures have contributed to the development of fattening activities and sedentary livestock production systems. In Niger, the major transformation is in access to crop residues: farmers pay herders to graze livestock on their fields because manure improves soil fertility. Tenancy contracts in Niger also highlight the increasing participation of herding communities in agricultural production.

PATHWAYS TO INSTITUTIONAL REFORM

There are two institutional-reform pathways for the development of pastoral systems: privatization and common property. The role of the state is crucial in both cases.

In Morocco, the opportunistic behavior of community members and breakdown of traditional access options amongst some pastoral communities suggest that privatization might be more desirable. This would be also the best way to promote the improvement of pastoral resources, though many equity issues need to be taken into consideration. Further, in the short term, land-grabbing may also lead to increased degradation.

In Niger, recognizing and granting ownership rights to pastoral communities (similar to those granted in Morocco) might be desirable. Priority-of-use rights will not permit rural communities to effectively manage their pastoral resources, and conflicts between herders and farmers are likely to increase. To reduce land appropriation, pastoral communities need to be granted a stronger role in the management of their resources; farming communities should be granted only a policing role. If grazing areas remain under the control of farming communities, farmers and community leaders will have many incentives for transforming these lands into croplands.

There is no going back. Many traditional pastoral institutions have lost their effectiveness. Pastoral communities have developed various strategies to cope with socioeconomic, environmental, and political pressures. States should promote flexible frameworks that provide more options to community members, since it is unlikely that traditional access-options based on reciprocity can be recreated and made functional solely through legal frameworks. Moreover, given the individualization of production strategies, the central government's role may be to promote institutions that are likely to be accepted by pastoral communities and enable better interaction among communities, members, and users.

In Morocco and Niger, the central government should promote the development of market relations between communities and users. Market relations already dominate pastoral transactions, and are important for the improvement of pastoral resources. Reciprocity may not be the proper mechanism for pasture improvement: only one party pays for the costs while the other reaps full benefits. Market-based access-options, which require users to share the cost of improving or maintaining the resource base, remains the best way to secure access and promote sustainable resource development.

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Managing Resources in Erratic Environments:

An Analysis of Pastoral Systems in Burkina Faso, Niger and Ethiopia

Nancy McCarthy, Céline Dutilly-Diané, Boureima Drabo, Abdul B. Kamara, and Jean-Paul Vanderlinden

BACKGROUND

In the semi-arid regions of Burkina Faso, Niger and Ethiopia, livestock is the predominant production activity, though cropping can also be important particularly in Niger and Ethiopia. The ability to move livestock to different pastures is a key strategy for mitigating exposure to erratic rainfall, and the reliance on access to a wide range of pasture resources has long been essential to the viability and sustainability of such systems. Various types of common tenure regimes facilitate the herd mobility.

Nonetheless, while the flexibility inherent in such common tenure systems enables herders to cope with different rainfall patterns and thus limits their exposure to this risk, one potential cost to such systems may be in terms of the use and management of the natural resource base. As is well known, common resources may be subject to externalities; and these externalities open up the possibility that resources will not be well-managed. Thus, there may be a trade-off in terms of flexible access to mitigate risk and the use and management of common-pool pastures.

METHOD

We looked at three community-level outcomes that can be affected by both climate variability and by externalities generated when managing the commons is costly. With respect to climate variability, we expect that stock densities on home pastures will be lower, herd mobility will be higher and lands allocated to private crop activities will be lower (and thus the size of home pastures will be greater). With respect to cooperative capacity, we expect that stock densities will be lower, herd mobility lower, and that more lands will be allocated to private crop activities.

RESULTS

Empirical results indicate that there are some general lessons to be drawn. First, greater cooperative capacity does indeed lead to lower stock densities and greater mobility. Cooperative capacity has a more limited impact on land allocated to private uses vs. common pastures; though its impact is particularly strong in Burkina Faso. Also interesting to note is the fact that the capacity of communities to manage pastures and allocate land to its best use varies greatly both within and among countries. Factors that are generally associated with greater cooperative capacity include relatively small community size, more equal distribution of wealth, and fewer adults migrating for wage work, all of which should reduce negotiation and enforcement costs of undertaking collective action. Other factors affecting cooperation differ across countries. For instance, external pressure to use community resources appears to have a much greater impact on cooperation in Ethiopia and Burkina Faso than in Niger. Higher productivity rangelands and higher effective livestock prices are associated with greater cooperative capacity in Ethiopia, but have no impact in Burkina Faso. This evidence suggests that more favorable livestock market conditions either increases cooperative capacity or has no impact; in either case, there is no evidence to suggest that better market conditions erodes this capacity.

Second, there is little evidence to suggest that livestock owners accumulate larger herds to mitigate vulnerability to rainfall shocks in the high variability environments. Our results instead suggest that herd sizes do increase with rainfall variability at relatively low variability, but decrease precisely in the higher variability environments. In other words, we would expect that policies and programs that directly "insure" livestock owners – through feed subsidies in response to drought, for instance – would likely lead to larger herds precisely in the environments subject to the greatest variability. We must emphasize that our results are consistent with this latter hypothesis, but, given the one-period nature of the survey, we did not test this hypothesis directly. This is still a contentious issue, since a wide range of researchers, policymakers, and indeed, herders themselves, believe that holding onto more livestock is a strategy to mitigate the impact of climate shocks, such as drought.

Pastoral land tenures and drought mitigation policies will need to take into account the continued reliance on herd-mobility even by those not considered to be "traditionally" pastoralists.

POLICY IMPLICATIONS

Results presented here imply that policymakers designing crises mitigation strategies – as are many governments that are signatories to the UN Convention to Combat Desertification – must carefully consider insurance and crises mitigation mechanisms that do not lead to dramatic

increases in the national herd. Not only do policymakers need to consider the impact of such programs on herd size, but also on herd mobility. Mobility remains an important part of these systems; and our results indicate that current rainfall patterns – and thus locally available feed resources – heavily influence the extent of herd mobility. Given the rather complicated patterns of herd mobility into and out of community areas in Ethiopia, we were not able to gather good enough data to include this variable in the statistical analyses. Still, more than 84% of the communities relied on mobility for at least part of the previous year, and in the 12 communities where data was quite good, herds were mobile for nearly 40% of the year. The number of communities where at least some members engaged in herd mobility is lower in Niger and Burkina Faso, but mobility is still practiced in more than 40% in both countries. And, as noted above, better cooperative capacity within communities supports greater herd mobility. Nonetheless, herders' rights to access traditional grazing areas are generally eroding everywhere. Results indicate that communities with more traditional pastoralists do tend to rely more heavily on herd mobility, but the impact is weak and not robust across specifications. Thus, pastoral land tenure and drought mitigation policies will need to take into account the continued reliance on herd mobility – even by those not considered to be "traditionally" pastoralist.

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Institutional Options for Managing Rangelands

Tiadiane Ngaido and Nancy McCarthy

Garret Hardin's "tragedy of the commons" theory uses the example of rangelands to argue that when many people have access rights to the same resource, there is a potential for each individual to overuse and underinvest in the resource. This theory has prompted a debate over the effectiveness of common property resource management, especially for rangelands.

In reality, rangelands have been subject not just to the open access situation described by Hardin, but to a wide range of tenure arrangements, with different structures for regulating access to, use of, and management of rangelands. These include many customary and tribal institutional arrangements that have functioned for long periods. Each of these property rights regimes and institutional options is associated with different costs for achieving various goals, such as poverty reduction, equitable access to resources, and sustainable use and management of those resources. This brief considers the benefits and costs of alternative tenure and institutional arrangements and the impact of existing legal and policy frameworks on the sustainability and equity of pastoral production systems under three categories of landownership: (1) state ownership; (2) individual ownership; and (3) common property.

STATE OWNERSHIP

Proponents of state involvement maintain that only an external authority can enforce the best use of, and investment in, common pool natural resources. They argue that the state has greater financial resources with which to make large-scale investments and can bear the risk associated with such investments better than community members can. Defining the "best" use rates and investments, however, requires a good deal of information on local conditions. In most cases government agencies responsible for state rangelands have only limited knowledge of agroecological conditions, and even less understanding of local rules of use and management. These information problems increase the costs of enforcing management decisions by government agents. Furthermore, in the arid and semi-arid regions, flexibility and mobility are valuable strategies for managing spatial and temporal variation in climate.

Centralized government decisionmaking and enforcement structures are likely to severely reduce this flexibility. Finally, collective action is likely to be lower under state tenure because pastoralists may fear that claims on returns to investments they make now on state land will not be recognized in the future. Nonetheless, a number of different institutional arrangements have been introduced to manage some of these costs, including the granting of common use rights to communities or cooperatives, grazing licenses, and leaseholds.

COMMON USE RIGHTS FOR PASTORAL COMMUNITIES

Some governments provide tacit recognition of pastoral communities' use rights and their potential for informally operating grazing networks. This tacit recognition, however, gives pastoralists only a limited role in management and investment decisions and an even smaller role in deciding on the evolution of property rights. Often users do not have the right to reallocate common land to alternative activities like cropping or reserves, a situation that limits the capacity of pastoralists to respond to local conditions. By appropriating pastoral resources and limiting the role of local-level pastoral institutions, state ownership has often fostered land use conflicts and the breakdown of collective action within and across pastoral groups. In particular, where the state claimed ownership but expended limited resources to manage rangelands or relied on bureaucrats to implement management schemes without knowledge of local resources and institutions, many land use conflicts have arisen and resources have become degraded.

Each of these property rights regimes and institutional options is associated with different costs for achieving the goals of equity, sustainability and poverty reduction.

COMMON USE RIGHTS FOR PASTORAL ORGANIZATIONS

Numerous projects have attempted to reorganize pastoralists into cooperatives with the aim of improving rangeland resources and promoting collective action, but the cooperatives have rarely been effective managers of rangelands. In theory, the state and the local organizations could work together to create and enforce use rules and investment activities, but in practice the costs of negotiating such rules have often been prohibitive. In most West Asian countries pastoral cooperatives have mainly been involved in distributing subsidized feeds. In Jordan, however, the new herder-driven cooperatives, which have management rights granted by the state on their traditional pastures, are getting better range productivity results than state-managed reserves, without requiring expensive fencing and guarding. This type of cooperative fosters collective action between members because members are certain to reap the benefits of their investments and control access to improved pastures. There remain, however, concerns about potential conflicts between cooperative members and nonmembers. In the Sahel, most of the pastures exclusively used by members of pastoral organizations reverted to common pastures open to all community members at the end of the projects.

GRAZING LICENSES

As part of a strategy designed primarily to reverse rangeland degradation, government-managed grazing reserves grant grazing licenses. In the best-case scenario, the government has a welldefined and well-funded investment strategy. Grazing reserves are then opened for grazing during specific periods of the year, and any herder can buy a license, whether or not he or she is a member of the tribe or community that held traditional claim to the reserve area. Pastoral communities contribute little to the management of these reserves, and the main collective action of community members has often been to hinder state licensing policies. In Jordan and Syria, this situation has often led to conflicts between local and nonlocal herd owners.The approach has also been widely criticized because of the high costs of fencing and guarding reserves and the lack of community participation in improving and managing these reserves.

INDIVIDUAL LEASEHOLDS

The practice of granting long-term individual leaseholds on range resources remains limited. In Botswana, leaseholds have in some cases led to increased livestock production and improved rangeland conditions, but the policy has been strongly criticized on equity grounds. In many cases, people with previous claims to resources have been dispossessed or denied further access without compensation.This situation has led to additional pressures on the now smaller common pool resource base, increasing range degradation and leading to conflicts between large and small herd owners.Widespread individual leaseholds increase the vulnerability of pastoral communities during droughts by limiting their capacity to move and negotiate access to neighboring pastures.There is very little collective action under this system.

In summary, state ownership often does not promote community stewardship and thus limits collective action and incentives for members to manage their resources effectively and make long-term investments. Competing claims between pastoral communities and states has created situations of confusion and open access, leading many pastoralists to challenge both state and traditional range management rules and activities and in some cases to illegally appropriate common rangelands.

INDIVIDUAL OWNERSHIP

In pastoral areas of central Tunisia, individual private property rights fostered the transformation of pastoral and nomadic systems into agropastoralist systems. Privatization led to the wide-scale adoption of fodder crop production, including cacti and shrubs.The efficiency of this option, however, depends on the performance of land, purchased input, credit and output markets, and legal and institutional provisions to reduce land fragmentation. Obviously, there is potential for misappropriation of land by the politically powerful, and equity issues are thus of utmost concern. Also, such a system is likely to reduce herd size, mobility, and collective action within and between pastoral groups, and consequently pastoralist households may become more vulnerable to drought.

COMMON PROPERTY

Common property rights for communities make tenure more secure, but the communities must bear all costs of making, monitoring, and enforcing rules regarding rangeland management. Managing access to and use of resources can be difficult, particularly when benefits and costs are not equally distributed among community members. Common property rights are generally granted to a fixed and well-defined group for rangelands with well defined boundaries, thereby limiting flexibility and herd mobility. Nonetheless, under community ownership, local institutions may keep their traditional roles of managing the resources, deciding how to allocate resources between pastures and croplands, and deciding on the nature of the rights to be allocated to members and nonmembers. These opportunities may empower local institutions and provide them with the capacity to mobilize collection action and sustain the livelihoods of their communities.

Because landowning communities may have difficulties mobilizing financial resources and technical expertise, they may enter contractual arrangements for improving their resources. Under such contracts, as in central Tunisia and Morocco, state institutions, generally forest services, are entrusted with the responsibility for improving and managing the resource. After the improvement of the resource, rights holders purchase grazing or cutting licenses, and the revenues generated from the licenses are used to pay off improvement costs. Theoretically, these ranges will revert to communities once improvement costs are recuperated; in practice, however, such transfers have often not taken place.

CONCLUSIONS

Achieving efficient, equitable, and sustainable rangeland management depends on the costs and benefits of alternative systems. These costs and benefits, in turn, depend on agroecological, sociocultural, and economic characteristics.The conservation and management of rangelands require not only tenure security, but also an understanding of local livestock production and risk management strategies and factors that promote collective action, which can then be integrated into national policy formulation strategies and project designs.

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Property Rights, Risk and Livestock Development in Africa: Niger Case Study

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INTRODUCTION AND PURPOSE

This brief describes preliminary results of an attempt to model the linkages between property rights, risk, and livestock development in Niger. The research contributes to the rangeland and mobility debate, and is intended to offer a clearer understanding of how environmental variability and the use of land for agricultural and pastoral activities affect land tenure in Niger. This is important because the Niger government has been implementing a new rural code that should redefine access, use, and natural resources in the country.

BACKGROUND: TRADITIONAL LAND TENURE IS CHANGING

Land tenure in Niger is under stress. Traditional tenure arrangements are facing challenges posed by population increase, unfavorable changes in climate, and the changing political environment, and the system seems to be shifting from one geared toward an equilibrium between pastoral and agricultural activities to one geared toward agricultural activities. This is mainly attributed to increasing arable-land scarcity, combined with a growing importance of agriculturalists in the local political sphere. Successive land tenure reforms have led to confusion and generated tension and conflicts. De facto, village and canton chiefs remain the principal authorities regarding land-allocation decisions, customary tenure arrangements prevail, use-right holders have secure tenure, and tenants always face the risk of losing their fields.

Until independence, rangeland consisted of uncultivated areas under the control of village and canton chiefs. Afterward, lands that had never been cultivated were nationalized, and those that were fallow were considered as common village land. Rangeland is presently under the control of groups with a strong agricultural tradition. Property or use rights are defined seasonally: any uncultivated land can be used as pasture land during the rainy season, and all fields are open for grazing on residues during the dry season.

Development policies have also affected land use and land allocation to rangeland. The terroir approach to land-use planning, linked with sedentary agriculture, may risk contributing to further transformation of land-tenure arrangements traditionally adapted to mobility. Though the relative importance of livestock has been growing steadily since the 1980s, livestock development in Niger faces a series of challenges, including the gradual colonization of pastures by agricultural activities, and transfer of ownership from pastoralist groups to groups not historically practicing pastoral activities, including absentee owners.

GATHERING DATA AND ITS PURPOSE

Though secondary sources enable a general understanding of how property rights, risk, and livestock development interact in Niger, recent, detailed information is missing. To determine whether village rangeland in western Niger is managed and to quantify the determinants of rainy season mobility, a stratified sample of 40 villages on the edge of the continental shield were selected, based on their average annual rainfall and rainfall variability. In each village, interviews were conducted with chiefs and their advisors. Community members engaged in participatory mapping, locating fields, pastures, water, and areas of particular geographical interest, as well as identifying their use and management.

The next step was a field survey, followed by precise determinations of village land boundaries and assessments of its grazing resources. For each geographical unit, the following was geo-referenced and visually estimated: proportion of fallow, bush, cultivated, and barren land; millet density on cultivated fields; three dominant species in the herbaceous layer and in the tree layer; and level of grazing on the pastures. Socioeconomic data was gathered from group interviews, and a livestock-price survey was conducted in 10 markets.

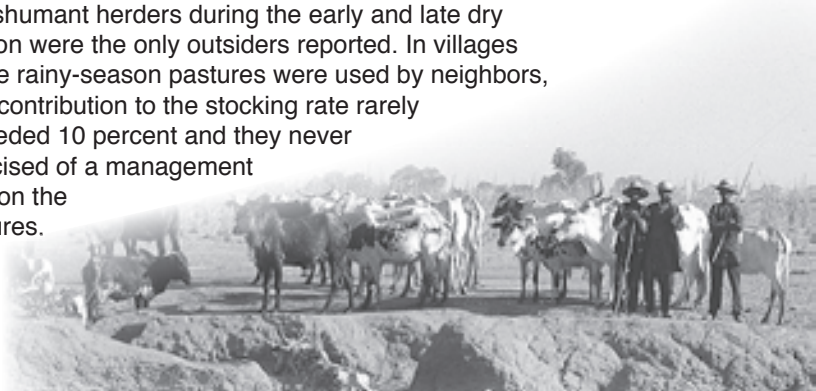
Data gathered provides a basis for modeling decisionmaking regarding range management during the rainy season. Among the purposes that the model will serve are the following:

- analyzing how and whether village rangelands are managed
- quantifying the relative importance of different rationales for mobility
- determining other factors in land-use decisions.

DATA ON RANGELAND MANAGEMENT, EQUATION, AND HYPOTHESES

In all communities, access to pastures was considered open, but some access was reduced through enclosure of pastures and watering points. In 25 villages, informants reported that pastures were not used by neighbors. Transhumant herders during the early and late dry season were the only outsiders reported. In villages where rainy-season pastures were used by neighbors, their contribution to the stocking rate rarely exceeded 10 percent and they never exercised of a management right on the pastures.

In Niger property or use rights are defined seasonally. Any uncultivated land can be used as pasture land during the rainy season, and all fields are open for grazing on residues during the dry season.



Partial or total exclusion manifests cooperative behavior to manage the village rangeland, and is reflected in the outsiders' contribution to the stocking rate. Pastoral action-space thus consists of several subspatial units, defined by the rationale for their use and tenurial status. The subunits can touch each other, allowing a passage from one to the other, or can be connected by transhumance corridors.

The actual stocking rate, expressed as tropical livestock units per hectare, is affected by the range quality, scored from 1 to 5 and influenced by the proportion of land in a geographical unit available for pasture. Other factors in the equation are the average rainfall, standard deviation of rainfall, the relative price of livestock to millet, and the number of community members engaged in livestock raising, as well as the level of livestock mobility—involving the tropical livestock equivalent of animals seasonally absent from village land. The computation also entails a cooperation index, the distance to the nearest regional livestock market, and the wealth of the community, proxied by the total millet production as a proxy of land quality.

Estimating the equation should allow the testing of the following hypotheses:
1. Changes that increase livestock profitability (increased prices, better market integration, better range quality) increase the stocking rate.
2. Increases in rainfall variability leads to decreases in stocking rates. For a given level of cooperation, a negative coefficient on this term implies that that rangelands in higher rainfall variability areas face a smaller risk of being overstocked.
3. Increases in the level of cooperation lead to decreases in the stocking rate. This demonstrates that management of the range, while difficult to measure quantitatively, is important.

However, to avoid an endogeneity problem, this equation must be estimated simultaneously with a mobility equation.

DATA ON MOBILITY, EQUATION, AND HYPOTHESES

In 25 villages, part of their livestock was away during part of the rainy season . Daily movements to pastures shared with other nearby villages were justified by the need to have the animals graze where they do not interfere with agricultural production. Movements of less than one month to pasture areas less than 50 kilometers away generally occurred toward the end of the dry season. Four-month transhumance movements during the rainy season were destined for pastures in northern Niger and, more recently, southern Benin, where, informants suggested, pasture quality is inferior but pasture quantity and livestock safety are better.

Reasons for being mobile included avoiding destruction of crops (giving priority to agriculture), benefiting from earlier onset of rain when rains are late in their own villages (risk management), and benefiting from better pastures (rent capture). In communities where no livestock movement outside of village land was reported, two rationales were given: grazing resources on village land were sufficient, or the expected cost of movement was too high to justify movement.

Quantifying the relative importance of these different rationales contributes to a better understanding of mobility and its importance in the face of environmental variability. Analysts should keep in mind the characteristics of each justification for mobility when modeling property rights, environmental variability, and livestock development.

A purely preliminary reduced-form model is proposed in an equation that factors in range quality, the stocking rate, a cooperation index, and the cost of mobility. This entails the sum of the labor cost of tending the animals while away, and, where relevant, the addition of expected livestock losses. Use of the equation should allow the testing of the following hypotheses:
1. As environmental variability increases, mobility increases.
2. As the stocking rate increases locally, mobility increases.
3. As range quality increases locally, livestock mobility de creases.

OTHER FACTORS THAT DRIVE DECISIONS

Subsumed in most of the literature on the colonization of pastoral land for agriculture is the assumption that the two major (if not only) driving forces are population densities and rainfall diminution. However, in their land use decisions, agropastoralists are likely to take into account other pastoral activities and exogenous factors, such as prices for livestock products or wages from external sources of employment.

Supplementary insight may be gained by analyzing dry-season behavior, when water is the driving force behind decisions on livestock management. This would nevertheless pose a series of problems: very little can be known of the contribution of dry-season transhumant stock to the stocking rate or of such features of the institutional environment as interstate conventions on transhumance.

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Cooperation, Collective Action and Natural Resource Management in Burkina Faso: A Methodological Note

Nancy McCarthy, Céline Dutilly-Diané and Boureima Drabo

INTRODUCTION

While there has been much discussion of the factors affecting the success of collective action, little has been done to consider the practical application of these concepts in empirical settings. One difficulty is in defining certain terms such as "social capital" and in determining what observable indicators actually measure it. Even when there is agreement on certain concepts and their measurement, their impact on cooperation is often disputed. The wide range of variables over which there is disagreement about the impact on cooperation includes size of the group, profitability, isolation, and level of social cohesion.

This paper considers a study of 48 villages located in northeastern Burkina Faso and details how we conceptualized, measured, and applied different measures of cooperative capacity, how these measures relate to explanatory factors hypothesized to affect cooperation, and finally, the impact of these indicators on a variety of outcomes observed at both the community and household level.

The Situation in Northeastern Burkina Faso Burkina Faso is an agropastoral Sahelian country, where livestock production has always been an important component of agricultural activity, but crop activities are important as well. In the study region, livestock production is based on extensive and semi-extensive systems where access to common grazing lands and transhumance is heavily relied upon to provide forage resources. In such systems, there is wide scope for collective action and cooperation to influence land use and allocation patterns, resource management, investments and maintenance of community resources, and household income and wellbeing. We hypothesize that the success of collective action will be a function of individuals' incentives to contribute to maintenance and abide by rules and regulations, the capacity of the community as a whole to cooperate and to manage these incentives, and the overall policy environment in which these institutions must operate.

THEORETICAL OVERVIEW

For the purpose of this study, we define collective action as internalizing negative externalities and/or generating positive externalities in the use and management of natural resources. Externalities occur whenever one person's decisions affect outcomes for another. The traditional example is that of livestock on common pasture; the number of livestock one person puts on the pasture affects his/her own production and also affects livestock production of all others sharing the commons, and may potentially affect future forage condition as well. In this case, use of the common pasture generates a negative externality. An example of a positive externality is given by soil erosion control measures, which improve soil productivity in the specific area in which such measures are employed but also generate positive spillover benefits via improved erosion control over a much wider area

The capacity of a community to cooperate is its underlying ability to create formal and informal frameworks to achieve goals of collective action. Certain variables affect both the capacity to cooperate in general as well as the incentives to undertake any particular action; one of the goals of the research was to isolate factors affecting cooperation more generally, and specific activities in particular.

Cooperative capacity may not be a unique underlying factor, but rather capacity may itself have different components

The major focus, then, was to recover the underlying capacity to cooperate at the community level, which is not directly observable and is rather a latent variable. For this purpose, we use a factor analysis of variables thought to be associated with cooperative capacity to recover our main latent variable. Indicators of collective action include the density of organizations and density of household participation, the total number of rules, regulations, activities, and average participation by members in activities and at meetings. Determinants of cooperative capacity are those variables hypothesized to directly affect the capacity of a community to make and enforce collective action decisions.

SURVEY INSTRUMENTS AND DATA COLLECTION

This study is based on a survey administered in 48 communities, 209 NRM-specific institutions and organizations, and 450 households, located in four administrative regions of Séno and Oudalan during the end of rainy season of the year 2000. Given that we were working with a specific project (the Programme Sahelian Burkinabe supported by German Technical Cooperation), communities were stratified into four categories on the basis of the length of participation in various programs. Household-level information was gathered from the head of household with the primary aim of capturing individual incentives to access and use community-level resources and households' participation in collective action. Data were also collected on the institutions and more formal organizations that dealt with NRM, including measures of the decision-making, monitoring and

enforcement mechanisms, rules and activities undertaken, and participation by members in meetings and activities. Extensive information was collected on the community as a whole, including basic demographic information, structure and mobility of all livestock herds in the community, infrastructure, and detailed information on land allocation and resource mapping using aerial photographs as a base. Finally, data were collected at six markets identified as being important for livestock transactions for surveyed communities.

RESULTS AND DISCUSSION

A review of previous research shows that there is still a great deal of debate over the factors that determine successful collective action. Equally important is the debate over what observable characteristics actually comprise social capital, cooperative capacity, or indeed cooperation. In our case, we used aggregated information on all organizations in the community (e.g. total number of NRM-related organizations; number of members, on average; total number of rules in operation, etc.) and performed a factor analysis on these variables at the community-level in order to recover a latent measure of cooperative capacity, which is not directly observable. We chose this analysis specifically because the wider literature indicates that looking at one or two aspects of only one organization rarely seems to adequately capture cooperative capacity; even within a community, some organizations may function better than others, some may have more members or meetings or undertake more activities, etc. Our measure, relying on different summary statistics of all organizations, is intended to capture overall capacity.

Results indicate that there are two different factors that capture cooperative capacity; the first being network capacity (weighted mainly by network and membership density variables) and the second being implementation, or "agency", capacity (weighted mainly by rules, activities, participation rates). Thus, the analysis indicates that cooperative capacity is not be a unique underlying factor, but rather capacity may itself have different components. Individuals may access networks and sustain membership in organizations primarily for private benefit in terms of increased production, improved marketing, or insurance. Individuals may also participate in organizations to undertake collective action and generate gains that accrue to the group as a whole, via the provision of public goods or mitigation of negative externalities. What is good for the individual may not benefit the group; characteristics previously associated with "social capital", e.g. networks, may improve household welfare but may not improve the capacity of a community to engage in collective action.

This interpretation fits well with the results from analyses of the impact of cooperative capacity on land use and allocation patterns observed at the community level, investment in public goods provision in NRM (soil erosion control measures such as constructing stone bunds and reforestation), and also in terms of individual income patterns. Implementation capacity behaves more in accord with the literature on determinants of successful collective action: higher implementation capacity leads to lower stock densities, greater herd mobility and less encroachment of private cropping; it leads to greater likelihood of undertaking soil erosion control activities and it leads to greater household incomes coming from livestock production and to higher total incomes. Network capacity, on the other hand, has no impact on land use and allocation, though it does increase the likelihood of undertaking some soil erosion control and, rather interestingly, increases the efficiency with which these public goods are provided. Finally, network capacity is associated with higher household incomes coming from crop farming, but has no impact on total incomes.

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The Dynamics of Land Use and Property Rights in Semi-Arid East Africa

Brent Swallow and Abdul B. Kamara

BACKGROUND

In the large transition zone between wetter semi-arid and arid areas of Africa, land use can evolve toward integrated crop-livestock systems or remain under mobile livestock production. Similarly, property rights can tend toward increased privatization, remain as common or state-owned property, or slide toward open access. Dynamic processes shaping property rights and land use in the transition zone in East Africa have been identified in studies of the Orma pastoralists of northeastern Kenya; of Maasai pastoralists of south-central Kenya; of the Gabbra and Ngisonyoka Turkana in northern Kenya; in the environs of Nyala township in Sudan's South Darfur Province; in the central rangelands of Somalia around El-Buur town, and in the Butana area to the east of Khartoum in Sudan. Very different processes of change have unfolded in those different settings, from virtual open access in the Butana area, to stronger local common property in the Orma area, and individualization in Maasailand. Building on these studies and existing theories of property-rights and land-use change, this paper offers a new conceptual model for semi-arid East Africa. It focuses on processes of individualization among the Borana, a semi-nomadic ethnic group that resides in the southern rangelands of Ethiopia.

CATALYSTS OF CHANGE

Internal population growth is a ubiquitous catalyst of change, along with changes in environmental conditions. Conflict over pastureland tends to occur more frequently during drought years. Precipitation, policies, and prices affect people's demands for new property arrangements. There are also very important supply side factors. These include changing prices, plural legal and social institutions, local interest group pressures, pressures from international development agencies and nongovernmental organizations, as well as producer incentives and the general costs of providing services that support a new property arrangement. Experience shows that central governments can impose policies that destroy a functional common property regime, or it can assume the rule-enforcement function from a customary authority that has lost its enforcing ability.

INCENTIVES FOR CHANGE AND THE ROLE OF INTEREST GROUPS

The demand for changes in property rights is a function of a number of incentives: for changing land use, for making fixed investments in land or water, for moving livestock herds around the landscape, for adhering to or deviating from the dictates of existing property rights, and for using a resource at different intensities. Each incentive often depends on factors that may apply to an entire community or locality (such as climate), as well as factors general to community subgroups (such as technology, market conditions, values, and objectives). Other factors that may be specific to subgroups or individual members of the community include level of asset holdings and the costs to individuals or groups of seeking the change in property rights.

Many changes for property rights and land use can be accommodated within existing social and legal institutions and Africa's customary systems. However, some demands may not be accommodated—particularly demands regarding mobility of livestock and exchange of property rights. Individuals may then try to cause direct change in social and legal institutions by openly defying the institutions, appealing to local rulemakers or rule-enforcers, or forming coalitions with others. Individuals will likely appeal to those institutions and organizations (at local, regional or national levels) that are accessible to them and which will respond favorably to their demands for change. This is referred to as forum shopping. Accessibility to transportation and communication infrastructure will determine the extent of forum shopping.

Interaction of interest groups and organizations may result in greater cooperation and mutually beneficial alternatives, in simple bargaining situations (in which rules are well defined and bargaining power is well balanced), or full-fledged conflict (when groups have fundamentally different interests). Important interactions also occur among interest groups, rulemakers, and rule enforcers. The outcome depends on the bargaining powers of the different groups and the interests and incentives of the rulemakers and rule enforcers.

DRIVING FORCES OF INSTITUTIONAL CHANGE

The new model focuses on the determination of property rights and land use at the community level. It includes development assistance agencies and nongovernmental organizations because they often drive or indirectly affect

The main driving forces behind institutional change in semi-arid East Africa are changes in population density, population structure, climate, market conditions, and available technologies.

property-rights change in Africa. However, the main driving forces behind institutional change are changes in population, density, population structure, climatic conditions, market conditions, and available technologies. These affect the incentives individuals have to

- change land use from mobile livestock production to extensive cultivation
- invest in assets fixed to a particular plot of land
- exchange rights to land
- keep animals
- adhere to rules regulating resource use
- join organizations and interest groups to demand institutional change.

CHANGE IN THE BORANA PLATEAU

The model was used to analyze changes in land use and property rights in southern Ethiopia's Borana plateau, where the pastoral system is changing rapidly. The dominant land use in the region is livestock production, and most grazing resources are owned communally and administered by traditional elders. The private regime is predominantly observed where communal rangeland has been converted to cultivation or private enclosures. Privatization is also associated with investments such as fencing and bush-clearing.

In the Borana, range privatization is evident in several land use changes. For instance, the communal-grazing system, present in 85 percent of communities investigated, accounts for about 50 percent of their land area. Also communal calf-enclosures have greatly increased in recent years. The increasing privatization of rangelands can be attributed to a variety of factors:

- Gradual increases in population density and market access have increased local demand for subsistence food crops and commercial incentives for livestock production.
- In the 1970s, the national government instituted policies that encouraged crop cultivation and privatization of land rights, including the creation of local administrative units called peasant associations. These associations, or Kabeles, have the power to grant cultivation rights to individual farmers, and devolved power from customary authorities, who had been resisting cultivation and private appropriation of land.
- The enforcement of a national ban on bush fires resulted in increased bush encroachment, a reduction in the availability of good pasture land, and demand for greater private rights, as individuals are willing to clear bush from private land, not from communal pasture.
- National policies that increased the powers of regional governments resulted in increases in the size of certain peasant associations, leading to a rush toward privatization in at least one area.

Nongovernmental organizations and other development agencies have implemented bush-clearing programs that have contributed to local commons and facilitated reclamation by the community. Though agencies built roads and market centers that had positive effects on stocking rates, they also constructed ponds that contributed to sedentarization and cultivation.

However, the policies that appear to have had the greatest effect on land use and property rights in the Borana plateau are those implemented countrywide by the national government. One such recent policy is a ban on exports of livestock to Kenya, which stands to increase the relative price of food crops. The new federal system needs to provide for greater local-level input, and the customary authorities of the Borana people should be given voice to effect new policy changes.

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The Dynamics of Land Use and Property Rights in Semi-Arid East Africa: Ethiopia Case Study

Abdul B. Kamara

BACKGROUND

Livestock production in sub-Saharan Africa is dominated by pastoralism and agropastoralism, traditional systems that have evolved in response to the region's diverse agricultural environment. In recent decades, pastoralism has been in decline because of threats posed by human population growth, increasing crop cultivation, and other human activities that shift extensive livestock-production to areas that are of increasing marginal primary productivity. In addition, government land-tenure policies designed to support sedentarization have, in most cases, proved to be inappropriate. As a consequence, pastoralism, once capable of maintaining the sensitive balance between grazing land, water, livestock numbers, and the environment, is gradually breaking down. This has created a need for reorientation in planning and implementing development projects and research priorities for revitalizing pastoral systems.

OBJECTIVES OF THIS STUDY

This study is intended to provide information that will help to smooth the development process of the livestock subsector in semiarid areas of sub-Saharan Africa, using the Borana Plateau in the southern rangelands of Ethiopia as a case study. The study is designed to test the following hypotheses:

- The main motivations for privatization in the Boran rangelands are related to individual incentives for appropriation of pasture for private grazing.
- Improvement in market access and market condition leads to demand-led livestock-development pathways, and improved marketing facilities in Borana increases the demand for privatization.
- State policies and interventions are crucial in facilitating changes in property rights in the Borana Plateau.

METHODOLOGY

To test the hypotheses and address the research questions in the preceding sections, a field survey was conducted in 40 rural communities in the Borana Plateau. The selection focused on the Borana pastoral ethnic group in areas that had access roads or paths and some secondary data, at least on rainfall and markets. The communities were selected to represent different rainfall patterns and access to markets.

Data was collected in two phases. The first phase, the community survey, employed a combination of both open- and close-ended survey questions and participatory appraisal methods. The second phase was an in-depth survey of two pairs of communities (a subsample of the four communities), selected based on information generated by the first rounds of surveys in the 40 communities. In each pair, common range is largely maintained in one community while the conversion into private land is greater in the other, despite both being exposed to similar policies, interventions, and climatic conditions. The objective was to assess the long-term impacts of policies and external interventions on property rights, institutional change, and the way in which different livestock development pathways are followed. The first set of data (40 communities) was used to conduct a rigorous regression analysis on the determinants of property rights and land use change, while the second set of data (4 communities) was used to conduct a non-quantitative (retrospective) analysis using timelines.

FINDINGS

Changes in Property Rights and Land Use
Expansion of cultivation and enclosure of land around cultivated fields are two of the most important changes in land use in the Borana Plateau. Up to 16.3 percent of the land area in the 40 communities is now cultivated, compared with 1.4 percent in 1986. Approximately 80 percent of the communities in the sample now include some households that cultivate; however, 53 percent took up cultivation only in the last 20 years.

The privatization path constrains mobility on which traditional pastoralism is based.

Rangeland privatization is increasing rapidly, and all of the cultivated land is reserved for individual use. Warra grazing (for lactating cows or sick and weak animals) areas, the most significant of all the communal-grazing systems in Borana is present in 83 percent of the communities under investigation. The expansion of cultivation areas and the privatization of rangel ands encroach a great deal on these areas. Despite this encroachment, warra areas still account for about 50 percent of the total land area of the communities covered in the surveys.

The communal calf-enclosures are more regulated, with more restricted conditions of access and rules that are more strictly implemented. Enclosure by private individuals for grazing is also evident, but comprises very little land area. Community-level enclosures are more important, composing about 10 percent of the available land in the study communities.

Determinants of Property Rights and Land-Use Change
The observed privatization of rangelands can be attributed to a number of factors. Among important factors is population growth: the average

population density in the west-central part of the Borana Plateau increased from 7.3/km^2 in the mid-1980s to 46/km^2 in the late 1990s. Also important, particularly in the last 10 years, has been an influx of nonpastoralists, particularly around towns.

The main cultivation areas continue to be within 10 km of main towns. Estimates of the stocking-rate equation in the regression analysis also show a positive relationship between population density and stocking rates. This is due to the fact that the larger the number of people with access to the grazing resource base, the more difficult it becomes to cooperate and make and enforce rules.

Climatic conditions are also important. While some parts of the Borana Plateau are actually well suited for crop cultivation, as of the mid-1980s, most of the land was still used as pasture. However, the drought of the mid-1980s resulted in a reduction of about 70 percent of the cattle kept by Boran pastoralists, and crop cultivation may have become a fallback for many households.

The timing of the rapid change in property rights and land use is likely more related to the interplay of the external and local political systems. Until 1975, the rulemakers and enforcers in the Borana Plateau were the traditional elders, who were generally reluctant to grant individual rights to either cultivated land or to enclosed pasture land. The advent of peasant associations in 1975, however, created an alternative form of government that favored the sedentarization of pastoralists. Peasant associations were rulemakers and rule enforcers strong enough to facilitate the formalization of individual use-rights to crop land. The Derg regime (1975 – 1991) also supported the development of agriculture in the Borana Plateau through its external support to crop cultivation.

Another change in the external environment occurred after the change in government in 1991. Since then, regional governments have become much stronger, and some changes have been made to the structure of peasant associations. In some cases, the forced merger of two traditional grazing-based administrative units (ardas) into one new peasant association has resulted in increased land annexation.

Thus the policies of the Ethiopian government since 1975 have been biased toward cultivation and, through the government's system of individual land-use rights for cultivated land, toward individualization. Cultivation and individualization thus go hand-in-hand in Borana. It can therefore be hypothesized that the main motivations for both cultivation and individualization are related to appropriation of pasture land and desired investments in pasture land. At the same time, changes in the national government have made private appropriation more feasible. Demand for investment in pasture land has also increased as an indirect result of policies of the Derg government.

Private appropriation of pasture land without the pretext of cultivation is occurring in some communities, most likely because of an implicit partnership between wealthy households that want to appropriate land and poorer households that seek to align themselves with the wealthy households. There is also evidence of the elites securing their interests through affiliation with the heads of the peasant associations, which they use as means of annexing land for private use.

The activities of NGOs and other development agencies in Borana also contribute to sedentarization and its associated cultivation. On the other hand, some programs contribute a great deal to the management of warra grazing areas. For example, one of the hypotheses behind the private appropriation of rangelands is that forage scarcity is due largely to the loss of grazing areas to bush encroachment following a policy that banned burning in the 1970s. The NGO-sponsored bush-clearing programs facilitate reclamation of grazing areas that can once again be used by the community.

CONCLUSIONS

Changes in property rights and management institutions in Borana are explained by an interaction of internal and external factors. Adoption of cultivation and privatization of rangelands in Borana is partially demographic and partially market driven. Evidence of endogenous individualization is found in traces as demonstrated by the "interest groupings" and "forum shopping" in a few communities. The current demand for the individualization of rangelands for private grazing is facilitated by the state through the formal institution of the peasant associations. National policies that support cultivation and sedentarization also play a paramount role in facilitating the privatization process.

The bush-clearing and pasture reclamation programs by NGOs are desirable for supporting the local commons in Borana. As an alternative to privatization, common management is consistent with traditional pastoralism in Borana, especially under equity considerations. The privatization path constrains mobility on which traditional pastoralism is based; and if the trend continues unabated, movements may become restricted in the future, perhaps to the extent of full sedentarization, hardly the basis for a stable production system in this semiarid area.

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The dynamics of land use and property rights in semi-arid East Africa:

The subdivision of group ranches in Kenya's Maasailand

Esther Mwangi

BACKGROUND AND PURPOSE

This study explores the process of property rights transformation from collectively held group ranches to individual, titled parcels among Maasai pastoralists of Kajidao District in southwestern Kenya. It seeks answers to the question of what motivated group ranch members to subdivide their collective holdings into individual parcels, and how the process was conducted. The study applied institutional analysis to disaggregate community actors and examine their preferences, incentives, and influence of their resources of power and wealth on the parcelization process.

Recent demands for individualization have come from the Maasai themselves and, generally speaking, appear to be related to three main factors: proximity to the capital city (and hence higher land value for development purposes—both commercial and agricultural); an increasing "sense of uncertainty" related to population pressure and the immigration into traditional Maasai areas by outside ethnic groups; and the development of commercialized agriculture in more arid regions.

HISTORY OF LAND PROPERTY RIGHTS

The history of the Maasai property rights in the area of study illustrates the idea of "path dependence," that is, the idea that historical events constrain options for future change, and current phenomena cannot be fully understood without knowledge of how they have been shaped by past events. The path dependence framework identifies critical junctures during which time one of several possible decisions is taken. This sets into motion an institutional path that gets reinforced over time as the feasibility of selecting other options diminishes. In this account, the path dependence began with the decision of Kenya's colonial authorities to encourage immigration to develop commercial farms. The purpose was to generate revenues to pay the high costs of colonial administration and to construct the Uganda railway.

In support of these policies, throughout colonial times and in the run-up to independence, formal property institutions were imposed on the Maasai and others by the state. These subordinated native interests to those of settlers. Beginning with the Maasai treaties of 1904 and 1911, and continuing through such institutions as the Kenya Land and East Africa Royal Commissions, "unoccupied" Maasai lands were appropriated, native "reservations" were created, and grazing and development "schemes" were imposed that encouraged individualization. The outcome was a shrunken resource base that was inadequate to Maasai systems of production and an increased sense of land insecurity among the Maasai.

These policy interventions were directed toward enhancing private, individualized rights, especially those that favored the immigrant settler community. As independence approached and it became clear to Africans that private property appeared to protect land rights, African populations increasingly demanded them. The colonial government, forced to respond, recommended individualization of the communal reserves and set the foundation for the extensive land adjudication and registration programs of the late 1950s and early 1960s.

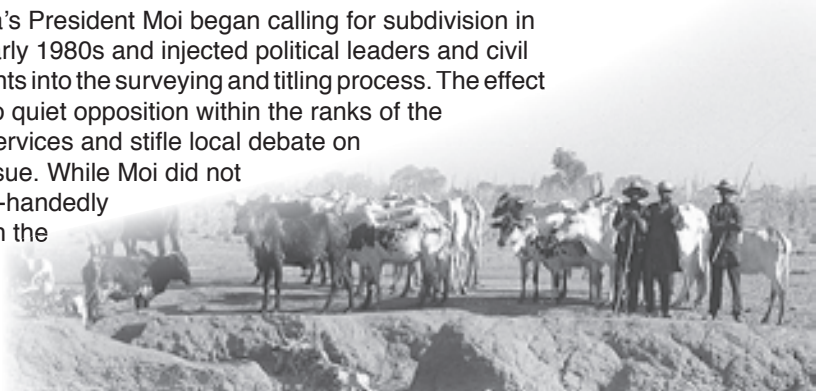
In the early 1960s to the 1970s the Group (Representatives) Act created exclusive land ownership and rights among groups of Maasai residing within an identified area. A land title was issued to each group formalizing its collective rights to the land. The group ranches were in the spirit of privatizing Maasai land (albeit collectively) and guaranteeing it from further encroachment and appropriation. However, in practice the lands were systematically grabbed, gifted, or sold and over time ordinary Maasai lost access and control over much of their land.

The motivation for subdivision cannot be fully explained by price changes and new economic opportunities offered by privatization. Individual titling offered a mechanism for defending Maasai land claims against unsanctioned appropriations.

GROUP RANCH MEMBERS' MOTIVATIONS FOR SUBDIVISION

In light of Maasai pastoralist traditions that have evolved and adapted to the environmental conditions of climatic variability and resource heterogeneity, the decision to subdivide is puzzling. Subdivision reduces the mobility (and access) necessary to sustain the Maasai livestock enterprise under circumstances of variability.

Kenya's President Moi began calling for subdivision in the early 1980s and injected political leaders and civil servants into the surveying and titling process. The effect was to quiet opposition within the ranks of the civil services and stifle local debate on the issue. While Moi did not single-handedly launch the



subdivision process, his repeated calls for subdivision and titling served to quicken its pace.

Other factors that motivated Maasai group ranch members to support subdivision include increasing population pressure; the notion that development and progress could best proceed with individual ownership; problems of differential access to and exploitation of group resources; immigration of outsiders and the intrusion of their cattle onto communally held lands; and the popular idea that the "vacant" group-held lands should be made available to settlers from other overpopulated areas of the country. Besides these factors, group decision making began to break down: it became more difficult to enforce livestock numbers and settlement patterns.

In addition, the process of allocating parcels off of the collective holding was exclusionary and unequal. Poorer herders with little influence were assigned smaller parcels relative to wealthier ones, or those with direct connections to the management committee. Youths and women were excluded from the ranch committees' decision making processes, and their rights to the collective holdings were subordinated to the group members' need to maximize the size of their individual landholdings. Community identity and membership was replaced by inheritance rights as the chief factor in land claims. When youth tried to protest these changes in several forums, their concerns were ignored by elders, the committees, the courts, and local and national politicians. Women, partly for cultural reasons, had already been excluded for decades, as only male household heads were allowed to be members of the new group ranches when they were formed in the 1950s and 1960s. Women never organized themselves to contest this reinterpretation of Maasai traditional custom.

CONCLUSIONS

Beginning in colonial times, major changes relating to land ownership were imposed on the Maasai by the state. The eventual creation of group ranches and then the allocation of individual ranches to Maasai elite were also important. Combined with government policies that promoted individualization, the move to subdivision appears to be remarkably path dependent: choices indeed diminished across time in favor of privatization. The motivation for subdivision, however, cannot be fully explained by price changes and new economic opportunities offered by privatization. Subdivision was also perceived as an appropriate way to defend increasingly threatened Maasai land claims. Conflict was a hallmark of the process as differentiated actors (youth, poor herders, committee members) attempted to secure their claims through multiple sources of authority, from traditional elders' councils, the management committee, government officials and the law courts.

This study strengthens the case for development actors to better secure land rights, including of collective rights. Similarly, an understanding of the cultural norms, political factors, and the goals and aspirations of the local individuals at whom reforms are targeted is crucial.

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The System-Wide Program on Collective Action and Property Rights (CAPRi), one of several intercenter initiatives of the Consultative Group on International Agricultural Research (CGIAR), fosters research and promotes collaboration on instititutional aspects of natural resource management between CGIAR centers and National Agricultural Research Institutes. CAPRi contributes to policies and practices that alleviate rural poverty by analyzing and disseminating knowledge on ways that collective action and property rights institutions influence the efficiency, equity, and sustainability of natural resource use. For additional information, email **Capri@cgiar.org** or visit our website at **www.capri.cgiar.org**.

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