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# Land Tenure Center

## THE NEW PASTORAL DEVELOPMENT PARADIGM: ENGAGING THE REALITIES OF PROPERTY INSTITUTIONS AND LIVESTOCK MOBILITY IN DRYLAND AFRICA

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The new pastoral development paradigm:  
Engaging the realities of property institutions and livestock mobility in dryland Africa

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## **Abstract**

The confluence of new understandings of dryland ecology and common property resource management has arguably led to a “new pastoral development paradigm” -- a paradigm that incorporates a widespread acceptance of the ecological and economic importance of livestock mobility within the context of devolving greater rangeland management authority to local groups. Despite over a decade of interest and attention generated by this new paradigm, little progress has been achieved on the ground. A major premise of this paper is that this impasse results from persistent conceptual difficulties surrounding the relationship between livestock mobility, nonequilibrium ecology, and common property institutions. These difficulties are best resolved through work grounded in the social and ecological realities of particular regions. The promise of such engagements is illustrated through case material from the annual grasslands of Sahelian region of West Africa. The policy implications resulting from a reconceptualization of the relationship between property and dryland ecology are presented.

**Keywords:** common property management, nonequilibrium range ecology, Sahelian West Africa, social institutions, drylands, pastoral development policy

## INTRODUCTION

Since the early colonial period, African pastoralism has been portrayed by scholars, government officials, conservationists, and development professionals as a stagnant, unproductive, and ecologically-damaging livelihood. As a result of these views, development programs could arguably be described as attacks on common pastures and more mobile forms of livestock husbandry. Examples include not only forced settlement programs, land titling programs, and group ranches but also more widespread efforts to destock pastoral herds and to regulate and restrict mobility (de Haan 1994; Niamir-Fuller 1999; Homewood and Rogers 1987; Ferguson 1994). Over the past fifteen years, there has been a fundamental shift in scholarly assessments of the economic and ecological rationales of pastoral livelihoods in dryland Africa.<sup>1</sup> Out of these assessments a new pastoral development paradigm has emerged over the past decade -- based on a new appreciation for livestock mobility, opportunistic stocking, and the abilities of agropastoral groups to self organize to manage common pastures (Scoones 1994; Sullivan and Rohde 2002; Ellis and Swift 1988).<sup>2</sup> A whole series of multilateral consultancies, forums, and policy statements have promoted policies consistent with this new perspective (e.g. Global Drylands Imperative 2003; Grell and Kirk 2000; de Haan *et al.* 2001; Nori *et al.* 2008). Different national governments have instituted land legislation to protect pastoral commons (Toure 2004).<sup>3</sup> Participatory projects have encouraged the creation of community-based land management and

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<sup>1</sup>New understandings of dryland ecology and development have contributed to this new appreciation. Widespread development failure in the region has revealed the real biophysical constraints to alternative livelihoods (Ellis and Galvin 1994). Range ecologists working in the region, recognize the importance of livestock mobility for ecology and production (Vetter 2005; Oba *et al.* 2000; Behnke *et al.* 1993). Social scientists have argued that rangelands are best seen as common property resources which can be managed effectively by local peoples (Swallow 1994; Niamir-Fuller 1999; Simpson and Sullivan 1984).

<sup>2</sup>This new sensibility to the importance of mobility, flexibility, and opportunism is variously referenced as the “mobility paradigm”, “new rangeland paradigm”, “opportunistic livestock management” or “nonequilibrium range management” (Andriansen 2003; Niamir-Fuller 1999; Behnke *et al.* 1993; Scoones 1994).

<sup>3</sup> An example is Mali’s passage into law of a pastoral charter (N° 01004 of February 27, 2001) – a commitment on paper to support wider patterns of livestock mobility that is new in Sub-Saharan Africa.

pastoral associations in dryland regions of Africa (Morton *et al.* 2007; Waters-Bayer *et al.* 2003; Vedeld 1994; de Haan 1994).

Despite this attention, the erosion of pastoral livelihoods, measured by declines in the availability of common pastures and livestock mobility, has continued or even accelerated over the same period with significant social and ecological implications (Niamir-Fuller 1999; Fratkin 1997; Thébaud and Batterbury 2001; Turner and Hiernaux 2008). There are a number of reasons for this seemingly ironic trend. Continued negative views of pastoralists remain among government officials, conservationists, and development officials that may thwart the effective implementation of pastoral development policies framed at the regional and global scales (Global Drylands Imperative 2003; Niamir-Fuller 1999). Climatic and political economic changes in these regions have also arguably worked to undermine pastoralism. Recurrent drought and insecurity in dryland areas, greater incorporation/exposure of pastoral peoples to western education, national politics and market economies have resulted in the abandonment of pastoral livelihoods (Andriansen 2003; Thébaud and Batterbury 2001).

In this paper, I focus on a less-explored reason for the failure for these new understandings to slow or reverse the erosion of pastoral production systems. Livestock mobility, decentralization, and the common property resource management (CPRM) lie at the heart of the new pastoral development paradigm. Following years of state-sponsored assaults on community-managed resources with concomitant declines in livestock mobility in dryland Africa, the provision of decision-making authority to rural peoples and improvements in the management of commonly-held resources (such as pastures) are seen as key for new strategies to maintain flexible access to pastures and livestock mobility. Using the case of the Sudano-Sahelian West Africa, I will argue that the overly abstracted treatments of livestock mobility and

common property management in policy and scholarly analysis contribute to continued failure of pastoral development and range management due largely to:

1. Confusion over institutional forms (CPRM) and practices (livestock mobility) as management/development goals rather than the means to reach more fundamental goals of sustainable pastoral development.
2. Poor recognition that the features of CPR institutions that facilitate livestock mobility are different from those commonly promoted by resource management professionals and decentralization advocates.
3. The focus on the CPR – mobility relationship has caused scholars and policy analysts to ignore other institutional features that strongly shape livestock mobility and the flexible response of livestock rearing peoples to environmental variability.

More generally, I argue that conceptual problems lie at the heart of problems facing conservation and the development practice. As has been argued in the “development and environmental narratives” literatures (e.g. Ferguson 1994), unacknowledged contradiction, ignorance, logical gaps, and ambiguities often lie at the heart of on-the-ground conservation and development failings. Given the prominence of the “new rangeland ecology” in Africa as a case for adaptive management approaches to nonequilibrium systems (Zimmerer 1994; Acheson *et al.* 1998; Scoones 1999), clarification of these limitations will serve broader illustrative purposes.

The arguments developed in this paper derive from the author’s experience studying the grazing management of FulBe pastoralists in the Sudano-Sahelian region of West Africa over the past 20 years. Prior research has been conducted on the transhumant systems of the Inland Niger Delta of Mali and the Say Region of southwestern Niger; and on more sedentary livestock grazing systems in the Fakara and Ouallam regions of western Niger (e.g. Turner and Hiernaux

2008). These experiences coupled with a review of the academic and policy literatures form the basis for the arguments made. The focus of the paper is on the disjuncture between the conceptual framing of pastoral development and the social and ecological features of the region rather than recounting the ubiquitous failure of pastoral development. Still, the pastoral development implications of the arguments will be outlined.

This paper is organized as follows. First, the grazing systems of Sudano-Sahelian West Africa will be briefly described with particular attention to the more recent socioeconomic changes affecting their functioning. These realities will be related to how key features of the new pastoral development paradigm are conceptualized: livestock mobility and common property resource management. I will show that despite the importance of new understandings of ecology and resource management institutions embedded within the new paradigm, its policy prescriptions remain largely irrelevant to the problems facing the region resulting in policy inaction or failure. I will conclude by outlining the major ecological and institutional features that should be considered for developing more practical range management strategies.

## GRAZING SYSTEMS OF SUDANO-SAHELIAN WEST AFRICA

The Sudano-Sahelian region of West Africa is the strip of land lying south of the Sahara desert stretching eastward from Senegal to Sudan. A major climatic feature of the region is the sharp gradient of declining rainfall as you move north from the open savanna woodlands in the south (600-800 mm/year) to the desert steppe to the north (100-300mm/year). Another important feature is that rainfall is seasonal, falling between June through September (length of rainy season declining as you move north). These two features strongly shape the regional and intra-

annual distribution of grazing resources (fodder, water) and explain the historic pattern of north-south transhumance found in the region.

The classic transhumance pattern for the Sudano-Sahelian region is the movement of livestock during the rainy season from the more populated and well-watered Sudanian and Sudano-Sahelian zones in the south to the northern pastures of the Sahel (generally 200-800 km). The benefits of this pattern are: 1. livestock successively graze the highly nutritious first flush of growth as they move north at the beginning of the rainy season (Niamir-Fuller 1999); 2. livestock graze sparser but more nutritious vegetation to the north during the rainy season (Penning de Vries and Djitèye 1982); 3. grazing patterns at any one location are composed of waves of heavy and light grazing approximating that produced through rotational grazing; and 4. livestock leave the cropped zone area in the south reducing the chance for crop damage and resting the more restricted pastures during the rainy season.

At any one location, rainfall is highly variable within and across years. Rainfall is also quite variable spatially. Therefore, it is important that travel movements are responsive to the changing availability of fodder at possible destination points. Transhumance corridors generally connect destination zones in the north and south. While travel movements are highly variable within destination zones, movements are quicker and with fewer options from each encampment point along transhumance corridors. As a result, transhumance corridors display a braided rope pattern compared to the clouds of encampment points visited over a number of years within destination zones.

### **Grazing Ecology**

The annual grasslands of Sudano-Sahelian West Africa are adapted to the extreme aridity experienced during its long dry season (Ellis and Galvin 1994). These annual grasslands are



also strongly resilient to livestock grazing pressure. Research has found that it is heavy grazing pressures during the short growing season that affects vegetative productivity, species composition, and soil structure (Penning de Vries and Djitèye 1982). Grazing during the long dry season has very limited impact given that its soils are dry (and less prone to structural change) and vegetation lies dormant as seeds (Penning de Vries and Djitèye 1982). A major implication of these findings is that production systems that maximize the movements and dispersal of livestock during the short rainy season will most likely benefit rangeland ecology.

### **Pastoral Tenure**

Grazing rights in the region are generally communally-held, centered around points (water points, villages, encampment points) with poorly-delineated territorial boundaries, and socially-porous with rights given to outsiders under conditions of reciprocity (Gilles 1988; Niamir-Fuller 1999; Peters 1994). Exceptions to this characterization are generally those tied to pastures of consistently higher value, particularly floodplain pastures, where communal rights to pastures are territorial with stronger exclusionary rights held by particular social groups requiring some forms of payment to access grazing lands by outsiders (Niamir-Fuller 1999). In dry rain-fed pasture areas, rights to pasture are generally governed by rights to water points. In areas and seasons where water is available at ephemeral ponds, surrounding pastures are more likely to approximate open-access. More permanent water points requiring human investments of labor (e.g. wells) are associated with more exclusionary rights to the group whose investment created the water point. Still, in all cases, points are tied to particular social groups with outsiders required to contact and request permission (for cases of greater exclusionary rights) to camp near the point controlled by the social group. “Owners” of these points rarely refuse outsiders (except in cases of animal disease within outsider herds or when reciprocal rights were previously

refused by outsider) but can discourage their locating there through language. For an outsider, locating in an area where he is not entirely welcome, is risky.<sup>4</sup> Being granted rights is not without cost – there is an obligation to maintain friendship with one’s host and to reciprocate by providing access to host your host’s herd in pastures in your home area during a different season.

### **Recent Trends in Grazing Management**

Since the early 1970s, the region has experienced recurrent drought and food insecurity. A number of inter-related trends have been observed that have major implications for grazing management. A shift in the species compositions of herds from cattle toward those dominated by small stock (sheep and goats) has been reported, caused by an uneven reconstitution of livestock wealth; shifts in livestock ownership, and changes in the structure and productivity of pastures (Turner and Hiernaux 2008). While livestock have historically been owned by all social groups of the region, there has been a shift in livestock ownership from herding specialists to those with other primary professions and to those residing in moister areas to the south (Habou and Danguioua 1991). This shift has led in some cases to a diversion of labor within herding specialist families from livestock herding to other economic pursuits (Turner and Hiernaux 2008); more sedentary herd management by new livestock owners with little herding knowledge (Turner and Hiernaux 2008); and a renegotiation of customary herding labor contracts with greater restrictions on movement decisions (van Driel 1999; Bassett 1994). There has been a movement of people and livestock from the Sahelian to Sudanian zones (Bourn and Wint 1994; Boutrais 1986). As a result, commentators have noted that many areas of the Sudanian zone have experienced a rapid expansion of both cropland and livestock populations since the 1970s

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<sup>4</sup>A transhumance herd represents a considerable store of wealth managed by 1-3 young men or boys. As such, it is vulnerable to theft and loss especially where social connections are few.

with increased difficulty of moving livestock regionally (e.g. across the Sudano-Sahelian zone boundary).

Through different causal pathways, these trends can be seen to all work to reduce livestock mobility at different spatial scales. These studies suggest that a lower fraction of the regional livestock herd follows the classic north-south transhumance leading to greater year-round presence of livestock in the more populated and cultivated Sudanian and southern Sahelian zones. Moreover, research has found that a reduction of labor invested into herding leads to more constricted daily grazing around encampment points with greater chances of local forage-grazing imbalances (Turner and Hiernaux 2008). Observed reductions of livestock mobility have been seen by some observers as signs of population-induced intensification (Bourn and Wint 1994) – the reduction of livelihood specialization and the creation of mixed farming systems. Except for rare cases where cash is available to purchase feed supplements, empirical evidence suggests however that as population density increases, local pasture availability declines and the need for extra-local livestock movements increases (Turner and Hiernaux 2008; Lericollais and Faye 1994) often leading to increased farmer-herder conflict if livestock paths are cut by fields (de Haan *et al.* 1990). Just as there is a need to move livestock long distances to pastures in southwestern U.S., there is no development alternative to livestock mobility in the resource-poor Sahel.

#### COMMON PROPERTY MANAGEMENT AND LIVESTOCK MOBILITY

As described above for West Africa, shifts in livestock ownership, despecialization of livestock husbandry, extension of cropped fields into pastures, and reduction of livestock mobility described have also been noted for other dryland regions of Africa (Niamir-Fuller 1999; Galvin *et al.* 2008; Little *et al.* 2001; Baker and Hoffman 2006; Fratkin and Roth 2005). Mobility of

livestock and livestock-rearing people are associated with livestock production systems referred to as nomadism, pastoralism, and transhumance etc. These systems have developed under quite different bioclimatic environments, technological infrastructures, and institutional conditions and display tremendous variation in the seasonality and range of livestock and human mobility. Since the colonial period in Africa, short-term observations of poor range condition coupled with models of property contributed to persistent diagnoses of pastoralists' propensity to overstock their range in an ecologically and economically irrational fashion. These models of property include:

1. "Cattle complex" portrayals of the pastoral production (Herskovits 1926) where the cultural veneration of cattle by pastoralists is seen as leading to limited herd offtake and high livestock growth. Despite the cultural importance of livestock to livestock-rearing peoples, these portrayals have since been criticized as underestimating the marketing of livestock by pastoral peoples (Kervan 1992), the size of herds necessary to support households with milk (Dahl and Hjort 1976), and the size of herds to maintain adequate production across drought cycles (Sandford 1982).
2. "Tragedy of the commons"-like analyses of the propensity of grazing lands held in common to be overstocked (Peters 1994). These viewpoints were held by colonial officials prior to more academic (Gordon 1954) and popular treatments (Hardin 1968) of the idea that resources held in common are prone to be mismanaged.
3. Pastoral mobility as leading to poor husbandry of pastures because of the limited ties to place engendered by such production systems. The "abuse and move" mentality of mobile production systems was seen as not ecologically nor economically sustainable.

Within the context of experts' ignorance of the motives, land-use history, and grazing practices of pastoral peoples, these models of property provided the explanation for observations made by rangeland specialists of overstocked rangelands. These observations were generally based on short-term observations of poor rangeland condition – the prescription for such deviations from the preferred successional stage, no matter the cause (grazing, rainfall, etc.), was to destock. In this way, models linking property institutions and resource management combined with succession-climax (equilibrium) models of rangeland systems provided diagnoses of pastoralist mismanagement with limited empirical grounding and incomplete understanding of socioecological causal connections.

After decades of neglect of the pastoralist sector, new understandings of common property management and arid rangeland ecology have worked to destabilize the prior consensus. Not surprisingly, questions on both fronts came first from social scientists with strong empirical knowledge of pastoral systems (e.g. Horowitz 1979; Sandford 1982). Since the early 1990s, these views were accepted more widely with range scientists working in dryland Africa accepting the view that rangeland productivity is controlled less by grazing than by rainfall fluctuations – fluctuations that are so frequent to make the idea of an equilibrium vegetative state (climax) difficult to defend (Ellis and Swift 1988; Behnke *et al.* 1993; Sullivan and Rohde 2002). This “nonequilibrium rangeland” perspective shifted the management focus from settling pastoralists and controlling the numbers of their livestock to facilitating their adjustments to changing rainfall-vegetative conditions. Given that local rangeland conditions were now accepted as quite variable, the mobility of livestock was seen as a major means for such adjustments (Niamir-Fuller 1999; Scoones 1994).

Concurrently, social scientists developed new understandings of common property management that resources held in common are not necessarily over-exploited ending in tragedy (Ostrom 1990; Bromley 1992). Privatization of common rangeland landscapes can increase local vulnerability because of the increased changes of fodder or water shortfall within smaller privatized parcels (Ostrom 1990; Swallow 1994). In other words, commonly held resources present fewer barriers (both physical and transactional) to the movement of livestock across the shifting mosaic of fodder and water availabilities in dryland Africa.

New understandings of rangeland ecology and common property management have thus combined to produce a new “pastoral development” or “range management” paradigm that emphasizes livestock mobility (nonequilibrium rangeland) and governance institutions to facilitate collective action around the management of common pastures (common property management). The two goals are seen as consistent since common pastures, compared to private pastures, allow for a greater range of livestock mobility. While certainly an improved conceptualization over the previous pastoral “development” model, development/management successes stemming from the new paradigm have been far from widespread. As described above, some have observed a decline in livestock mobility while pastoral associations have often failed to resist the encroachment of agriculture on to key pastoral resources. While reasons for failure are many, this paper focuses on some conceptual issues that remain unaddressed within the new paradigm that lead to either prescriptions too vague to implement or contradictions that remain unacknowledged. Vagueness surrounding the concepts of livestock mobility and common pastures will be first described before exploring the contradictions between the institutional requirements of these two conceptualizations. In so doing, I will argue that the

legacy of old paradigm remains embedded within the new with negative implications for management progress.

### **Seeking Clarity in the Meaning of “Livestock Mobility”**

The limited policy impact of the new appreciation for livestock mobility reflects a failure in how we think about it. A major conceptual difficulty that has plagued the “nonequilibrium rangeland literature” is the abstract level at which “livestock mobility” is discussed. Livestock mobility is seen as something inherent to pastoralist strategies with benefits that are clear and costs low (at least to “pastoralists”). Developers and rangeland specialists just need to free the prior constraints to pastoral livelihoods that were produced in part by the prior paradigm and pastoralists will become “more mobile” as a result. But what do we actually mean by livestock mobility and what are its benefits and costs?

By “mobility”, are we referring to the distance covered by animals during a 24-hour period? If so, some sedentary systems where livestock graze from a central point may exhibit greater livestock mobility (combined night and day grazing circuits of 15-20 kilometers) than daily displacements along certain transhumance routes during certain seasons. Is mobility best viewed then as the distance of displacement – over 24 hours, a month, a season, or a year? Or is it better seen as the frequency of displacement with many shorter displacements across a time period representing greater mobility than a few longer displacements of equal aggregate length. In short, the use of a single term misleadingly suggests that the multidimensional temporal and spatial parameters of livestock movements can be captured by a single aggregate measure (Schlecht *et al.* 2001; Andriansen 2003). This is not only misleading but unfortunately abstracts livestock movements from their underlying productive rationales and ecological effects.

Livestock mobility should not be seen as an end in itself but a means that will benefit rangeland ecology, livestock productivity and agropastoral risk management. With respect to all three, mobility is seen to result in an improved spatiotemporal distribution of livestock to the density and grazing sensitivities of forage and water resources. The spatiotemporal distribution of livestock grazing is itself admittedly an abstract concept. Still it is a concept that better bridges understandings of grazing ecology to management. For sustained livestock production, our goal is not simply to maximize mobility but to facilitate management adjustments of grazing charge (animal units per unit of palatable forage) given the known sensitivities of vegetation to grazing.

To illustrate this concept, let's revisit the Sudano-Sahelian region. The annual grasslands of Sudano-Sahelian West Africa are most sensitive to heavy persistent grazing once rains are well-established during the rainy season. It is during the rainy season when the natural pastures provide the fodder of suitable nutritional quality and surface water is most plentiful. Natural pastures most limit livestock productivity during the second half of the long dry season. During this time, the productivity of grasslands is least sensitive to grazing and water resources more limited. Given this ecological context, it makes most sense for grazing systems to facilitate the wide distribution of livestock both regionally and around encampment points during the rainy season and early dry seasons to take advantage of higher quality of natural pastures during these periods. More constricted grazing patterns during the dry season are of less concern given the ubiquitously poor forage quality and the high resilience of natural pastures during this period. It is not too surprising that these considerations support the continuation of the north-south transhumance system that has operated in the region historically.



Despite depictions to the contrary, livestock specialists in the Sahel do not unthinkingly subscribe to their “mobility tradition” (Andriansen 2003). Given the interannual variability inherent in Sahelian grazing systems, the productivity gains associated with greater mobility is not always clear. Mobility has nutritional costs -- the energy expended by animals may exceed the increases in energy intake achieved from moving to new pastures (Schlecht *et al.* 2001; Baker and Hoffman 2006). This is why that as animals become weaker as a drought proceeds, livestock mobility declines rather than increases as would be expected from common portrayals. Livestock mobility is also associated with higher labor demands. Since different livestock species have different mobility aptitudes and a milk herd needs to remain near family and/or markets, grazing strategies that rely to some degree on herd mobility often necessitate the division of managed livestock into separate herds. Multiple herds require the multiple herders to manage daily grazing. Livestock mobility also is associated with greater information and social networking demands. Moving with livestock in areas outside of one’s immediate home area increases the risk of livestock loss by force (bandits) or through the exercise of power (local elites and government officials). Moreover, social connections often need to be maintained in order to gain access to pastures and water held by other social groups. The added labor, information, and social networking costs associated with more mobile grazing systems need to be addressed by resource management programs. As described above, conservation and development organizations have primarily sought to improve the management of rangeland resources by making CPR institutions governing local pastures more effective. Institutions that facilitate the sharing of labor among herding families; increase the security of livestock entrustment and herding labor contracts (between owners and herders); or govern the processual

process through which outsiders gain access to the distant pastures are just as if not more important.

To develop range management strategies that seriously consider livestock mobility options, abstract appreciations of livestock mobility need to move toward more grounded understandings of how patterns of livestock movements affect the spatiotemporal pressures on rangeland resources. Livestock mobility has risks and requires expenditures of resources by livestock-rearing peoples. As a result, the distribution of livestock in relation to forage resources reflects not only access to common pastures (see below) but other factors including: labor availability; access to markets; the knowledge and social networking of herders; (in)security in rural areas through which livestock move; and access to the paths, pastures, and waterpoints needed to reach pasture in question. Therefore, there is a broader social and biogeography affecting livestock mobility involving multiple actors over different spatial scales. The greater demands of livestock mobility on governance institutions therefore need to be addressed.

### **Common Rangeland Management Revisited**

Rangelands in dryland Africa are held in common and western observers have long emphasized that such joint ownership reduces the incentives to invest in the resource (to increase its sustained productivity) and increases the incentives to over-exploit the resource. African pastures have served as prominent examples of the “tragedy of the commons” (Simpson and Sullivan 1984; Barrière and Barrière 2002) given the few incentives for herders with rights to these rangelands to reduce their livestock numbers given that the costs of overstocking are borne by all (ownership externality). Much of the recent common property literature has been built around refuting the foregone conclusion that common property management inherently ends in tragedy. This literature shares with the tragedy narrative the portrayal of common resource

management as a collective action problem to address the ownership externality (Ostrom 1990; Bromley 1992). It demonstrates however that communities can self-organize to limit and monitor extraction of commonly-held resources by the establishment of clear rules and boundaries. Working from these premises, most CPR management work since the early-1990s (community-based conservation etc.) has been with local communities to develop rules, governance structures, and to establish clear boundaries around both the resource and the social group owning/managing the resource (Goldman 1998).<sup>5</sup>

Common property scholars have often pointed out that real situations often diverge from simple collective action models (Ostrom 1990; Peters 1994). Still, the CPR management frameworks utilized by conservation and development practitioners diverge strongly from the realities of grazing management in the Sahel in the following ways:

1. There is an assumption that the effects of grazing on vegetative productivity are clear and tractable and therefore can guide stocking decisions on common rangeland (e.g. the costs borne by the group can be measured). Given the high spatiotemporal variability of rainfall in the region, the short window of time when annual grasslands are sensitive to grazing, and the multiple constraints to vegetative productivity (nutrient availability, moisture), it is very difficult to calibrate stocking rates to vegetative response in this environment. Therefore, analogous to the management of chaotic fisheries (Acheson *et al.* 1998), effective rules governing the extraction of the common resources may be not based on limits on stocking rate within a given region but more on regulating the seasonality, duration, and spatial distribution of grazing.

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<sup>5</sup>The introductory chapter for one of the more influential recent texts dealing with property rights and livestock development in Africa adopts as one of its chief institutional design principles that membership and boundaries need to be clearly defined (Swallow and McCarthy 2000, pg 10).

2. Commonly-held pastures result in lower vulnerabilities since livestock can move freely to spatially variable pastoral resources. As described above, this has proven to be a highly persuasive counter-argument to privatization – one of the possible solutions to the commons tragedy (Ostrom 1990). Thus at first glance, common property institutions are seen as the institutional form most consistent with livestock mobility. However, relating this example to the Sahelian region is less than satisfying since local groups are likely to control rangelands that do not even approach in spatial extent what would be required to cover the annual movements of even a single herd. Therefore, herders will necessarily need to gain access to pastures outside the control of their social group.
3. Another related assumption is that the social group involved with governing the commonly-held resource (governance group) overlaps in terms of membership with the social group that uses the commonly-held resource (user group). For example, the herders using a common pasture are also those that have rights to that pasture. The village government that governs the use of a woodlot represents those that use the woodlot. Given the need of livestock mobility in the Sahel, the governance group may be a small minority of the users of its resource and its members may depend heavily on the resources controlled by other governing groups during different parts of the year.
4. The common pasture case is a favorite example of the ownership externality since the costs of grazing are born by the group while the individual benefits through the production of his/her livestock. In the Sahel, grazing decisions are made by herders who often do not benefit directly from the increased productivity of the livestock in their care

but owned by others. Therefore, the incentives to overstock for personal gain is limited for most herders due to the low self-ownership rates of Sahelian herds.<sup>6</sup>

5. Boundaries are poorly defined around most pastures of the region due to the fact that the costs outweigh the benefits of excluding others from such ephemeral, low density resources.

Figure 1 presents a schematic of the institutional implications of the two major goals of common rangeland management: 1. reduce the transaction costs associated with livestock mobility; and 2. address the ownership externality that gives livestock owners the perverse incentive to overstock common pastures. From a range management perspective, these abstract goals address the two management factors affecting the magnitude of grazing pressure at range sites: the spatiotemporal distribution of livestock population and the overall size of the livestock population across the pastoral region. These different goals have quite different implications for improved management of common rangelands. Addressing the “free-rider” problem will lead to institutional emphases to exclude and to establish clear rules of access. Facilitating livestock mobility across multiple common pastures requires a specification of procedures for gaining temporary, flexible access rather than strict (and clear) exclusionary rules. In this way, the sets of institutional requirements that address each of these two goals are somewhat contradictory.

Clearly, the proper mix of institutional features depends on the relative importance of these goals in the particular socioecological context. In the case of the Sahel, managers of livestock grazing often own a small fraction of the herds they manage. Therefore, addressing the “ownership externality” associated with the divergence between individual versus communal

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<sup>6</sup>This is not to say that the ownership externality works at a broader spatial scale than that of the individual rangeland (controlled by a particular social group). Livestock owners do make investment decisions ignoring the environmental costs of an increased regional livestock herd. However, increased restrictions on access to individual pastures will not address this problem (better addressed through taxation and subsidies to alternative investments).

interest leading to the overstocking local pastures for individual gain is of limited importance. Therefore, policy initiatives should not only seek to address the uncertainty associated with the herding labor contract but also seek to establish common property institutions that do not inhibit livestock mobility.

Common property management principles have very much shaped resource management and development projects in areas like the Sahel. Unfortunately, these projects have been unduly influenced by the abstract goal of common pasture management of lesser relevance to the Sahelian context – addressing ownership externalities. It is easy for the commons professional to see many of the rural development and conservation problems in the Sahel – land degradation, social conflict -- as CPR management problems. The village land management projects common to the region (“projets de la gestion de terroir villageois”) seek to improve the management of common lands through the establishment of clearer, more enforceable boundaries and more tractable rules of access (Toulmin 1993). By seeking situations with well-defined, non-politicized social groupings (villages) governing contiguous parcels of land (village territory), these projects: a) emphasize local over district and national-scale resource governance; b) ignore local institutions other than CPRM institutions affecting resource management; c) emphasize CPRM approaches that delimit CPR rights to a well-defined social group which reinforces common insider-outsider politics of local communities; and d) seek to reduce the private incentives to over-stock local pastures through the creation of formal rules and social sanctions. These tendencies have resulted in a proliferation of CPRM projects that have reduced the channels for herders to gain access to distant pastures, facilitated the extension of cropland onto key pastoral resources; and have completely ignored the legitimate need for district- and state-level governance systems to regulate transhumance. Despite the promising connections between

CPRM perspectives and livestock mobility in theory, the development and conservation programs that have been most influenced by CPRM perspectives in the Sahel have generally had a decidedly negative effect on livestock mobility and rangeland management.

## CONCLUSIONS

The new pastoral development paradigm recognizes the importance of livestock mobility and the capacity of local communities to manage local rangeland resources. Grounding the abstract concept of “livestock mobility” down to regional realities reveals that it is best seen as one means toward the goal of improving the spatiotemporal distribution of grazing pressure for sustained productivity of livestock production on common pastures. Common property theory treats rangeland management as a collective action problem focusing on the divergence between public and private interests. The simple model of a well-defined, cohesive group of herders seeking private benefit from a common pasture unless constrained by rules is compelling although quite divergent from on-the-ground realities. Rather than focus on excluding outsiders, CPRM institutions should facilitate the regulated access (seasonality, duration) of outsiders to local pastures. This goal will require a coordinated co-management of important pastures, transhumance corridors, and water points involving not simply local actors but district and national government agencies. This demands a role for the state in resource management which runs counter to present development emphasis in the region.

Given the high spatiotemporal variability of forage production and the sensitivity of vegetation to heavy persistent grazing, livestock mobility lies at the center of successful strategies. To achieve real policy and management success on the open rangelands of Africa, one must:

1. treat livestock mobility not as a goal but as a means to reach clearly-articulated management goal(s). In the case of the Sahel, this goal is an improved spatiotemporal distribution of grazing pressure in relation to the productivity and sensitivity of vegetation;
2. seriously consider the proper design of common range institutions. Such a design would recognize the proper mix of flexible and exclusionary rules of access that match the socioecological realities of the region in question. In the Sahel, this will require a co-management system whereby the national and district governments protect areas surrounding key pastoral resources (transhumance corridors, waterpoints, pastures) from agriculture (territorial) with pastoral clans governing livestock access to these points (point-based system of flexible access).
3. address the social and economic costs of livestock mobility and in so doing identify other areas of institutional innovation that may reduce the inhibitory effect of such costs on ecologically-effective livestock mobility. For the Sahel, such areas of innovation include: increasing the security of the herding labor contract; improvements in labor sharing institutions; facilitating social networks along transhumance corridors; improving security in northern pastures; and increasing access to marketing channels away from population centers.

The new pastoral development paradigm contributes useful insights for developing more effective range management strategies for dryland Africa. Still, it is only through seriously relating the abstracted concepts and principles that are imbedded in the new paradigm to regional realities that range management problems in Africa can be effectively addressed. More generally, the case of the new pastoral development paradigm illuminates the need to contextualize the highly-abstracted academic and policy discussions of concepts such as



“adaptive management”, “institutional resiliency”, and “adaptations to climatic change” to the complex realities of particular sociologies and ecologies.

## Figure Legends

**Figure 1.** Contradictory implications of addressing two different goals of common rangeland management that are often referenced in the abstract. Abstract goals associated with reducing transaction costs to facilitate livestock mobility and with reducing the ownership externality associated with the common rangeland (leading to tragedy of commons) are tied to operational goals which are tied in turn to institutional features that best address these goals.

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