

The Status of Common Property Resource Tenure in Semiarid Eastern Africa: Evidences from the Borana Rangelands of Southern Ethiopia¹

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Abstract

The paper assess the status of common property rangelands in the study area, identifies tenure changes and evaluates their causes. Changes in the area are hypothesized to be related to variability of rainfall, market accessibility and demographic shifts. A bivariate method is used to test the hypotheses using primary level data on land use and property rights, complemented by secondary rainfall data. The results indicate that rainfall risk, market access and population pressure explain the dynamics of land use and property rights in the area. However, the impact of these factors depends largely on other socio-economic and policy variables.

Key Words: common property; rangelands; privatization

1. Introduction

In Africa, property rights over natural resources originated as communal systems with households having exclusive rights to the use of croplands and shared rights plus access options to rangelands, forests and water resources. This system of resource tenure served well especially during phases of low population pressure and little environmental degradation. With the advent of high population pressure, a need for adapting these common property regimes to the increased pressure on the finite natural resource base has been a key recommendation (Pendar et al., 1995; Hooper, 1994; Harrison, 1992). Some scholars even view traditional African land tenure systems as inefficient and advocate for various modifications (Bruce, 1993; Place & Hazell, 1993). Both socialist and market oriented land reforms triggered by this view have not performed in terms of increasing land use efficiency. The reason is straight forward: most of the reform codes were designed to replace existing community management systems, rather than adapting them to population and other exogenous pressures. The privatization campaign in Kenya after independence and the reforms in Ethiopia in the mid 1970s are a few examples from Eastern Africa, while the Rural Code in Niger represents a typical West African case (Okoth-Ogendo, 1995; Tolossa & Asfaw, 1995; Ngaido, 1995).

Following these reforms, a gradual evolution of property rights over natural resources in many parts of Africa has been documented. The change, in general, is towards privatization. But 'is privatization the only efficient pathway to intensification in all production systems?' The likely answer to this question is 'no' especially if one considers the current status of natural resources in many of these reform-affected countries. It is currently observed that cultivation, for instance, is increasingly extending into common property resources especially rangelands, while pastoralism is compelled to marginal and fragile land areas (Kirk, 1996; Swallow & Kamara, 1998; Bassett, 1993). Given that sub-Saharan Africa hosts about 25 million of the world's pastoral population, deriving their livelihood directly from communal land use, there is a need for an assessment of the major forces driving these changes in property rights so that their relevance to policy formulation can be evaluated.

2. Background and Problem Statement

The study is intended to enhance an understanding of the processes of changes in property rights over communal rangeland resources in Eastern Africa, using the Borana rangelands of Southern Ethiopia as a case study. This semi-arid southern rangelands are valuable to Ethiopia both as a source of livestock for the provision of draught power for the small holders in the highlands and for export to generate foreign exchange. Despite the consensus on the region's high ecological potential vis-à-vis livestock production, the area is seen as one which is still in crisis today, mostly due to population induced pressure on the rangelands —privatization for both cultivation and grazing (Coppock, 1994; Swallow & Kamara, 1998; Hogg, 1997; Kerven & Cox, 1996).

The study is based on the theories of agricultural intensification and induced innovation, viewed from the perspective of collective action and institutional change (Boserup, 1981; Ostrom, 1990; Binswanger & McIntire, 1987; Lele & Stone, 1989). Proponents of these theories assert that factors such as population pressure, changes in market conditions and technology may induce changes at local level resource management as a result of changing factor scarcities and prices. Local level responses to these changes may depend on the available institutions facilitating the process, and on community baseline conditions such as natural resources, human capital and social capital. Based on these constraining factors, a divergence in preferences for property regimes may result (North, 1994; Lele & Stone, 1989; Pender et al., 1996).

The broad objective of the study is to assess the relative importance of the main driving forces of the observed changes in land use and property rights in the study area, and to evaluate the consequences of these changes on livestock development. Population pressure, changes in market conditions and natural production risk (level and distribution of rainfall), among others, are hypothesized to be the main driving forces. These hypotheses are tested using community level cross sectional data.

3 Methodology and Data

A field survey was conducted in forty rural communities in all the six districts of the Borana Rangelands from September 1997 through July 1998. The choice of the community as a unit of study is based on the fact that spatial and temporal use of key production resources in the area is communal, and access is largely determined by community level decisions —mostly by elders who define the rules and ensure the implementation of sanctions and penalties. In this pastoral system, the household does not command any authority regarding decisions on access to or control over resources (pasture and water). It therefore becomes expedient to look beyond the household for an analytical unit that is commensurate to the level at which decisions about resource use and property rights are made. Hence, the study is undertaken at the community level. A community in this study consists of two or more pastoral settlements having common access to pastures and water resources to which they bear a common claim. Such a community —referred to as *arda*— has its own rules and regulations, and enforcement mechanisms. Ardas form an inherent component of a larger traditional unit called *maada*. The *maada* is characterised by the possession of a permanent water source, a traditional deep well.

3.1 Study Area

The Borana Rangelands occur on the south-most part of the Ethiopian lowlands occupying a total land area of about 95 000 km². It is located between latitudes 4-6 degrees North and 36-42 degrees East, sloping gently from 1600 meters in the north-east to about 1000 meters in the

extreme south that borders northern Kenya. The area is still predominantly in pastures comprising flat plains forming the main parts of the range. There is an occasional occurrence of mountains, massive valleys and depressions. Occupied almost entirely by pastoral populations, resource use on the Borana rangelands is largely communal, with traces of crop cultivation and private enclosures that emerged in recent decades.

The area exhibits a bimodal pattern of precipitation, with the long rains falling between March and May, and the short rains between September and November. Spatial and temporal variability in both the quantity and distribution of rainfall renders the area semi-arid, with an average annual rainfall varying from 300 mm to 900 mm per annum. The area is dissected by a tarmac road that creates a transverse road-link between Addis Ababa and Nairobi, forming a significant segment of the African transcontinental high way. This road link plays a significant role for linking the area to markets centers both on the country side, and in Addis Ababa and Nairobi.

3.2 Data Sources

The communities were selected to represent different rainfall patterns (level and variation) and access to markets. Monthly rainfall data from 1982 to 1996 for 12 weather stations located across the area were used to classify the communities into four different rainfall categories: high mean with high variation; high mean with low variation; low mean with high variation; and low mean with low variation. The weather stations also varied in terms of access to markets. Three to five communities were randomly selected from around each station to cover the rainfall categories and different degrees of market access. The selection of communities was also contingent upon physical accessibility and the prevalence of pastoralism. Inaccessible areas and heavily cultivated communities (fully privatized) were excluded from the sampling.

The first phase of the data collection employed a combination of open-ended questionnaires and participatory appraisal methods. The respondents included community elders, heads of encampments or other key informants responding as a group. Social mapping was used to assess the proportion of land under different types of land uses—different types of common property grazing areas, transhumance routes, cultivated area, private enclosures etc. This was followed by a wealth ranking exercise and identification of boundaries. Physical measurements of land area under different land uses were not possible due to environmental and geomorphological constraints. The total land area of a community was appraised using a geographical positioning systems techniques (GPS). The GPS data were later digitized to generate community areas and maps. Market surveys were also conducted to generate cross-sectional market data followed by range quality assessment.

3.3 Sample Stratification

The rainfall data that formed the basis of sample stratification was generated by the Southern Rangelands Development Unit (SORDU). An analysis of this data facilitated the classification of the area into four rainfall categories based on aggregate annual mean and coefficient of variation. The communities were also stratified into easy and difficult market access categories. The easy access category corresponds to those located within 25 km average distance from major markets, while those located farther than 30 km are categorized as difficult access. The criteria is based on the fact that Boran pastoralists trek a maximum distance of about 20 to 25km a day. Locations beyond these distances are associated with high marketing costs both in terms of time and resources. The use of physical distances instead of time is justified by the fact that trekking is the popular means of travelling in the entire area.

3.4 Socio-economic Characteristics of the Sample Communities

Table 1 gives a summary of the characteristics of the communities covered in the study. The communities consist of a total of about 200 settlements or pastoral encampments, with an average of 5 settlements per community. These constitute a total of 3141 households, with an average of 79 households per community and 7 people per household. The total human population of all the communities is 21637 people, with a mean of 541 people per community and a population density of 46 people per km². About 26% of the households are female headed. The overwhelming majority of the households are classified as poor (67%), 21% as middle class and only 12% as wealthy. This is based on the wealth stratification criteria suggested by the respective communities according to their definitions and perceptions of wealth.

Cattle is by far the most important livestock species that is reared by the Borana pastoralists and accounts for about 90% of the total livestock holdings in the area. This amounts to about 50000 TLU (Tropical Livestock Units) or 64470 heads of cattle. The remaining 10% consists of small ruminants, camels and equines. The mean number of livestock per community is 1249 TLU, with a minimum of 58 and a maximum of 9780 TLU. The average livestock holdings at the household level varies between 2 TLU for poorer households and 34 TLU for wealthier ones, with an aggregate mean of 12 TLU.

Table 1: Characteristics of Sample Communities

<i>VARIABLE</i> ^a	<i>Min.</i>	<i>Max.</i>	<i>Mean</i>	<i>Std Dev</i>	<i>Sum</i> ^b	<i>%</i>
Settlements	1.00	21.00	4.97	4.25	199	100.00
Community population	48.00	3160.00	540.93	610.00	21637	100.00
Pop. density: persons/km ²	4.35	218.00*	46.14	46.72	--	--
People per household	4.00	8.00	6.50	0.90	--	--
Female headed households	1.00	85.00	20.68	19.58	827	26.32
Male headed households	5.00	331.00	58.35	64.29	2314	73.68
<i>Total</i>	--	--	<i>79.05</i>	--	<i>3141</i>	<i>100.00</i>
Wealthy households	4.00	58.00	9.62	14.82	385	12.25
Middle class households	6.80	59.60	16.50	12.75	660	21.01
Poor households	13.00	90.00	52.45	21.96	2096	66.73
<i>Total</i>	--	--	<i>78.57</i>	--	<i>3141</i>	<i>100.00</i>
Sum Cattle (TLU)	46.00	9345.00	1128.20	2080.80	45128.3	90.34
Sum Others ^c (TLU)	4.70	1515.00	120.48	246.20	4819.7	9.64
<i>Total (TLU)</i> ^d	<i>58.00</i>	<i>9780.00</i>	<i>1248.69</i>	<i>2229.80</i>	<i>49948.0</i>	<i>100.00</i>

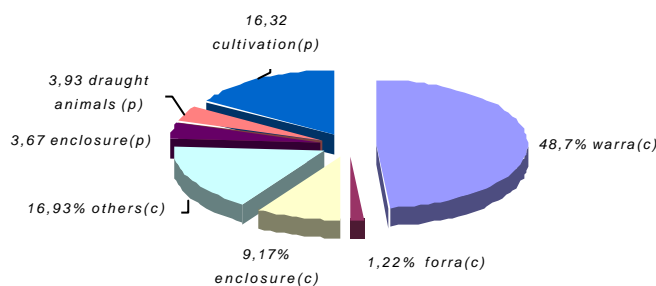
() minimum besides the zeros; ^a per community; ^b sum for all communities; ^c small ruminants, camels and equines; *excluding one highly sedentarized community with a density of 407.51 persons/km²;
^d Tropical Livestock Units; -- not applicable

3.5 Current Land Use Patterns and Property Rights

Despite the tremendous problem encountered by attempts to proxy or categorize land use, the exercise cannot be avoided since land use patterns emerge as basic indicators that express the social and economic pressures that surmounts on a piece of land at any point in time. Current land use patterns can also be extrapolated to assess the past and present forces leading to changes in use. In this study, land use is categorized into crop and livestock production and property rights into private and common. Each is proxied by the percentage of land area allocated to the activity or regime.

As illustrated in Figure 1, about 84% of the total land area is allocated to livestock production activities while 16% is currently under crops. The land area under livestock is largely managed as different forms of common property (76%) denoted by (c) in Figure 1. *Warra* grazing is by far the most predominant form of common property in the area constituting about 48.7% of the total land area. These are communal grazing areas for milking cows, calves and sick or weak animals. They are accessible to all members of a defined community at specified periods of the year and for specified types of animals. In this context, warra areas largely benefit the definition of regulated common property resources.

Figure 1: Land use patterns and property regimes in % of land area (c= common; p= private regime)



The second most important form of common property regime is the communal enclosures mainly for calves and other home grazed cattle during periods of forage scarcity (9.17%). Community level enclosures and warra areas are present in about 83% of the sample communities and hence constitute the most important forms of common property resources. Areas that are now used as warra and community enclosures are said to have been demarcated from much generalized grazing areas called *forra*. Forra areas are unrestricted communal grazing areas for dry herds —non-lactating cattle— for all members of the Borana pastoral ethnic group. Spatial and temporal access to such areas is unregulated both in terms of members and herd type. Forra areas generally constitute the largest communal grazing areas in Borana but being unsettled, they largely fall outside the boundaries of the communities under investigation, thus comprising only about 1.22% of the total land area. The rest of the communal land is used for settlements and for grazing small ruminants, camels and equines.

Private holdings account for about 23% of the total land area, allocated mainly to crop production (16.32%), partly to enclosed private grazing (3.67%), and partly to enclosed areas for draught animal grazing around cultivated field (3.93%). The private enclosures for grazing is a relatively new trend that alludes to a new dimension in the dynamics of property rights in the area. Such trends were observed only in 17.5% of the communities under investigation.

4 Results and Discussions

A partial bivariate analysis was used to analyze the data. The method is applied here to determine the partial impacts of natural production risk (depicted by the level and variability of rainfall) and improvements in market conditions (proxied by access to markets) on stock densities, land use and property rights. Stock densities are important indicators of management efficiency which in turn affect land allocation decisions. Means and standard deviations of the observed values of these variables are computed followed by an F-statistic to assess the variances between the computed means.

4.1 Livestock Holdings by Rainfall and Market Access

Livestock holding is influenced by natural production risk, marketing opportunities as well as the price expectations of the pastoralists. The results generally indicate that livestock holdings are higher in areas of high rainfall. However, the disparity only prevails in areas of high variability of rainfall. Communities with low variability of rainfall do not differ much in the level of livestock holdings regardless of the amount of rainfall. This suggests that even though the level of rainfall is important in determining stock levels due to its impact on forage availability, yet rainfall variability across sites plays a more significant role in determining stocking rates. The overall difference between the high and low rainfall areas in terms of livestock holdings is statistically significant at 1% probability level. The trend holds for all the species of livestock raised in the area.

Physical accessibility to markets does not seem to play a significant role in determining stock levels. Even though there are slight nuances in the mean livestock holdings in the easy and difficult market access categories —i.e. stock levels increase with improving market access, the differences are very tenuous and statistically insignificant. This may imply that natural risk (rainfall conditions), together with other socio-economic variables could be playing a more important role in determining stock densities. Due to its flexible and fungible nature, livestock can be moved over long distances in response to variable market conditions. This attribute partially explains the relatively less significance of market accessibility to pastoral livestock producers. It is also important to note that the number of camels and equines is much higher in the difficult market access categories, certainly due to the transportation function fulfilled by these animals.

4.2 Changes in Land Use and Property Rights

Privatization of communal pastures at the community and individual levels is increasingly noticeable in the area. The privatized land is used both for grazing and crop cultivation (Figure 1). In the past decade, cultivation has increased from 1.4% in 1986 (Coppock,1994) to about 16% in 1997/98 (Figure 1). At the same time the number of cultivating households has considerably increased while the average plot sizes have expanded from 0.15 ha (Coppock,1994), to 2.4 ha per household in the current study. This privatization encroaches a great deal on communal grazing areas to the extent that the traditional warra grazing areas (Figure 1) have entirely disappeared in about 17.5% of the communities. Such areas have either degenerated into enclosures for restricted communal grazing or fallen into private hands.

4.3 Determinants of Property Rights and Land Use Change

Hypothetically, the privatization of rangelands in the area is attributed to a number of exogenous and endogenous factors. Among the important factors, population growth is asserted to played a key role. Previous studies document that human population has been growing at a rate of between 2.5% and 5% per annum. While the average population density in the west-central part of the Borana Rangelands was 7.3 persons/km² in the mid-1980s, the average density in the sample communities in 1997/8 was 46 persons/km² (Table 1). This is a relatively high population density relative to other pastoral areas in East Africa. While acknowledging this fact, it is also worth reiterating that natural population growth alone cannot explain the rapid changes that have occurred particularly in the last decades. The influx of non-pastoralists into the area, particularly around towns is also worth mentioning. These in-comers are mainly engaged in cultivation, thus paving the way for others to follow. The process has also been linked to the improvements in market conditions and changing crop-livestock price relation in favor of crops. This observation is associated with the

improved access to both input and output markets followed by recent policy reforms at both the national and regional levels (Tolossa & Asfaw, 1995). Also, the impact of climatic factors cannot be entirely ignored in explaining this dynamic process. Ecological studies show that about 12% of the Borana Rangelands, particularly valley bottoms and water swills may be cultivated sustainably. As of the mid-1980s therefore, cultivation (hence privatization) could already be observed in some of these areas.

4.4 *Rainfall Risk, Market Access, Land Use and Property Rights*

Table 2 presents the bivariate results of the impact of rainfall and markets on land use and property rights. About 25% of the land is allocated to crops in high rainfall areas while the low rainfall areas allocate an average of 6%. The trend hold true both in areas of high and low coefficient of rainfall variation. The differences are statistically significant at 1% probability level. This affirms the assertion that rainfall plays a significant role in determining changes in land use in the area. Population and other exogenous variables may equally be acting side by side with rainfall variability. Areas of low rainfall may not only be lacking the minimum threshold for cultivation but are also associated with high temporal variability and inconsistency of seasonal precipitation. Such uncertainty may not form a stable basis for the adoption of crops even under the influence of price incentives, population and other socio-economic variables.

Property rights also show a similar trend in almost all the rainfall categories. Private holdings in the high rainfall areas doubles the amount in the low rain fall areas for both communities with high and low variability of rainfall. The similarity of these trends to that of land use (in terms of cultivation) can be attributed to the fact that the desire for cultivation is an important force behind privatization in the area. In about 83% of the communities, privatization at the individual level goes hand in hand with crop cultivation. In these communities, claims to private land can only be made under the pretext of cultivation. Once the land for cultivation is allocated to an individual, adjacent areas can easily be claimed by erecting a fence. While only a small portion of the enclosure is actually cultivated, the rest is used for livestock grazing. In the high rainfall areas, about 29% of the land area of the sample communities is already in private hands while only 14% is privatized in the low rainfall areas.

Table 2: Land use and property rights by rainfall and market access

<i>Rainfall/ Market Access</i>	<i>Land Use (%)</i>		<i>Property Rights (%)</i>	
	<i>Crops</i>	<i>Livestock</i>	<i>Private</i>	<i>Common</i>
Low Rainfall (n=17)	6.11(±0.97)	93.89(±0.97)	13.89(±2.67)	86.11(±2.67)
HCV ^a	7.20(±0.98)	92.80(±6.19)	16.53(±2.74)	83.47(±2.74)
LCV ^b	0.67(±0.18)	99.33(±0.18)	0.67(±0.18)	99.33(±0.18)
High Rainfall (n=23)	25.34(±2.79)	74.66(±2.79)	29.43(±3.59)	70.57(±3.59)
HCV ^a	27.31(±2.53)	72.69(±2.53)	34.23(±3.75)	65.77(±3.75)
LCV ^b	22.50(±3.24)	77.50(±3.24)	22.50 (±3.24)	77.50(±3.24)
F-Value	8.21***	8.21***	1.800	1.800
Easy Access (n=25)	23.22(±2.77)	76.78(±2.77)	26.42(±3.56)	73.58(±3.56)
Difficult Acc. (n=15)	5.80(±1.10)	94.20(±1.10)	15.80(±2.74)	84.20(±2.74)

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Sample (n=40)	16.32(±2.64)	83.31(±2.64)	22.44(±3.40)	77.56(±3.40)
F-Value	6.3498**	6.3498**	1.4685	1.4685

^a high coefficient of variation; ^b low coefficient of variation; (±x) standard error of the mean
*, **, *** significant at 10%, 5% and 1% probability levels respectively

Source: Author; Field Survey 1997/98

The overall mean of the privatized land in all the sample communities is about 22%. However, the observed differences in the various rainfall categories in terms of privatized holdings do not show any statistical insignificance.

Market access also shows a positive relationship to changes in land use and property rights. Both the proportions of cultivated and privatized land are greater in communities within the easy market access category. These are the communities that are closer to market centers and towns. In fact, cultivation in the area is mainly concentrated around a 10-20 km radius of the major settlements and towns. While this alludes to evidences of population induced intensification of land use as asserted by Boserupian theory, the influx of crop producing ethnic groups who settle in towns cannot be neglected. The latter is certainly a more important determinant of cultivation in the area than the expected traditional influence of input and output markets as facilitated by proximity to markets. Input markets for crops are not well established in the area. Generally, they are non existent. So the observed increase in crop cultivation cannot be attributed to incentives from input markets. However, incentives from output markets do exist as indicated by the ever increasing crop-livestock price relation in favor of crops. The differences in the easy and difficult market access categories in terms of land use is statistically significant at 5% probability level while the divergence in the proportion of privatized land does not have any statistical significance.

4.5 Interdependence of Stocking Rates, Land Use and Property Rights

Table 3 shows that stocking rates, land use and property rights all seem to be influenced by variability of rainfall and market access. That is, they all increase with increasing mean rainfall and improving market access. The interrelation of the three under the existence of dual property rights is certainly more intricate than this simple tabular presentation.

Table 3: Stocking rates, land use and property rights by rainfall and market access

<i>Rainfall/ Market Access</i>	<i>Variable</i>		
	<i>Stocking Rates^a</i>	<i>Land Use (%)^b</i>	<i>Property Rights (%)^c</i>
Low Rainfall (n=17)	44.63(±6.46)	6.11(±0.97)	13.89(±2.67)
High Rainfall (n=23)	153.45(±30.01)	25.34(±2.79)	29.46(±3.59)
F-Value	21.59***	8.2155***	1.8083
Easy Access (n=25)	131.10(±28.85)	23.22(±2.77)	26.42(±3.56)
Difficult Acc. (n=15)	60.12(±9.96)	5.8(±1.09)	15.80(±2.94)
Sample (n=40)	104.48(±24.04)	16.32(±2.69)	22.44(±3.40)
F-Value	8.3793***	6.3498***	1.4685

^a TLU per km²; ^b % cropped; ^c % of land under private tenure; (±x) Standard Error of the mean
*, **, *** significant at 10%, 5% and 1% probability levels respectively

Source: Author; Field Survey 1997/98

Under conditions of dual property rights, the allocation of land resources to private or common use crucially depends on the efficiency of management of the common pool resources. The prevalence of cooperative behavior leads to a high efficiency of management,

which in pastoral systems could be indicated by low stocking rates (McCarthy, 1996). The problem of high stock densities is thus hypothesized to be associated with low efficiency of management of the common pool resources.

Collective action theories assert that low efficiency of management leads to appropriation of common property resources by individuals in response to economic incentives to generate socially efficient outcomes. It can therefore be inferred that despite the observed impact of rainfall and market access variables on the observed changes in land use and property rights, high stocking rates in the easy access and high rainfall areas could be serving as a disincentive for community members to cooperate in community level resource management. This may be contributing to the increasing desire for private regimes.

5 Conclusions

Like other pastoral systems in Sub-Saharan Africa, the dynamics of land use and property rights in the Borana pastoral systems is explained by an intricate interaction of socio-economic and environmental factors. The adoption of crops by pastoralists is partially driven by accessibility to market centers and towns under the influence of in-coming crop producing ethnic groups, and in some areas by suitable rainfall and agroecological conditions. In certain areas, crop production is merely adopted as a pretext for acquiring grazing land that would otherwise have been impossible to alienate. The relative ease of acquiring land from the heads of the peasant association simply by a declaration of intent to cultivate may therefore be serving as an incentive to privatization.

The desire for privatized enclosures for grazing at both the individual and community levels is more likely related to demographic factors and changing social relation. Even though the results generally indicate a positive correlation between market access, rainfall variability and privatization, yet the findings remain statistically insignificant. The impacts of market access and rainfall only show statistical significance in explaining the adoption of crops. This may suggest that other factors such as population pressure, changing price relations and declining social cohesion may be contributing to the process. From common property theories, it is asserted that the outcome of community level resource management depends to a large extent on the number of members with access to the resource. Increasing population (evident in the area) implies an increase in the number of community members for a finite resource base. This may create difficulty in enforcing existing rules and regulations or introducing new ones, leading to a low efficiency of management. The number of deviations from the common property resource management is thus bound to increase. The Borana society is getting gradually integrated into the national economic system, so that traditional rules, norms and taboos that form a cohesive force that keeps the traditional pastoralism together, are becoming weaker and weaker. This is coupled with improving prices since the national policy reforms of 1995 which may increase returns to production activities and facilitate investment in privatized enclosures.

Finally, the whole process is largely facilitated by national sedentarization policies and support for cultivation. This move implicitly supports the privatization pathway to intensification. This is evident by the formally vested authority in the administrators of the peasant associations to allocate private land, as against the authority of the elders which favors a continuity of traditional common property resource management.

¹Note

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