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Policies, Interventions and Institutional Change in Pastoral Resource Management in Borana, Southern Ethiopia

*Abdul B. Kamara, Brent Swallow and Michael Kirk**

The Borana rangelands of Southern Ethiopia are characterised by extensive livestock production under a communal land-use system that has evolved in response to variable rainfall and uncertain production conditions. However, the last two decades have witnessed an increasing privatisation of rangelands for crop production and private grazing. The results of a quantitative assessment are used to develop a framework for assessing the drivers of change and their long-term implications. It is concluded that certain national policies have resulted in conflicts of authority between traditional and formal systems, creating an avenue for spontaneous enclosures, associated conflicts and decreasing human welfare.

1 Introduction

The Borana rangelands occupy an area of about 95,000 km^2 in Southern Ethiopia. The area is semi-arid with low rainfall ranging between 300 and 900 mm per annum, with high spatial and temporal variability. The dominant ethnic group in the area are the Borana, whose life centres around extensive livestock production – predominantly cattle and small numbers of small ruminants, camels and donkeys. Despite the relatively good ecological potential (Billé, 1985: 213-16), semi-arid attributes subject the area to droughts and extreme forage scarcity, making extensive mobile livestock production a highly desirable adaptation (Coppock, 1994: 163; Smith et al., 2001). The Borana have thus, until recently, continued to produce livestock with a remarkable social organisation that has often been cited as a model of pastoralism in sub-Saharan Africa (Hogg, 1997: 1-23).

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The system is currently in transition away from the traditional transhumance system, under which rangeland resources are administered by traditional elders who define rules and implement resource-use regulations. Although a significant proportion of the resources are still held as common property, the past two decades have witnessed a dramatic increase in land allocated to crops and pastures that are either fully privatised or accessible to small sub-groups of individuals and households. Various conflicts have resulted from these changes. Studies of the factors driving these changes remain limited, with most focus on the effects of local socio-economic, market and environmental drivers of change (Desta, 1999; McCarthy et al., 2002: 9-29). Other scholars have highlighted the role of policies and development interventions, but their propositions remain largely hypothetical, with limited empirical exploration (Bassi, 1997: 23; Helland, 1997: 56-80; Kerven and Cox, 1996; Swallow and Kamara, 1999: 243).

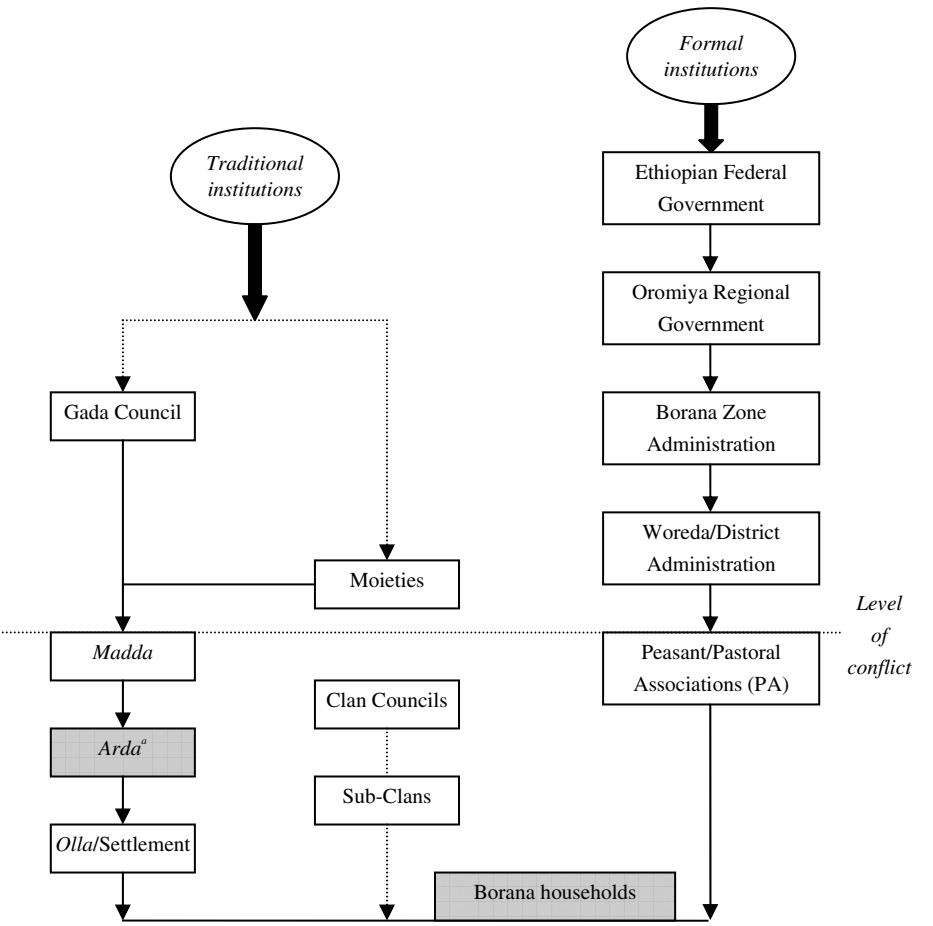
This article therefore seeks to present an empirical analysis of the role of policies and development interventions in determining local-level resource management, and how this relates to changes observed in Borana. The results of an econometric assessment of demographic, market and socio-economic factors are used to develop a non-quantitative framework for assessing the drivers of property-rights and land-use change. The article is divided into five main sections. The rest of this section presents a synoptic overview of the social dimensions and political context of livestock production in the study area, highlighting traditional institutions that have hitherto regulated resource use, and the changes that may have affected resource use in Borana. It also briefly revisits theoretical issues related to property-rights and land-use change. The second section outlines the research methodology and the data characteristics, and provides a summary of the econometric findings. Section 3 presents the in-depth analysis, while the fourth section highlights the emerging pathways to intensification and land-use change in Borana. The final section presents conclusions and policy implications.

1.1 Social dimensions and policy context

The traditional social organisation of the Borana is based on a *gada* system, which divides the entire rangelands into grazing-based administrative units called *madda*, configured around permanent water points. Each *madda* is further divided into sub-grazing units or *arda*, consisting of a few encampments or *olla* which have jurisdiction over surrounding grazing areas, cultivated land and to a lesser extent water resources. The *olla* comprises about ten households and is the smallest administrative unit in the system. There are selected councils of elders at each level, managing the affairs of the communities to ensure the implementation of resource-use rules and regulations. Property rights over pastures and water are largely communal, administered by councils of elders and clan representatives (Figure 1). Grazing rights are recognised at different levels of common property, with three distinctive forms: *forra*, *warra* and *kalo*. *Forra* areas are for the grazing of bulls and non-lactating cows, and are customarily open to the entire Borana community. *Warra* areas are restricted to grazing lactating cows and frail animals, and are only accessible to members of the custodian *arda* community. *Kalos* are thorn-fenced fodder-banks for calves and sick animals during periods of forage scarcity. The use of *kalos* is restricted to the members of the same encampment who contribute labour for fencing, bush clearing and cleaning of surrounding water

sources. This system maintained its authority and effective functioning largely from social norms, values, beliefs and traditional mechanisms of sanctioning that were used to devise resource-use rules and ensure compliance. The rules and regulations were continually adapted to adjust human and livestock populations to the changing capacity of the natural resource base (Helland, 1997: 56-80).

Figure 1: Formal and informal institutions in Borana



Note: a) unit of analysis in this study.

As with pastoralists elsewhere, the Borana traditional setting has been affected by various policies and development interventions over the past decades. Reforms in many parts of post-colonial Africa were largely based on models of private property rights or declaration of *de facto* state property rights over land resources (Kirk, 1996; Tolossa and Asfaw, 1995). In Ethiopia, the reforms largely followed socialist paths with re-distributive motives, and were associated with three phases of policy changes in the country, corresponding to the periods of the monarchy before 1974, the socialist government, or *Derg* regime, that ruled from 1974 to 1991, and the transitional government (post-*Derg*) that has ruled from 1991 to the present (Bruce et al., 1994). Land policies before the *Derg* regime favoured the feudal landlords, but paid little attention to pastoral areas, which were largely unaffected by policies. The *Derg* regime nationalised all land, set up peasant associations throughout the country, and established state farms. In the pastoral areas, it also established state ranches, set up settlement programmes for pastoralists, introduced forced livestock sales, enforced a ban on bushfires, and provided special support for cultivation. Although some of these policies have been repealed since the early 1990s, there is evidence of disruption of the social system and values of mobile pastoralism, to which current resource conflicts are strongly hypothesised as being related (Coppock, 1994: 39; Joireman, 2001; Swallow and Kamara, 1999: 244).

1.2 Theoretical issues

Several models have been put forward to explain changes in property rights, land use, and institutions. The demand-led model, for instance, is consistent with the postulates of theories of agricultural intensification, but emphasises that the redefinition of property rights follows a need to internalise externalities resulting from population growth and increasing market opportunities, and that property rights will evolve if the benefits of establishing and enforcing private rights exceed the costs (Demsetz, 1967: 347; Platteau, 1996; Posner, 1993: 195). The demand-led model is largely accepted from efficiency perspectives, on the grounds that technological innovations, factor scarcities and market opportunities do change people's preferences for different property rights. Others have expanded differently upon these models, incorporating the concept of marginal benefits and marginal costs associated with the definition and enforcement of property rights (Anderson and Hill, 1975); discrete jumps in changing property rights and the irreversible nature of such changes (Howitt, 1995: 1192); induced institutional innovation with special attention to factors affecting the supply of institutions, and the interest-group and rent-seeking theories of institutional change (North, 1992, 1995: 17-26; Ruttan and Hayami, 1985).[1]

In this article, the analysis draws largely on elements of the above theories to examine institutional change in Borana, focusing on emerging development pathways, and how these are shaped by various forces, especially resource-use policies and development interventions. We conceptualise development pathways as a set of causal factors, conditioning factors and local-level responses that define a common pattern of

1. As opposed to efficiency theory, which attributes institutional change to technological innovation and market incentives, the interest-group theory attributes institutional change to the activities of interest groups, focusing more on the process (the actors) rather than the outcome (North, 1995).

change among communities. Earlier, other scholars focused largely on the role of technology and demographic and market variables in explaining institutional innovation in resource management (cf. Kamara, 2001: 159-63; Pender et al., 1996). The current article is intended to expand the analysis by incorporating the role of policies and development interventions in depicting institutional change. It recognises the potential role of socio-economic, market and demographic variables in driving institutional change, but argues that the role of policies and development interventions should not be ignored, as these are hypothesised to play a complementary role in influencing the observed changes in Borana. The study posits that socio-economic and market factors alone may not be sufficient conditions for changes in land use and property rights, and that agro-ecological factors, policy variables and development interventions may be equally crucial factors.

2 Methodology and data

The study was conducted at the *arda* level, at which traditional resource management decisions are taken in Borana (Figure 1). The data were collected in two complementary phases in 1997/98. A first round of surveys was conducted in 40 randomly selected pastoral communities to appraise resource-use patterns and property rights, and to generate basic socio-economic and demographic data for the quantitative analysis. Communities were selected to represent different rainfall patterns with varying annual means and coefficients of variation, based on monthly rainfall data for the period 1982-96. Participatory appraisals (with GIS techniques) and semi-structured interviews were conducted, using key informants – community elders, heads of encampments, chairmen of peasant associations, well managers, etc. – as respondents. Social mapping was carried out to generate resource-use maps that provide insights into current land-use patterns, especially land allocation to crops and private grazing, and land under different property regimes. This was followed by intensive interviews consisting of structured questionnaires administered in group discussions, using the resource-use maps as baseline references. The characteristics and distribution of the sample communities are highlighted in Table 1.

2.1 Data characteristics

The 40 *ardas* consist of about 21,637 people in 199 pastoral encampments comprising 3,141 households. The area has a relatively low population density, with the majority of the households classified as poor.[2] Cattle comprise about 90% of the total livestock holding. About 16% of the land area is currently allocated to crops and eighty-four per cent to livestock production under different property rights arrangements,[3] consisting of *warra, forra* and *kalo*. About 50% of the land is currently allocated to *warra* grazing,

2. The classification into wealthy, middle-class and poor was based on the criteria suggested by the respective communities. Perceptions varied among communities, but were based largely on the possession of cattle. Thus, total livestock holding per household (in TLU) is the variable used in constructing the *Gini* coefficient that was used in the econometric estimations.
3. Crops grown in the area include teff (the staple food in Ethiopia), maize, wheat, barley and beans.

13% to *kalo*, while *forra* areas constitute slightly over 1% of the total land.[4] The rest is allocated to various other activities, including cultivation, small ruminants and private grazing.

Table 1: Characteristics of sample communities (n = 40)

Variable	Minimum	Maximum	Mean	Std Dev	Sum[a]	%
Encampment per community	1.00	21.00	4.97	4.25	199	100.00
Community (*ardo*) population	48.00	3160.00	540.93	610.00	21637	100.00
Population density[b]	4.35	218.00	46.14	46.72	-	-
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
Total	-	-	79.05	-	3141	100.00
Sum of cattle (TLU)	46.00	9345.00	1128.20	2080.80	45128.3	90.34
Sum of TLU (other animals)[c]	4.70	1515.00	120.48	246.20	4819.7	9.64
Total (TLU)	58.00	9780.00	1248.69	2229.80	49948.0	100.00
Sum of grazing land (ha)	186.8	2883	978	604	39112	83.67
Sum of cultivated land (ha)	0(32)	1050	191	230	7629	16.32
Total (ha)	249	3074	1168	639	46741	100.00
Sum common property (ha)	174	2459	889	569	35541	76.02
Sum private property (ha)	32	1050	280	281	11200	23.94
Total (ha)	249	3074	1168	639	46741	100.00

Notes: ( ) minimum besides the zeros; a) sum for all communities; b) persons/km^2; c) other animals include sheep, goats, horses, camels and donkeys; Std Dev = standard deviation; - not applicable.

The data highlight the proportion of land area held under different property regimes, defined both by the property institutions themselves and by their realisation as depicted by the area of land held under different categories of property rights. Land holdings under private property comprise 24%, while common property constitutes 76% of the total land area. Private land ownership is relatively new and is largely limited to spontaneous enclosures, with no title deeds to legitimise permanent claims. Private owners enjoy use rights as long as the land is isolated from the commons through cultivation or fencing for grazing. Such rights are usually granted by the community elders, but are also subject to the approval of the chairmen of the Peasant Associations (PAs), who currently have the highest prerogative to allocate land.

The data were analysed using both econometric and non-quantitative methods. These analyses highlight important emerging pathways of land-use intensification and property-rights change. The descriptive statistics show that land area allocated to crops is increasing, though most of the enclosed areas – ostensibly for cultivation – are actually used for grazing. About 80% of the sample communities have some households that are cultivating, of which only 30% have cultivated for ten years or longer. Thus, crop production in the area has only gained importance in recent decades. With only

4. *Forra* areas generally constitute the largest communal grazing areas in Borana. Such areas are, however, unsettled areas which do not fall within the boundaries of the sample communities, and hence they are almost absent in the investigated sample. This could imply that the estimated mean population densities for the sample communities are higher than average figures for the Borana rangelands as a whole, since *forra* areas are not included in our population density estimations.

about 12% of the area assessed to be ecologically suitable for crop production (Assefa et al., 1987; Coppock, 1994: 122), and with about 16% of the area of the sample communities currently allocated to crops, the question of whether or not this marginal and semi-arid area will sustain a fully privatised system with expanding crop production, remains a crucial issue.

2.2 Summary of econometric analysis

An econometric model was developed to assess the current utilisation patterns of the rangeland resources, and the factors driving property-rights and land-use change. Three basic equations were developed, with livestock densities in Tropical Livestock Units (TLU) per hectare, proportion of land allocated to crops (percent), and proportion of land allocated to private grazing (percent) as dependent variables.

The equations are developed by positing that community-level co-operation in resource management is affected primarily by natural conditions and socio-economic variables. These include the level and variability of rainfall, environmental variables (range condition), market incentives, including market distances and relative prices of the products competing for land use, as well as heterogeneity in wealth and income sources, and social capital variables. The effects of these factors lead to a certain level of livestock density, observable at the community level, which is accordingly defined as the dependent variable in the first equation.

Secondly, we assume, based on theoretical literature, that in crop-livestock systems with dual property rights (private and common), livestock densities (which indicate pressure on a piece of land) will determine the marginal value of land in common pastures. Thus, the observed livestock densities on land under community-based management will affect land allocation to private or common land-use activities (Kamara, 2001; McCarthy et al., 1998, 2002). Therefore the livestock density observed at the community level is entered as an explanatory variable in the land allocation equations – land allocation to crops and private grazing. The proportion of land allocated to crops is hypothesised to be a function of relative livestock-crop prices, rainfall variability, market distance, the number of years of cultivation, heterogeneity in wealth, and social capital variables. The proportion of land allocated to private pastures is hypothesised to be a function of co-operation on the common grazing land, which may be determined by heterogeneity in wealth, access to wage work, and social capital variables that facilitate reciprocal grazing arrangements.

This specification gives a recursive relationship between the stock density and land allocation equations. Therefore the stock density equation was estimated as a single equation using ordinary least squares (OLS), and the predicted value entered as an explanatory variable in the land allocation equations for the second step of the estimation. The land allocation equations conform to the seemingly unrelated regression (SUR) specification, and were thus estimated jointly. While land allocations to crops and to private grazing are posited as being interrelated, it is observed that the two equations are to a large extent determined by the same explanatory variables, with the exception of a few variables that are specific to each equation. This specification fulfils the condition for joint estimation using SUR (Greene, 1993: 578-634; Gujarati, 1995:

635-74), which is accordingly applied in the analysis.[5] The results of the estimations are presented in Table 2.

Table 2: Determinants of stock density, land allocation to crops and private grazing

Explanatory variables	Dependent variables	Land allocation equations (SUR)	
	Stock densities in TLU/ha (OLS estimate)	Land in crops (%)	Land in private pastures (%)
Total of households (in natural logs)	0.66 (5.67)[a]	0.10 (0.025)	5.21 (0.98)
Average rainfall (in natural logs)	2.01 (1.87)[b]	3.98 (0.44)	-2.03 (-0.18)
CV of rainfall (in natural logs)	-2.96 (-3.18)[a]	9.11 (1.16)	-0.32 (-0.03)
Dummy for high CV of rainfall	-3.11(-2.68)[a]	-	-
Dummy for haymaking	-0.29 (-1.16)		
Relative price livestock/grain (in logs)	1.04 (1.91)[b]	17.52 (1.52)	-
Distance to market (in natural logs)	-0.17 (–1.30)	-2.61 (–1.04)	-
Range quality index	0.04 (0.43)		
Years cultivating	-	0.47 (2.74)[a]	-
In-migration of animals (dummy)	0.15 (3.15)[a]	-0.76 (-0.70)	1.31 (0.88)
Out-migrating of animals (dummy)	0.16 (0.43)	5.53 (1.0)	-13.56 (-1.83)[b]
Members engaged in wage work (%)	-0.004 (-0.60)	0.06 (0.83)	0.001 (0.01)
Heterogeneity in wealth (gini-coeff.)	0.23 (2.42)[a]	0.31 (0.22)	1.5 (0.86)
Livestock densities (predicted values)	-	1.21 (0.26)	-10.97 (-1.77)[b]
Constant	-3.34 (-2.03)[b]	0.87 (0.02)	0.87 (0.19)
Adjusted R2	0.65	0.55	0.18
Sample size (N)	39	39	39

Notes: ( ) = in parentheses are the t-statistics; CV = coefficient of variation; OLS = ordinary least square; - variable not included in equation; a) significant at the 5% probability level; b) significant at the 10% probability level.
Source: Authors' field surveys, 1997/8.

The results indicate that population, represented by total number of households, is a positive and significant determinant of stock densities. The level of rainfall is positively related to stock densities, while the coefficient of variation of rainfall has a significant negative effect on livestock densities. Also, a dummy for highly variable

5. A SUR specification is a set of equations that include factors or explanatory variables that are common to all the equations (explanatory variables common to the system of equations), as well as others that are specific to particular equations. Such systems cannot be estimated by simple OLS (Greene, 1993: 578-634; Gujarati, 1995: 635-74).

rainfall gives a significant negative coefficient, indicating that stock densities are significantly lower in highly variable rainfall areas, which is consistent with the propositions of the 'new range ecology' (Behnke, 1994: 5; Niamir-Fuller, 1999; Scoones, 1999: 217). Among the social capital variables, heterogeneity in wealth, as well as reciprocity (arrangements that allow outsiders to graze in community areas) increase livestock densities. Heterogeneity makes it difficult to devise and enforce rules on the management of stock levels, owing to diverging economic incentives, and thus aggravates stock densities. In-grazing by outsiders could be a disincentive for co-operation since it may imply non-exclusion from reserved grazing areas. Again, these findings are consistent with evidence from common property theory and rangeland resource management elsewhere (Baland and Platteau, 1996:148; van den Brink et al., 1995: 171), although the results here show a low statistical significance. Relative prices and access to markets also bear the expected signs, though the market access variable is not statistically significant. This may imply that there is an opportunity for making modest improvements in market conditions in the area without necessarily aggravating stock densities over and above manageable level. The range quality index bears the expected sign but is not significant in determining stock levels.

The results of the land allocation equations – to crops and private grazing – indicate that most of the hypothesised variables are not statistically significant in determining property-rights and land-use change in Borana. The proportion of land under crops is greater in communities that have cultivated longer, which is very much as expected. Opportunities for grazing animals outside the community reduce grazing pressure, facilitate co-operation and promote community-based management. As hypothesised, low livestock densities foster co-operation and negatively affect individual incentives to privatise common land, and thus promote community-based management. Overall, land allocation to private grazing, which is a key source of resource-use conflicts in Borana, remains virtually unexplained, with an adjusted R^2 of 0.18, while the coefficients for nearly all the explanatory variables bear no statistical significance. A similar trend is observed in the equation for land allocation to crops.

These results consolidate the hypotheses that changes in land use and property rights may also be related to factors other than socio-economic, market and demographic variables. Therefore the need for undertaking a detailed analysis of hypothetical factors determining the process, other than those considered in the regression analysis, is evident. This assessment is confirmed by the growing number of resource-use conflicts resulting from privatisation of valuable common property rangelands resources (transhumance routes, seasonal grazing areas, etc.), the adoption of crops and subsequent tillage of marginal land areas, and associated resource degradation. In particular, the role of different national policies and development interventions, and how these interact with biophysical factors to influence the dynamics of land use and property rights in the area, remains unclear, and creates a need for further analysis.

3 The in-depth analysis

The detailed analysis was designed to provide a deeper understanding of the factors driving changes in land use and property rights in Borana. It is focused on assessing policies, interventions and environmental factors, hypothesised to affect the dynamics

of land use and property rights, which could not be incorporated in the quantitative analysis. This proposition is primarily driven by the realisation that the dynamics of land use may involve wider processes of institutional change which can be understood as long-term processes. The historical drivers of change may include issues such as national land policies related to local-level institutions, including the forced merger of traditional institutions into formally administered peasant associations, sedentarisation policies, formal support for cultivation through output price incentives and subsidised crops inputs, and development interventions. In particular, the in-depth analysis seeks to examine:

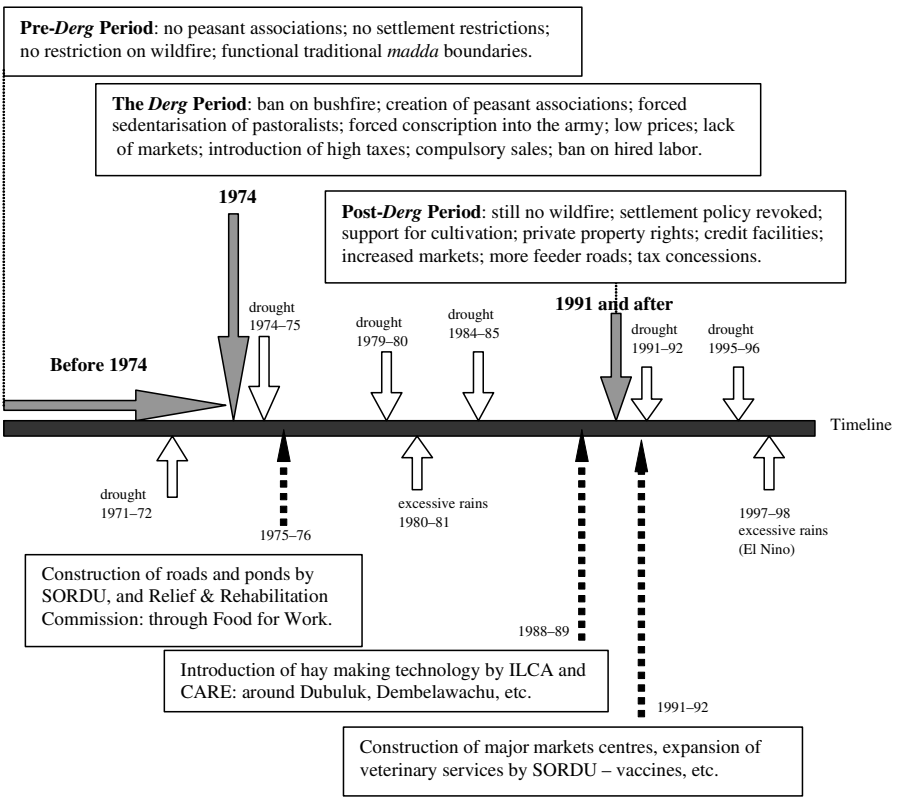
- how various policy reforms in Ethiopia have affected the authority of the traditional system in determining access to land, water and pasture in the Borana rangelands;
- the types of development interventions that were carried out in specific areas of Borana – ranches, wells, resettlement of pastoralists after droughts, etc. – and how these affected the dynamics of land use and property rights;
- how communities exposed to similar production risk, economic incentives, land policies and interventions may sometimes follow different pathways to intensification, and the long-term welfare implications of the emergence of different pathways for the sustainability of the Borana pastoral system.

An assessment of these questions is enhanced by a detailed survey of a sub-sample of four communities, which broadly represent the typology of land-use scenarios in the sample of 40 communities in the previous survey. A chronological framework of development interventions and policy events is constructed into a timeline. This is followed by a longitudinal exploration of the various issues raised in the research questions. A detailed analysis of the emerging pathways to livestock intensification and land-use change is undertaken, and the implications for livestock development in the area are assessed.

3.1 The detailed data

Two pairs of *ardas* (four communities) depicting current land-use trends in the area were deliberately selected such that each pair exhibits similar agro-ecological and socio-economic characteristics, but shows different trends of land use and property rights. This was to facilitate an analysis of the hypothesis that communities may sometimes follow different pathways to intensification, despite exposure to similar socio-economic and natural conditions, due to diverging institutional incentives and social settings. Based on the input of community elders and extension workers, and the results of the quantitative analysis, the *arda* communities of Soble and Arbate (as one pair), and Didakilensa and Gandullensa as another pair, were selected for the analysis (Appendices 1 and 2).

Figure 2: Policies, interventions and drought events in Borana (1974-98)



Note: SORDU = Southern Rangelands Development Unit, a component of the Ethiopian Ministry of Agriculture; ILCA = International Livestock Centre for Africa; CARE = Cooperation and Relief Everywhere.

The detailed data collection entailed the identification of major policy events and development activities, the construction of a timeline, and the exploration of how these events affected local-level resource management in each community. Through intensive discussions with community members (key informants including elders, well managers, women's groups, extension workers), and guidance from secondary information, policies and development interventions were identified for the period 1974-98 (Figure 2).

While the chart presents a general framework of the recorded events, the magnitude and importance of events differed across communities. The upper annotated boxes correspond to the three phases of policy changes documented in Ethiopia in the last three decades. Major national land reforms such as eviction of feudal landlords and prohibition of land titling and sale, which had little or no effect in the study area, were not explored in any detail. Rather, the analysis focused on the issues highlighted in the chart, which affected the study area. The chart further records droughts and development interventions, which are summarised in the three annotated boxes on the

lower part of the timeline. Detailed data were collected from the four communities, using retrospective methods as applied in previous studies (cf. Reid, 1997). The events were investigated, focusing on changes before, during and after each event. Population censuses were conducted in the encampments of each community, followed by interviews, using semi-formal, open-ended questionnaires, and group discussions. The interviews were also supplemented by field visits and personal observations over a two-month period.

As presented in the Appendices (also in Figure 2), all four communities exhibit low rainfall with high variability, with annual means of 353 and 473 mm per annum and coefficients of variation of 0.37 and 0.47 respectively for the two selected pairs. Soble and Arbate exhibit a large disparity in physical size, while Didakilensa and Gandulensa are similar in physical size. Didakilensa and Gandulensa maintain a large proportion of communal *warra* grazing areas, but show divergence in the extent of group enclosures and cultivation. The number and distribution of encampments and households are fairly similar within each pair of communities, but differ across the pairs (Appendix 2).

3.2 Changes in Soble and Arbate

Located in the peasant association of Wachile, the two *ardas* share similar natural characteristics and experienced the same national policies and development interventions. The fall of the monarchy in the early 1970s and the consequent emergence of the *Derg* regime engendered a series of changes in the communities, including a ban on the bushfire method of pasture improvement, the creation of peasant associations (administered by formally appointed heads), forced settlement of pastoralists and difficulty in livestock sales. Lasting for nearly two decades, these events resulted in some changes in the production framework conditions and local-level power relations, which are reflected in current land-use patterns.

The nationwide ban on bushfires in 1975-6 was particularly noted as a key development in the area, which was immediately associated with a pervasive encroachment of wild plant species of no forage value. The emerging bush also suppressed pasture growth, and reduced forage quality and the accessibility of grazing areas to animals. Diversification into browsing animals (camels and goats) to cope with the emerging bush was an immediate response in Arbate, and to a lesser extent in Soble. People in Soble further resorted to partitioning communal *warra* areas into enclosures, initially for use by all members of the seven encampments, so as to exclude non-*arda* members. As the situation worsened, these enclosures were further partitioned for use only by small sub-groups of individuals belonging to one encampment, and in some cases by single households or a few households together.

In Arbate, however, the response was different; certain areas were demarcated for grazing during certain periods of the year but for all the members of the *arda* community. The formation of more exclusive enclosures was never permitted by the *arda* elders. While seasonal transhumance to *forra* areas was permitted, a tremendous effort was made to maintain the whole community as a common grazing area for all. Both communities reported that there was no enclosure before the ban on the use of bushfire for pasture improvement in the mid-1970s.

The *creation of the peasant associations (PAs)* in the mid-1970s was also recalled as a policy intervention that affected resource management. Prior to the creation of the

PAs, grazing land was generally accessible to all Borana pastoralists within the same traditional *madda,* as long as the incumbent obeyed grazing rules and regulations. However, the creation of the PAs did not take traditional *madda* boundaries into consideration, so that different *madda* were either wholly blended into one PA or parts of different *madda* fell into the same PA. Mobility soon became constrained, culminating in disputes as people found it difficult to honour new boundaries in cases where they had effectively lost valuable grazing areas. The immediate effect of the creation of the PAs as perceived by communities entailed: (i) the severe restriction of access to grazing areas outside *arda* – though in the same traditional *madda* – due to new boundaries; (ii) loss of grazing areas left behind to replenish during transhumance, since these could no longer be secured as they became accessible to in-comers from within the same new PA, but from different traditional *maddas*; (iii) increased violation of grazing and water management rules, aggravated by declining formal support for traditional institutions, and a conflict of authority between traditional decision-makers and the relatively young chairmen of the PAs.

The creation of the PAs was further accompanied by settlement restrictions and forced sedentarisation, implemented through PA committees. With these restrictions, mobility was no longer at the discretion of local communities, since the situation obliged community members to remain within their PA or face the authority of the PA committee. Transhumance paths and traditional routes to water points became less and less accessible. Water rights, which used to give preference to elders, became subject to the PA chairman's decision. In Soble, annexation of rangeland for private grazing emerged at *arda* level, and slowly gave way to enclosures at the encampment level, and subsequently to individual private enclosures. In Arbate, grazing areas continued to be managed as *arda*-level common property, despite the restriction on mobility. Partition attempts only went as far as designating some areas for dry-season grazing and others for wet-season grazing for every member of the community.

Also, the post-*Derg* period (1991 till the present) brought increased formal support for cultivation, endorsement of private claims to land and subsidies for agricultural inputs. This also coincided with a steady increase in crop prices, while livestock prices showed a downward trend. With the formal support for cultivation, interest in group enclosures in Soble dwindled, as areas adjacent to cultivated fields provided more secure alternatives for individual enclosures. In Arbate, many attempts were made by government to introduce crops, but many users believed that common grazing was still a better option that should not be disrupted with private claims.

Major development interventions included large ponds, livestock vaccination centres and health posts for humans, as well as road networks that facilitate access to services and market centres, constructed in the 1970s. Prior to this period, livestock was marketed through middlemen at much lower prices. Improvement in medical facilities contributed to the reported increase in human population, though in-migration of highlanders also contributes to the process. Overall, most of the interventions in the two communities were geared towards the creation of permanent settlements, and associated intensification of land-use and private property-rights change.

3.3 Changes in Didakilensa and Gandulensa

With numerous ponds and reliable wells in the area, water availability does not pose a great problem in these communities as is generally the case in the rest of Borana, and the communities are well linked to market centres on the Addis-Nairobi main road. The two communities are on similar pathways to land-use intensification, but are currently at different stages of development in response to different policies and development interventions.

As in the first pair of communities, several policy-induced changes were identified in Didakilensa and Gandulensa. The ban on bushfire resulted in bush encroachment, livestock diseases and dangers from wild animals. The adoption of browsing animals, especially camels, was limited, because of relatively easy market access and less need for transportation. Changes in land use and property rights over grazing resources were minimal. Besides the spontaneous adoption of crops by some households in Gandulensa and group enclosures in both communities, there were few major changes. The creation of the peasant associations did not result in many conflicts, as the new PA boundaries largely coincided with old *madda* boundaries. However, traditional arrangements that permitted grazing across *madda* boundaries were disrupted, particularly in Gandulensa, where some people took up cultivation. In Didakilensa, transhumance to common *warra* areas was still possible and there was thus little incentive to shift to partitioning or cultivation.

The formation of peasant associations facilitated the imposition of many forms of taxes and the conscription of young males into the national army. The consequent loss of labour force (valuable for long-distance trekking during transhumance), coupled with high taxes and low livestock productivity, created great difficulties that led people to cultivation and enclosure of grazing areas near cultivated fields, especially in Gandulensa. In Didakilensa, where crops are basically absent, members claimed not to be cultivating because they did not want to put their animals 'at risk' in the sense of being tied down to a single place with segregated pastures. Proximity to market centres also facilitated the purchase of grains when needed or for storage when prices are relatively low.

There was no cultivation or rangeland enclosure in these communities before the ban on bushfire for pasture improvement and the formation of peasant associations. After these interventions, group enclosures soon emerged in the communities (Appendix 1). The enclosed area for cultivation is acquired through the PA chairmen who endorse the claims. The increased private grazing in these communities and associated conflicts are a direct result of the formal support for cultivation, and the creation of the peasant associations. Once a plot for cultivation is acquired, substantial surrounding areas can easily be fenced off and used for the grazing. Overall, traditional rules are still largely functional in these two communities. Unlike the first pair, Didakilensa and Gandulensa consist of only one large encampment each, with relatively low population density (especially in Didakilensa) and fewer problems of managing group enclosures, which are largely intended to deprive outsiders.

Also, the two *ardas* are well linked to markets constructed by various NGOs in the early 1990s, which facilitate livestock trade. The *ardas* have also benefited from large ponds, as well as haymaking introduced in the area during the late 1980s by ILCA and CARE, which laid a good foundation for sedentarisation. The increased aspiration to

obtain private land (for cultivation) was also attributed to the rising crop prices since the early 1990s, and increasing human population due to improved health facilities and weakening traditional rules, values and customs.[6]

4 Development pathways and institutional change in Borana

The discussion presented above indicates the diverging nature of strategies developed by communities to adapt to changes induced by exogenous forces. Despite exposure to similar policies, development interventions and natural conditions, Soble and Arbate are currently found on different development pathways: Soble is diversifying into crops and private rights to rangelands, while pastures in Arbate are largely maintained as common property, accessible to all community members. Didakilensa and Gandulensa seem to be on similar development pathways characterised by relatively large common grazing areas, but with significantly different levels of cultivation and enclosures for grazing.

Overall, the trends represented by these communities depict different development pathways in response to various forces. Soble is representative of communities found on a privatisation pathway with increased reliance on crops. The responses of the other communities depict different pathways that range between regulated common property, which characterises traditional Borana pastoralism, and full-scale privatisation with increasing crops, rangeland enclosures and the establishment of private property rights. As highlighted in the econometric analysis, various trends of property rights and land use are currently observable, which are related to demographic, environmental and socio-economic factors. The detailed analysis shows that the resulting grazing pressure from these variables creates an incentive for the acquisition of private land, which is barely possible under the traditional system. However, the PA chairman allocates land for cultivation, which most people acquire with a cultivation pretext, but actually use for grazing. The article therefore attributes the emerging privatisation to a conflict of authority between traditional elders and PA chairmen, which has weakened traditional authority. The recorded natural increase in population is partly due to improving health facilities, but largely to a weakening of the traditional rules that regulate marital and childbearing age and the number of wives per adult male. Loss of valuable grazing areas to bush encroachment (ban on bushfire) combines with rising population to increase pressure on the rangelands. This pressure creates incentives for private rights, which are facilitated and endorsed by the heads of the peasant associations. Community-level responses differ greatly and since they are largely driven by the activities of interest groups, they lead to different development pathways, which are conceptualised in the next section.

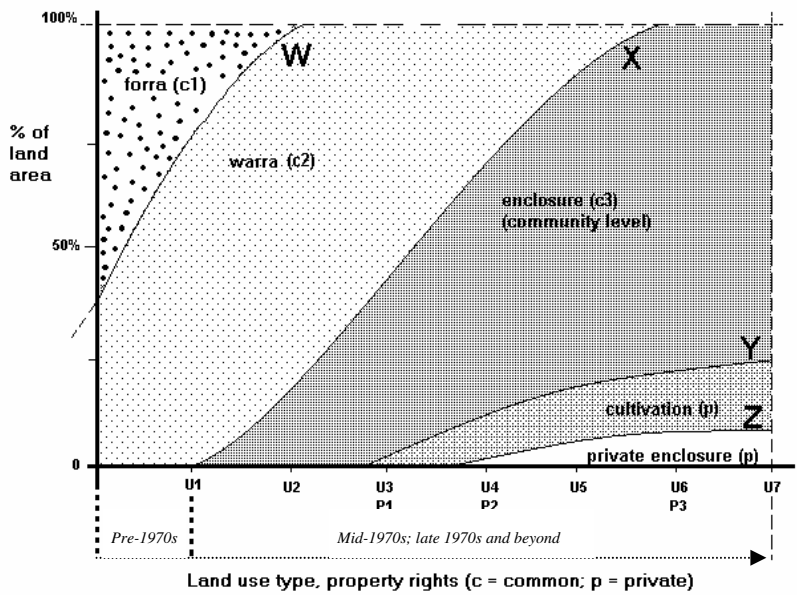
4.1 Conceptualising land use and property rights in Borana

The trends discussed so far are conceptualised in an effort to depict the changes in land use and property rights in Borana. The trends are shown in a conceptual diagram

6. The Borana tradition has provisions for determining marital age, sexual behaviour and conception age as traditional methods of controlling human population vis-à-vis the grazing resource base. With increased integration into the national economy, there is evidence that most of these customs are becoming weaker, and some are dying away.

depicting the various institutional arrangements (*warra, forra, kalo*), in which the y-axis represents land area under different activities while the x-axis represents different land uses and property rights, with a time dimension. The land areas held under different land-use types and property rights are denoted by U1 to U7, and range between exclusively common range management and trends towards privatisation. Communities occurring around U1 are pastoralists relying exclusively on communal range management and mobility. The entire community is kept to a *warra* grazing area (C2) for all *arda* members, with some *forra* areas (C1) open to all other Borana pastoralists, regardless of origin. These are relatively sparsely populated communities in locations much further away from market centres, where mobility is relied upon as the traditional risk management strategy. Though very few of such communities are currently found in the area, U1 was the predominant land-use type before the advent of the various policy changes and interventions in the 1970s, which gradually changed through U2, U3, …. to U7.

Figure 3: A model of property-rights and land-use change in Borana



Notes: **U1** = largely communal *warra* grazing, with some *forra* and no private property right; **U2** = largely *warra*; virtually no *forra*; traces of restricted grazing enclosures for all *arda* members; no private rights, no cultivation; **U3** = no *forra*; very large *warra* area; a considerable number of *arda*-level enclosures and traces of cultivation; **U4** = no *forra*, some *warra*, large proportion of enclosures (*arda*-level, *olla*-level); cultivation and enclosed grazing areas around cultivated fields; **U5** = no *forra*, relatively small *warra* area, predominantly enclosures, cultivated land and enclosures around cultivated fields; **U6**, **U7** = similar to U5 but no common property grazing areas (no *warra*, no *forra*); all grazing land is enclosed either for all *arda* members, for sub-groups or for individuals; with some cultivation.

Communities found around U2 rely almost exclusively on communal *warra* grazing (C2) with traces of enclosures in strategic areas, while the rest is used as

common pastures. These forms of land use and grazing arrangements were dominant in the late 1970s and early 1980s as responses to the early change on the rangelands. U3 depicts communities relying highly on common pasture (C2), but also in enclosures at the *arda* level for grazing by all members, with a little cultivation in naturally suitable areas such as valley bottoms and water swills. The scale of cultivation is minimal and crops are not used as a pretext for annexing pastures. This land-use type is largely representative of the area, as it is found in about 65% of the sample communities. Communities at U4 have a strong reliance on various forms of community-level enclosures (C3) rather than on communal *warra* grazing (C2). Cultivation also forms a significant component of the production portfolio, with adjacent areas enclosed for private grazing. Private enclosure of rangelands in such *ardas* is only possible around cultivated fields. Land-use types from U5 to U7 emerged only in the 1990s but are becoming increasingly important. In these communities, the reliance on communal grazing (C2) gradually gives way to restricted grazing by sub-groups, and strong reliance on crops and private property rights to grazing areas without the pretext of cultivation.

The shapes of curves **w** and **x** depict the tendency of *forra* areas (C1) slowly becoming restricted to *warra* grazing areas (C2), and *warra* areas gradually being converted into community-level enclosures of various types (C3). The curve **y** eventually becomes a horizontal straight line to indicate that cultivation cannot be extended beyond a certain natural limit, given the marginal and semi-arid nature of the rangelands. Once the high-potential areas are appropriated into crops, benefit-cost ratios and efficiency perspectives will halt the expansion of cultivation, giving rise to other forms of intensification, possibly through increased input use. Similarly, curve **z**, which demarcates the expansion of private enclosures for grazing, becomes a horizontal straight line depicting the fact that investments in rangeland privatisation will yield commensurate returns only until all the relatively high-potential areas are enclosed. Once such areas are exhausted, joint welfare maximisation under different forms of managed common property arrangement (C3) and community-level open grazing (C2) is likely to continue, so as to facilitate mobility and risk pooling across pastures of varying primary production potential – through mobility and transhumance. As depicted by the descriptive statistics (Table 1), the distribution of the forty communities peaks around U3 and U4, with large *warra* areas (C2), some group-level enclosures (C3) and some cultivation. Only about 4% of the sample communities fall between U5 and U7, where nearly all the pastures are enclosed, with little or no *warra* (C2) and no *forra* (C1).

4.2 Pathways to property-rights and land-use change

At the aggregate level, the various trends of land use and property rights broadly depict three emerging pathways to livestock development (P_1, P_2 and P_3):

- maintenance of common property grazing as traditional pastoralists with virtually no cultivation, few or no enclosures, and small ruminants and browsing animals (including camels) for mobility and adaptation to varying forage conditions – indicated by P_1, and prevalent during the pre-1970s phase;

- rangeland privatisation with expanding crop cultivation which also facilitates the acquisition of privatised grazing areas around cultivated fields, with numerous enclosures for grazing by sub-groups at the *arda* or *olla* levels, and little or no unrestricted communal grazing areas; private rights to rangeland are only possible with the pretext of cultivation and annexation around cultivated fields – indicated by P_2;
- expanding rangeland enclosures for grazing by individual households and groups of households, with diversification into small ruminants and some cultivation; private enclosures are acquired with or without the pretext of cultivation – indicated by P_3.

These three pathways can be respectively described as pastoral livestock development pathways with common property grazing and no desire for crops or privatised grazing areas (P_1); livestock production with great reliance on crops and private grazing around cultivated fields (P_2); and livestock production with incentives to privatised grazing or private rights to pastures without much reliance on crops (P_3).

The privatisation pathways to livestock development (P_2 and P_3) are clearly endogenous adaptations to a variety of incentives and exogenous pressure on the rangelands. This study shows that the changes in Borana are largely motivated by the special support for cultivation and sedentarisation programmes initiated in the 1980s, which were believed to be superior to the traditional pastoralism pursued in P_1. However, the sustainability of a sedentarised livestock production system on semi-arid African rangelands remains questionable, while opportunistic grazing, based on mobility and flexible boundaries is frequently recommended (Hogg, 1997; Niamir-Fuller, 1999; Scoones, 1999).

Therefore the emerging privatisation pathway should be envisaged more as a spontaneous and temporary response that may not be sustainable in the long run. While spontaneous cultivation and opportunistic enclosures for grazing are actually suited to some parts of the area, the variable and unpredictable nature of the rangelands requires flexible response mechanisms for long-term sustainability. These may include flexible institutions with transient rules and regulations that adjust to the seasonal availability of forage and water, and flexible property boundaries that guarantee risk pooling across patches of rangelands of varying types. These attributes are consistent with the communal range management pathway (P_1) which is inherently based on opportunistic grazing, less reliance on crops and seasonal adjustments in grazing rules to cope with feed and water availability.

5 Conclusions and implications

To a limited extent, the findings conform to the propositions of the first section of the article about socio-economic and environmental variables in driving the observed changes in Borana. That is, these variables induce pressure on the rangelands (evident in high stocking rates) and hence create incentives for individuals to take to crops or acquire private grazing land, and thereby diminish the negative externalities generated on community-owned land by overstocking. However, the limited explanatory power of the land allocation equations in particular largely validates the findings of the in-depth analysis, which attribute the changes in Borana to national policies and development

interventions. First, the advent of cultivation in the overwhelming majority of the communities coincides with the creation of the peasant associations, which formally endorse private rights to croplands, as opposed to the (now) weakened authority of the traditional elders. So, whatever the incentives generated by internal socio-economic, demographic and market variables, the previously strong system of communal resource management may have been responsible for the virtual absence of cultivation in Borana before the creation of the peasant associations.

Second, the emerging pressure on the rangelands is further attributed to biophysical factors relating to bush encroachment and loss of grazing areas. The study reveals that the current trend of bush encroachment is a direct result of a policy intervention in the early 1970s. Therefore the resulting high livestock densities due to loss of pastures and land-use changes should be seen more as an outcome of an interaction between environmental, socio-economic and policy variables. Policy variables are largely envisaged as co-actors or facilitators of institutional change, with the heads of the peasant associations endorsing private claims, and a conflict of authority between the traditional and formal systems. These findings validate the key hypothesis that land-use and property-rights change in Borana is related to national policies and development interventions.

Third, the roles of development interventions – development of road networks and market centres in recent decades – have increased the interaction of pastoralists and neighbouring agro-pastoral ethnic groups. This interaction could be associated with incentives related to lower information and learning costs for the adoption of crops, and hence there is a need to clearly understand incentives for individuals to acquire private land.

Also, it is important to understand the impact of droughts, since some communities reported that the drought-prone nature of the area is a primary reason for managing resources together as a community, so as to guarantee mobility at all times. However, without an in-depth analysis on specific drought cycles, this study can say little about the long-term impact of droughts on livestock and land-use dynamics, which is recommended as a task that still lies ahead.

5.1 Policy implications

The implications of these findings are two-fold. First, development interventions may have to pay specific attention to their impacts on the traditional values that regulate both human and livestock populations. Second, their possible impacts on equity (heterogeneity in wealth), which could be affecting the capacity of the community to manage stock levels, need to be examined, for example, in terms of their impact on livestock numbers and land allocation. Programmes that alleviate losses during drought will reduce output variability, and may lead both to high stock levels and amounts of private land over and above the social optimum, both because of moral hazard problems and because of higher risk of externalities being generated on the common pastures.

The analysis shows that demographic change in Borana is not only driven by in-migration but is also endogenously determined because of weakening traditional rules (early marriages, increasing birth rates) and improving medical facilities (declining death rates). The gradual withering away of traditional values is directly related to the shift of authority from elders to the formal heads of the peasant associations. Some of

these values are clearly relevant for community-level co-operation and are worth strengthening. A reduction in the influence of the formal authorities could be a milestone towards restoring stability and sustainability in the Borana pastoral system.

Among biophysical factors, the study recognises that the considerable loss of pastures to bush encroachment creates pressure on the resource base, with restricted mobility and subsequent congestion. Although diversification into browsing animals is an evident adaptation in some communities, the ultimate response to uncontrolled bush encroachment on pastures may be abandonment or migration. This creates a serious need to support systems stability through the provision of non-traditional pasture improvement methods as alternatives to the traditional bushfire, on which the Borana have relied for too long, but which had to be abandoned very suddenly.

More crucial perhaps is the adoption of crops and the concomitant annexation of pastures in favourable rainfall areas. In such areas, cultivation could not only be a spontaneous or opportunistic response to seasonal variations in rainfall, but may indicate a more permanent shift in land use. As only certain specific parts of the Borana rangelands are actually suited to crops – about 12%, mainly valley bottoms and water swills (Coppock, 1994: 122-36) – the trend is likely to abate after such high-potential areas are exhausted. Again, as argued already, the proposition may not hold for communities where crops are adopted merely as a pretext for the annexation of private pastures. The agro-ecological diversity of the Borana rangelands calls for selective policies that support the adoption of crops where the natural conditions make it appropriate, and extensive livestock production where suitable. The 'one policy fits all' approach in a heterogeneous system clearly has its shortcomings. These examples are valuable lessons that should be recalled in planning and policy design, not only at the national level but also at the regional and zonal administrative levels in Ethiopia.

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Appendix 1: Physical characteristics of communities in the detailed analysis

	Wachile Peasant Association		Dembelawachu Peasant Association	
Variable	**Soble**	**Arbate**	**Didakilensa**	**Gandulensa**
Size (km^2)	18.81	5.58	9.51	7.61
Mean rainfall (mm/annum)	473	473	353	353
Coefficient of variation	0.47	0.47	0.37	0.37
Mean market distance (km)	47	39	12	14
Wealth (TLU/hh)	7	13	58	76
Cultivated land (%)	10	0	5	10
Private enclosure (%)	20	0	0	0
Group enclosures-*kalo* (%)	0	0	25	15
Common grazing area-*warra* (%)	70	100	70	75

Source: Authors' field surveys, 1997/8.

Appendix 2: Demographic attributes of communities in the detailed analysis

	Wachile PA		Dembelawachu PA	
Variable	**Soble**	**Arbate**	**Didakilensa**	**Gandulensa**
No. of encampments or *olla*	7	5	1	1
Total no. of households	46	44	23	28
Female-headed households	17 (37)	12 (27)	8 (35)	8 (29)
Total population	322	276	115	140
Population density[a]	17	49	12	18
Sex composition				
No. of males	163 (51)	146 (53)	56 (49)	77 (55)
No. of females	159 (49)	130 (47)	59 (51)	63 (45)
Dependency ratios				
Old people (dependent)	32 (10)	19 (7)	10 (9)	13 (9)
Children (partly dependent)[b]	186 (58)	136 (49)	34 (30)	41 (29)

Notes: ( ) figures in percentages; a) people per km^2; b) children are not entirely dependent, participating in home-based herding activities.
Source: ibid.