

# Role of policies and development interventions in pastoral resource management: The Borana rangelands in southern Ethiopia

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# Abstract

The Borana rangelands of southern Ethiopia are characterised by extensive livestock production in response to the area's natural characteristics—aggregate mean rainfall ranges between 300 and 900 mm per annum with high seasonal and inter-annual variability. Though traditionally transhumant pastoralists, the Boranas have recently increased their reliance on crops, with evidence of communal pastures becoming either privatised, or accessible to only a small sub-group of individuals or households. Built on earlier quantitative assessment of the socio-economic drivers of the above changes, this paper focuses on the role of national level policies implemented in the area over the past decades, and how these have affected the traditional institutional setting that determines land use, property rights and pathways of livestock development. Intensive literature review was combined with in-depth key informant and group interviews to identify key policies and interventions, assess their impacts and explore the responses and strategies adopted at both individual and community levels to cope with the changing situation. While acknowledging the role of demographic and market forces as highlighted in the quantitative assessment, the paper concludes that different pathways from transhumant pastoralism have been shaped by policies and external interventions.

# 1 Introduction

The Borana rangelands occupy an area of about 95 thousand km<sup>2</sup> in southern Ethiopia. The area is semi-arid with highly variable rainfall that ranges between 300 and 900 mm per annum, with high spatial and temporal variability. The dominant ethnic group in the area are the Borana, whose livelihoods mainly depend on extensive livestock production—predominantly cattle and small numbers of small ruminants, camels and donkeys. Boranas are Oromo-speaking Cushitic people, believed to have converged from other parts of the country to the south-west during the second half of the 17th century (Bassi 1997). The area has a good ecological potential for livestock production (Billé 1983), which is the primary reason for intermittent conflicts arising between neighbouring groups contesting the area. The semi-arid attributes subject the area to recurrent droughts, the impact of which often reaches a life-threatening extent (Coppock 1994). Despite these constraints, the Borana have, until recently, continued to produce livestock with prolific success, and with such a remarkable social organisation that has often been cited as a model of pastoralism in sub-Saharan Africa (Hogg 1997).

The system is currently in a process of transition from the traditional transhumance system. Under this system, traditional elders who define rules and ensure the implementation of sanctions and penalties administer rangeland resources. Although a significant proportion of the resources (pastures and water) are still held under common property, the past 25 years have witnessed a dramatic increase in land allocated to crops, and land in pastures that are either becoming privatised, or accessible to only small sub-groups of individuals and households. While studies on the factors driving these changes remain limited, recent contributions focus mainly on the role of socio-economic, market and demographic variables (Coppock 1994; Desta 2000; McCarthy et al. 2002). The bulk of these studies conclude that changes in Borana are primarily driven by demographic, market and environmental forces, while others specifically highlight the possible role of policy variables as being co-drivers of the observed changes (Kerven and Cox 1996; Helland 1982; Bassi 1997; Swallow and Kamara 1999). These propositions, however, only remain hypothetical, as there is limited exploration of the role of specific policy variables, and how these have combined with various development interventions to lead to the observed institutional outcomes. In particular, the creation of peasant associations (PAs),<sup>1</sup> forced sedentarisation of pastoralists, government ban on traditional pasture improvement methods, and a host of development interventions are strongly hypothesised to have played a role in shaping institutional change in Borana.

This paper focuses on the role of national and local level policies implemented over the past decades and explores how these have affected the traditional institutional setting that determines land use, property rights and pathways of livestock development. The

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1. Peasant associations (PA) are officially created administrative structures that merge many small traditional communities (*arda*) into one administration. In terms of physical size, the PA compares to the highest traditional administrative unit (*madda*). However, PA boundaries often never coincide with *madda* boundaries, blending parts of different *madda* into one PA, leading to resource use conflicts.



study seeks to clarify the role of policy variables in driving institutional change among the Borana community and explain how these have affected local level resource management. As a driving hypothesis, the study posits that national policies and development interventions are as important as socio-economic, market and biophysical variables and sets out to assess the role of these factors in driving property rights and land use change in Borana.

The paper is divided into four main sections. Section 2 deals with the social organisation of the Borana, highlighting traditional institutions that have hitherto regulated resource use, and presents a synoptic overview of the political context that may have affected resource use in Borana. This section also briefly revisits theoretical issues related to property rights and land use change. Section 3 deals with the research methodology and presents a summary of related research results. Section 4 highlights the emerging pathways to intensification and land use change in Borana and discusses policy implications while Section 5 presents an in-depth analysis of the research results.

## 2 Social dimensions of resource use

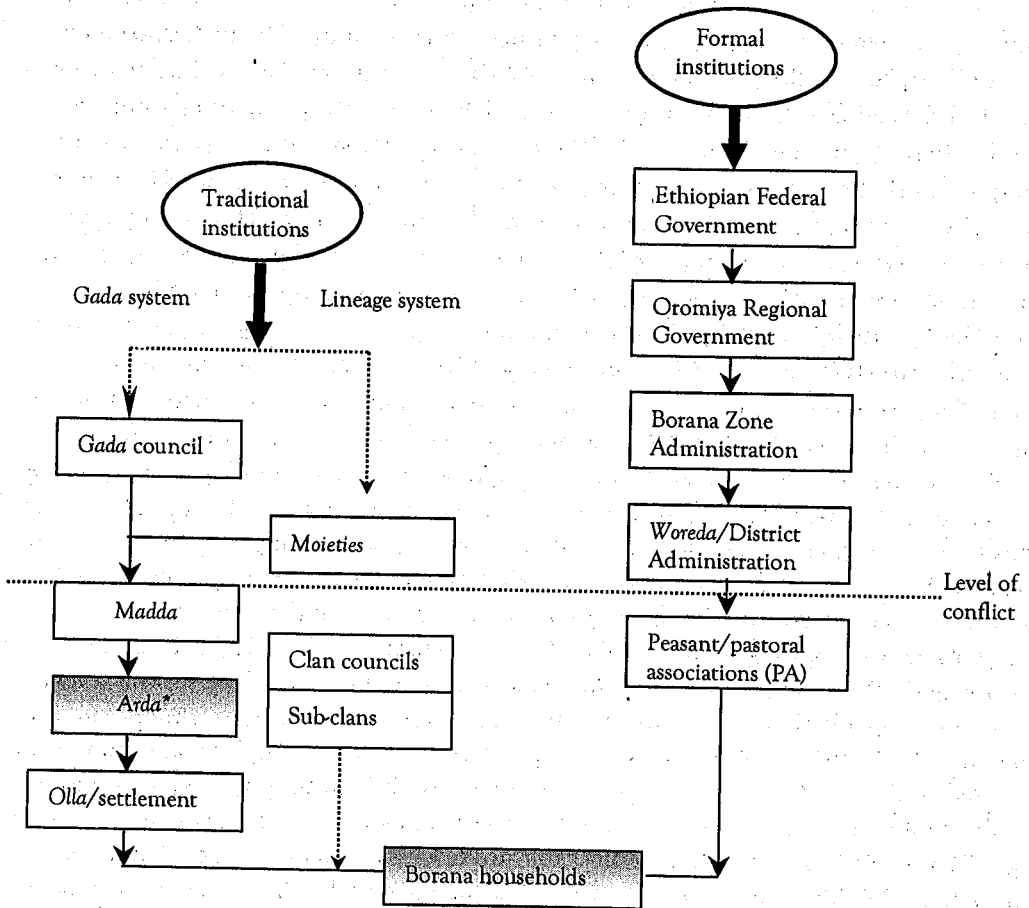
The social organisation and traditional system of resource management in Borana has survived for centuries independent of the formal administration. The highest council under the system is the *gada* council, which divides the entire rangelands into traditional grazing-based administrative units called *madda*. The *madda* on their part are centred around permanent water sources, usually traditional deep wells, which are vital to Borana pastoralism. All economic and social life revolves around the wells. The *madda* is further divided into sub-grazing units called *arda*, which consist of a few encampments that have jurisdiction over some form of grazing area, cultivated land and to a lesser extent, on water resources. The encampments or *olla*, which comprise about ten households, are the smallest administrative units in the traditional system. There are selected councils of elders at each of these levels who are responsible for managing the over all affairs of their respective communities in a manner that ensures the implementation of resource use rules and regulations in the community (Legesse 1973).

Grazing resources in Borana—pastures and water—are largely owned at the community level and administered by a council of elders and clan representatives (Figure 1). Under this system, pastures are demarcated in different levels of common property regimes called *forra*, *warra* and calf enclosures. *Forra* areas are designated for the grazing of bulls and non-lactating cows (dry herds) and are customarily open to the entire Borana community regardless of origin. Such areas are primarily regarded as fallback areas during periods of forage scarcity, but not for permanent settlement. The second level of common property, the *warra* areas, are grazing areas for lactating cows and frail animals, and are only open to members of one group of the *arda* community, but can sometimes be used by members of a different *arda* under reciprocal arrangements. Grazing in *warra* areas is unrestricted except during periods of forage scarcity, when herd-splitting<sup>2</sup> agreements force dry herds to migrate. The third level, the calf enclosures, consist of thorn-fenced fodder-banks that are reserved for grazing by calves as well as sick and weak animals during periods of forage scarcity. The use of enclosures is restricted only to members of the custodian encampment or *arda* community, who contribute to the collective investment, including labour for fencing, bush clearing and cleaning of surrounding water sources. Water resources consist largely of ponds and traditional deep wells. Each water source is subject to a complex set of restrictions, rules and regulations that are administered and enforced by selected agents under the surveillance of the traditional elders.

As depicted in Figure 1, the system previously did not directly conform to the formal administrative structure and hence had little reliance on it. Rather it maintained its authority and functioning largely based on social norms, values, beliefs and traditional mechanisms of sanctioning that were used to devise resource use rules and ensure compliance. These rules and regulations were continually adapted over time to adjust human and livestock populations to the changing capacity of the natural resource base.

2. Herd splitting in Borana refers to the separation of dry herds (non-lactating cattle) from the rest of the herd so that they can be moved over long distances in search of better forage.

There was, thus, a traditional mechanism in place that regulated human and livestock activities to the capacity of the environment.



\* Unit of analysis in this study.

Figure 1. Formal and informal institutions in Borana.

## 2.1 The policy context

As is the case with pastoralists elsewhere, the traditional setting of the Borana pastoralists encountered the impacts of 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 (Tolossa and Asfaw 1995; Kirk 1999). In Ethiopia, the reforms largely followed a socialist reform with redistributive motives and were associated with three distinct phases of policy shocks in the country. These phases correspond to the period of the monarchy before 1974, the socialist government that reigned from 1974 or the Derg

regime, and the Federal Democratic Republic Government of Ethiopia (post Derg) from 1991 to the present. Each phase is characterised by policy changes that have very important implications for different production systems in diverse sections of the country (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 at that time. The Derg regime nationalised land, established state farms and ranches, initiated settlement programmes (sedentarisation of pastoralists) and peasant associations, forced livestock sales, laid a ban on wildfire and provided special support for cultivation. Although most of these policies have been repealed since the demise of the Derg in 1991, there is still some evidence of disruption of the social system and values of mobile pastoralism. This is coupled with a host of development interventions that are believed to have affected pastoral livestock production in Borana.

## **2.2 Processes of property rights and land use change**

Two models (demand-led and supply-led) have been put forward to explain changes in property rights; land use and institutional change (Demsetz 1967; Anderson and Hill 1975; Posner 1977). The demand-led model is consistent with the postulates and theories of agricultural intensification, but emphasises that the redefinition of property rights by communities follows a need to internalise externalities that are inevitable agents of population growth and expansion of market opportunities. It also contends that property rights would evolve if the benefits for establishing and enforcing private rights exceed the costs (Demsetz 1967; Platteau 1995). Though with some criticism, the demand-led model is largely accepted because factor scarcities and market opportunities change people's preferences for different property rights. This consideration forms the basis of the quantitative assessment in the first part of the analysis.

Many authors have, however, expanded this model in various ways; by incorporating the concept of marginal benefits and 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 property rights change (Howitt 1995); inducing institutional innovation with special attention to factors affecting the supply of institutional innovation (Ruttan and Hayami 1985) and considering the interest-groups and rent-seeking theories of property rights change. North (1992, 1994, 1995) focused on the dependency of institutional change on path, citing the importance of individual and shared 'mental models', which are used to explain certain patterns of change among communities. The in-depth analysis is largely based on the elements of these theories.

## **2.3 Pathways to intensification and land use change**

The concept of development pathways has been fairly established in recent studies highlighting local level processes of intensification and land use change (Lele and Stone

1989; Pender et al. 1996; Kamara 2001). Development pathways are defined by a set of causal factors, conditioning factors and local level responses that define a common pattern of change among communities. Demographic, market and technologically induced intensification factors are described, among others, in the postulates of Boserupian theory, which highlights the role of changing factor scarcities and prices. Lele and Stone (1989), among others, expanded upon these theories by incorporating the role of government policies in depicting the nature of institutional changes particularly in natural resource management at the local level. The impact of these variables, in particular groups of communities, will depend on the available institutions facilitating and/or endorsing the change and on community characteristics such as natural resource endowments and human and social capital—the presence of local institutions, rules, regulations and enforcement agents. These incentives may result in different pathways to intensification.<sup>3</sup> Pender et al. (1996) referred to these as ‘conditioning factors’ that constrain resource use decisions at both the household and community levels, leading to different incentives that give rise to divergences in preferences for property regimes. The outcomes of these pathways are measurable in terms of changes in productivity, human welfare and natural resource conditions.

3. In pastoral areas in eastern Africa, recent studies have revealed many factors driving changes in property rights and land use (Behnke 1986; Ensminger 1992; Kirk 1994; Ruttan 1995; Swallow and Kamara 1999). Focusing on Kenya, Ethiopia, Somalia and Sudan, the studies categorised the factors according to the pathways they depict, and broadly distinguished the processes into endogenous development of local commons, state sponsorship of local commons, state sponsorship of individualisation, endogenous individualisation, resilient customary systems, and creation of open access. The development of endogenous local commons may be a response to mounting pressure on local resources, in which formal recognition is sought to protect the resource base. State sponsorship of local commons relates to the supply-driven concept of group ranches, which was seen as a means of strengthening group-based property rights to increase efficiency. Endogenous individualisation—spontaneous enclosure of rangelands based on individuals’ judgment of profits—is also noted especially in Sudan and Somalia (Behnke 1986), and in southern Ethiopia (Swallow and Kamara 1999). While such individual responses, backed with formal support, may lead to destruction of functional common property systems as was evident in Butana in Sudan (Kirk 1996), some customary systems may continue to be resilient, responding to exogenous changes only as a group (McCabe 1990; Stiles 1992).

### 3 Methodology and data collection

The study was conducted at the *arda*–community–level where resource management decisions are taken (Figure 1). The data collection was undertaken in two complementary phases during the 1997/98 production year. A first round of survey was conducted in 40 pastoral communities to appraise resource use patterns and property rights and generate basic socio-economic and demographic data. Divergence in rainfall conditions and market access were the main criteria for the selection of sample communities. Communities representing different rainfall patterns were selected: high mean with high coefficient of variation; high mean with low coefficient of variation; low mean with high coefficient of variation; and low mean with low coefficient variation, based on a 15-year monthly rainfall data (1982 to 1996). Using these criteria and a reference to 14 weather stations in the study area, a random sample of 40 communities were selected (see rainfall characteristics in Annex I).

The first phase of the survey employed a combination of participatory appraisals and semi-structured interviews. The respondents included community elders, heads of encampments, heads of peasant associations, key informants such as water well managers and other group representatives, including women. Social mapping was done to provide insights into current land use patterns especially land allocation to crops, private grazing and land areas held under different property regimes. Geomorphologic units such as mountains, valleys and depressions were visited to relate the observations to the discussions and resource use maps generated in the interviews. Private and common property grazing areas were appraised, followed by cultivated areas and adjacent enclosures. Measurement of boundaries was largely facilitated by geographic information system (GIS) techniques. The resource appraisal exercise was followed by intensive interviews consisting of structured questionnaires administered in group-discussions using the resource maps as baseline references.

#### 3.1 Socio-economic characteristics of the sample communities

Socio-economic characteristics of the sample communities covered in the study are presented in Table 1. The 40 *ardas* have a total population of 21,637 people grouped into 199 pastoral encampments comprising 3141 households. The area has a low population density with about 46 people/km<sup>2</sup> and four to eight people per household. The majority of the households are classified as poor, 26% of which are female headed. Cattle are the most important livestock species, with about 64,470 heads of cattle (45,130 TLU),<sup>4</sup> accounting for about 90% of the total livestock holdings. Livestock

4. Tropical livestock unit (TLU) is a unit of parameterisation for livestock of different sizes and species used to facilitate aggregation. Following the FAO standard conversion procedure, it is taken to be the equivalent of an animal with a liveweight of 250 kg (Jahnke 1982, 10). According to this procedure, TLUs are obtained by multiplying cattle by a factor of 0.7, sheep and goats by 0.1, camels by 1.0, donkeys by 0.7 and horses by 0.8.

holdings at the household level vary between 2.5 and 140 TLU for the poorer and wealthier households, respectively.

**Table 1.** Characteristics of sample communities (n = 40).

Variable	Minimum	Maximum	Mean	Standard deviation	Sum <sup>a</sup>	%
Encampment per community	1.00	21.00	4.97	4.25	199	100.00
Community ( <i>arda</i> ) population	48.00	3160.00	540.93	610.00	21637	100.00
Population density <sup>b</sup>	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
Number of cattle (TLU)	46.00	9345.00	1128.20	2080.80	45128.3	90.34
Number of other animals (TLU) <sup>c</sup>	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
Grazing land (ha)	186.8	2883	978	604	39112	83.67
Cultivated land (ha)	0 (32)	1050	191	230	7629	16.32
Total (ha)	249	3074	1168	639	46741	100.00
Common property (ha)	174	2459	889	569	35541	76.02
Private property (ha)	32	1050	280	281	11200	23.94
Total (ha)	249	3074	1168	639	46741	100.00

a. Sum for all communities.

b. Persons/km<sup>2</sup>.

c. Other animals include: sheep, goats, horses, camels and donkeys  
— not applicable.

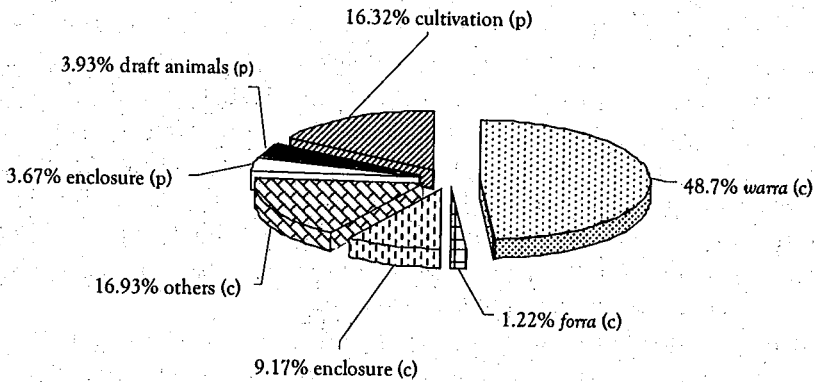
Source: Authors' field survey, 1997/98.

### 3.2 Land use, property rights and development pathways in Borana

The land use patterns show that about 16% of the land is currently allocated to crops while the remaining 84% is used for livestock production under various private grazing and common property arrangements, which include reserved areas for settlement and small ruminant grazing.<sup>5</sup> About 50% of the total land is allocated for *warra* grazing (Figure 2), which is present in 83% of the sample communities. Calf enclosures are present in about 80% of the communities but account only for 13% of the total land area, about 4% of which also belongs to private individuals. Private enclosure of rangelands is a relatively new phenomenon and is present in only 17% of the sample communities. *Forra* grazing area constitutes only 1.2% of the total land area and is present only in one community. *Forra* areas generally constitute the largest communal grazing areas in Borana. Such areas are, however, unsettled areas, which fall outside the

5. Crops grown in the area include teff (the staple food in Ethiopia), maize, wheat, barley and beans, with average area cultivated by households ranging between 0.4 to an average of 2.4 ha.

boundaries of the sample communities, and hence, are almost absent in the investigated sample.<sup>6</sup>



(c = common property; p= private property)

*Warra* (c): Communal grazing areas for milking cows, calves as well as sick and weak animals.

*Forra* (c): Unrestricted communal grazing areas generally reserved for non-lactating cattle, unsettled areas, open to all Borana pastoralists (could not be included in sampling).

*Enclosure* (c): Highly restricted for use by groups of households, usually in the same encampment; used mainly for calves during periods of forage scarcity.

*Enclosure* (p): Private enclosures for grazing calves belonging to individual households.

*Draft animals* (p): Private enclosures adjacent to cultivated fields; for grazing draft animals

*Cultivation* (p): Cultivated areas belonging to individual households.

*Others* (c): Reserved areas around settlements for grazing small ruminants, camels and equines.

**Figure 2.** Land use patterns and property regimes in percentage of land area.

Figure 2 also highlights the proportion of land held under different property regimes—common and private property. Property rights are defined both by the property institutions themselves and by their realisation as depicted by the amounts of land area held under different categories of property regimes. Private property rights are thus depicted by the land area held under private ownership and are made up of private enclosures for calves, cultivated land and adjacent areas for draft animals, which currently constitute about 24% of the total land area. Predominantly, grazing areas are managed as common property, which constitute 76% of the total land area. Private land ownership is relatively new and is largely based on usufruct, as there are no title deeds to

6. This could also imply that the estimated mean population densities for the sample communities are slightly higher than figures on the area as a whole. Densities over the entire Borana plateau are lower, because of these larger *forra* areas to which all Borana people have access but which do not specifically belong to any particular community, and hence, are not considered in our population density estimation.



legitimise permanent claims. That is, the private owners enjoy use rights as long as the land is being isolated from the commons through cultivation or by fencing for grazing purposes. Such rights are granted by the community elders upon approval from the chairmen of the peasant associations (PAs), who hold the highest prerogative for the allocation of land.

The current data highlight important emerging pathways of land use intensification and property rights changes in Borana. Land allocated to crops is increasing, though most of the enclosed areas for cultivation are actually used for grazing. Currently, about 80% of the sample communities contain some households that cultivate. About 30% of these adopted cultivation only in the last ten years, while only 10% have been cultivating for more than twenty years. Thus, crop production gained importance only in recent decades. Using aerial photographs, Assefa et al. (1987) estimated that only 0.3% of the area was cultivated in 1982, compared to 1.4 and 16% in 1986 (Coppock 1994) and 1997/98 (the current study). Private enclosure of rangelands for grazing has also emerged in recent decades and is gradually increasing.

Econometric assessment of the determinants of these trends by using a sample of 40 communities in the initial analysis and focusing largely on rainfall variability, population density, market access as well as environmental and social capital variables (rules, regulations, violations and sanctions), has established a link between stock density and community level co-operation. This, in turn, was hypothesised as an incentive for individuals to acquire private land for cultivation and private grazing (Kamara 2001, 112–138). Though the econometric estimation further highlighted the relative importance of socio-economic, market and demographic determinants of land allocation to crops and to private pastures (Kamara 2001; McCarthy et al. 2002), rangeland privatisation remained virtually unexplained,<sup>7</sup> suggesting the possible existence of other determinants not captured in this cross-sectional analysis. In particular, the impact of policy and development interventions on environmental and socio-economic variables and their effects on the dynamics of local level resource use remain unclear. This also creates a need for an in-depth analysis.

7. With adjusted  $r^2$  of 0.41 and 0.18 for land allocation to crops and private pastures, respectively, the rangeland privatisation equation remained virtually unexplained by the cross-sectional analysis (see Kamara 2001, 133; McCarthy et al. 2002, 20).

## 4 In-depth analysis of trends in land use and property rights

This detailed analysis is designed to provide a deeper understanding of the trends in land use and property rights and to assess the causes and consequences of these changes for pastoral livestock development in the area. It focuses on assessing policies, interventions and environmental factors believed to affect the dynamics of land use and property rights but which have not been adequately assessed by the quantitative analysis. This proposition is primarily driven by the realisation that changes in land use may involve wider processes of institutional change and which are best understood only under long-term considerations. These may include a broad range of issues such as national level land policies as related to local level institutions, including the forced merger of traditional institutions such as the *madda* into formally administered peasant associations. Government policies that gear towards the sedentarisation of pastoralists and special support for cultivation through price incentives and subsidised crops inputs and development interventions by government agencies as well as national and international non-governmental organisations (NGOs) at the local level and their consequences on traditional management institutions could be taken as other factors.

Other phenomena also include, natural occurrences such as droughts, ethnic incursions associated with conflicts and loss of grazing territory. In particular, the in-depth analysis seeks to address the following detailed questions on:

- How the various policy reforms discussed above affect the authority of the traditional system in determining access to land, water and pasture on the Borana rangelands
- The types of development interventions carried out and in which specific areas—ranches, wells, resettlement, relief programmes etc.—and how these phenomena affect land use, property rights and livestock development
- Major events—droughts, conflicts and the resulting loss of territory and livestock—that occurred during these periods and how they contributed to the observed trends
- Whether communities exposed to similar production risks, incentives, land policies and interventions sometimes follow different pathways to intensification; and if so, what the long-term implications of the emergence of different pathways to intensification and land use change are.

The study seeks to address these questions aided by a detailed survey of sub-sample of four communities from among the 40 communities examined in the survey. By mapping out a chronological framework of occurrences and using a timeline of events, a longitudinal analysis is also conducted to explore various events mentioned in the research questions and possible implications for the dynamics of land use and property rights in the area. This is followed by a detailed analysis of the emerging pathways to livestock intensification and land use change and implications for livestock development.

## 4.1 Detailed data

Two pairs of *arda* (four communities) were purposefully selected, from among the sample of 40 communities in the econometric analysis, such that each pair exhibits similar agro-ecological, demographic, market and rainfall characteristics, but different trends of land use and property rights. This was done to analyse how communities follow different development pathways, despite exposure to similar socio-economic and natural conditions. Based on inputs from community elders, extension workers and the results of the initial surveys, the above criteria led to the selection of Soble and Arbate in the *madda* of Wachile, and Didakilensa and Gandullensa in the *madda* of Dembelawachu, as shown in Figure 3.

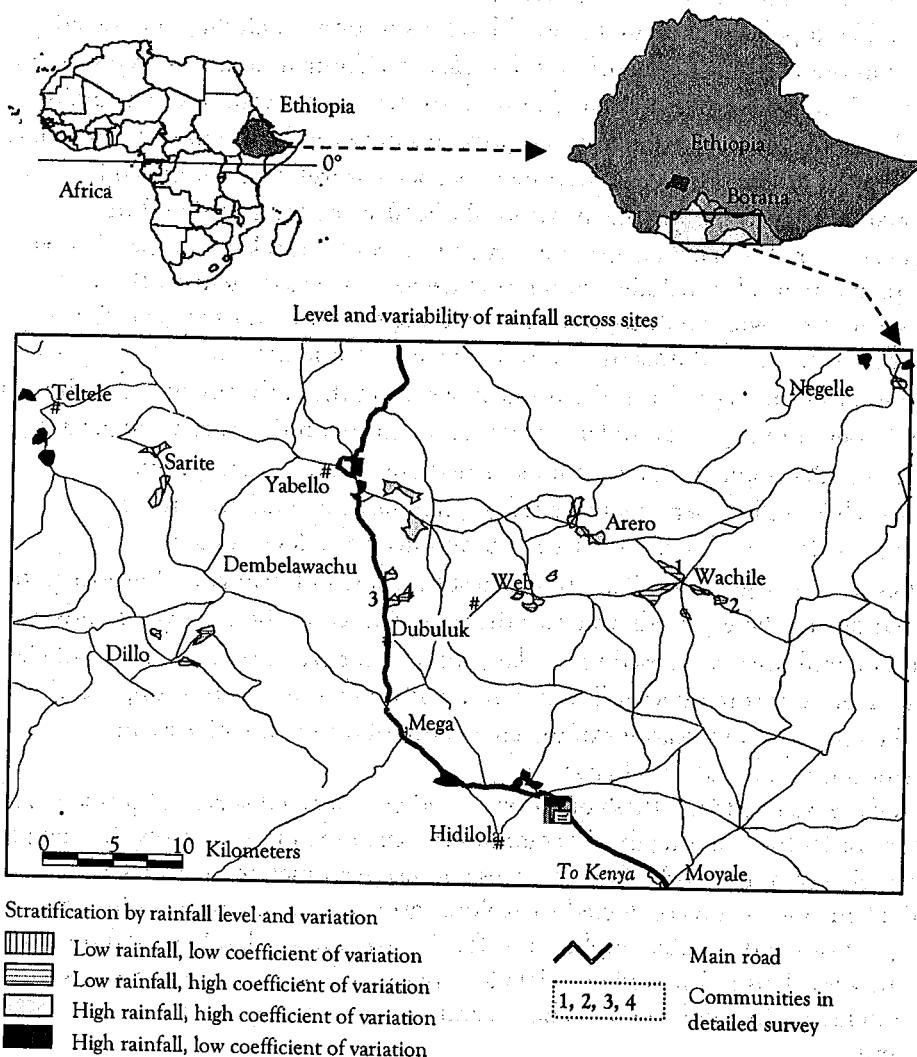
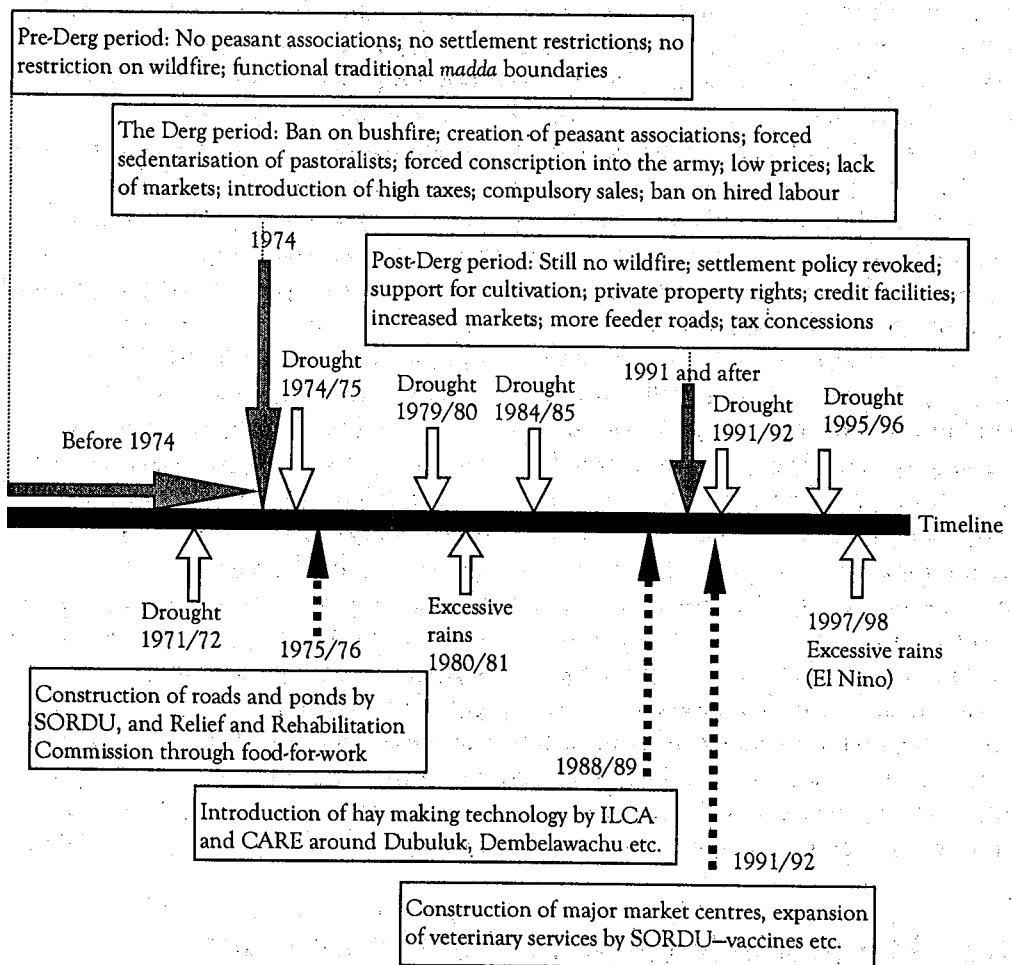


Figure 3. Characteristics and distribution of sample communities in the study area.

The detailed data collection entailed two complementary activities: the identification of major policy events, development activities and the construction of a timeline of events, and the exploration of how these events affected local level resource management in each community. Through intensive discussions with community members (elders, water well managers, women's groups, extension workers) and guidance from secondary information obtained at the national, regional and district levels, various policy events and interventions were identified for each community. The identified policy events were crosschecked against the suggestion of the key informants and respondents. Spending about three days in the community, the key informants produced a comprehensive checklist with the help of locally recruited field assistants. The list was standardised into a chronological chart of events, the timeline (Figure 4), using the traditional system of timing.



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

Figure 4. Policies, interventions and drought events in Borana (1974–98).

While the chart presents a general framework for the events recorded in all the communities, the specific occurrences differed slightly in magnitude and relative importance across the rangelands. The timeline is divided into three parts, corresponding to the three phases of policy shocks documented in Ethiopia in the last decades. The three annotated boxes on the upper section of the timeline depict these phases. Major land reforms such as eviction of feudal landlords, prohibition of land titling and sale, which had little or no effect in the area, were not explored.

Added to the policy elements, the chart further highlights the recurrence of droughts, and development interventions, as summarised in the three annotated boxes on the lower side of the timeline.

Following the timeline, retrospective data was elicited from the four communities over a two-month period, drawing largely on methods applied by Reid (1997). The events were investigated using guiding questions about changes before, during and after each event in the chart. Population census was conducted in the encampments of each community. This was followed by interviews consisting of semi-formal, open-ended questionnaires and group discussions with heads of encampments, elders, women's groups, extension officers and heads of peasant associations. The reference timeline and the checklist of key variables were used to focus the discussions on the dynamics of livestock and human populations and how these relate to each event, the causes and perceived consequences on land allocation patterns and how these are driven by policy processes and other events in the timeline. The interview was also supplemented by field visits and personal observations.

The characteristics of the communities are presented in Annexes II and III. All the communities exhibit low rainfall with high variability, with annual means of 353 and 473 mm/annum and coefficients of variation of 0.37 and 0.47, respectively, for the two selected pairs. Soble and Arbate exhibit large disparity in physical size, recording 18.8 and 5.6 km<sup>2</sup>, respectively, while Didakilensa and Gandulensa average around 9.5 and 7.6 km<sup>2</sup>, respectively. There is a great disparity in the livestock densities between the communities in each of the selected pairs. Mean livestock holdings are fairly identical in one pair, but significantly different in the other. Land use patterns and property rights are distinctly different in the first pair of communities but fairly identical in the second pair. In one pair, both communities maintain a large proportion of communal *warra* grazing areas, but show a divergence in the extent of group enclosures and cultivation. The demographic attributes differ in each pair of the communities. The number and distribution of encampments and households are fairly uniform within each pair, but differ across pairs (Annex III). The proportion of female-headed households is also fairly uniform, though population densities differ radically within the selected pairs of *ardas*.

## 4.2 Findings in Soble and Arbate communities

Both communities reported to have been in their current locations for very many decades, moving only once in the past 25 years due to ethnic conflict with the neighbouring Gari tribe in 1991/92. Arbate community are further reported to have

been relocated for three years between 1976 and 1979, due to the Ethio-Somalia war. Besides such interruptions and seasonal transhumance, the two communities have been fairly sedentary. Both located in the peasant association of Wachile (Figure 3), the two *ardas* share similar experiences in terms of national policies, development interventions, rainfall and agro-ecological conditions and droughts. Thus, the divergence in current trends of land use and property rights is likely to be related to differences in strategies or responses to the various events documented in Figure 1.

Policy related discussions in all the communities were centred around the three distinct phases of policy shocks in Ethiopia, and associated events that had a direct impact on the communities. The fall of the monarchy in mid 1970s and the consequent emergence of the Derg regime engendered a series of changes. These include a ban on the bushfire method of pasture improvement, the creation of peasant associations, forced settlement of pastoralists, difficulty in livestock trade and issues related to the liberalisation of labour markets. Lasting for nearly two decades, these occurrences created some changes in production framework conditions and local level power relations.

#### 4.2.1 Ban on bushfire methods of pasture improvement

Introduced in 1975/76, the nationwide policy affected the whole of the country, including communities in Borana. The immediate outcome was a pervasive bush encroachment mainly by acacia species of little or no forage value. A considerable part of valuable grazing areas were lost and subsequently abandoned each year. The emerging bush also suppresses pasture growth, reduces forage quality and the accessibility of grazing areas to animals. Besides this, the communities further reported the spread of tick-borne diseases and parasites that affected both human and livestock populations, while the bush further created a breeding ground for crawling creatures and wild animals. As perceived by the communities, the greatest impact was a general reduction in livestock holdings due to increased production risks—decreased forage availability, high incidence of diseases and exposure to wild animals and snakes.

Without an alternative to the traditional fire method of pasture improvement and reclamation, the communities employed local level mechanisms of adapting to the situation. Diversification into browsing animals (camels and goats) to cope with the emerging bush and to facilitate mobility was an immediate response in Arbate, and to a lesser extent in Soble. People in Soble further resorted to partitioning of communal *warra* areas into enclosures for use by all members of the seven encampments of the *arda* community (Annex III), and excluding only non-*arda* members. As the situation worsened, these enclosures were further partitioned for use only by sub-groups of individuals belonging to one encampment, and in some cases by single households or a few households together. This could also have been facilitated by a relatively large *arda* size of 19 km<sup>2</sup>, compared to 6 km<sup>2</sup> for Arbate (Annex III). The response in Arbate was different. Here, certain areas were indeed demarcated for grazing at 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 (outside the community) was permitted, tremendous effort was exerted to maintain the whole community as a common grazing area for all. Both communities conceded that there was no enclosure before the ban on the use of fire for pasture improvement in the mid 1970s, giving evidence of policy-induced changes in local level resource management.

#### 4.2.2 Creation of peasant associations

The communities recalled the creation of the peasant associations (PAs) in the mid-1970s, which are formally created administrative units that coincide with the traditional *madda*, or merges parts of different *madda*. The much younger heads of new formal units or the PA-chairmen were vested with much authority for land allocation and presiding over resource use issues, as against the authority of the *madda* elders. Land allocation had created serious grazing problems. Prior to the creation of the PAs, grazing land was generally available to all Borana pastoralists within the same traditional *madda* as long as the incumbent paid his taxes in the area of new settlement, and obeyed the grazing rules and regulations. In the rainy season, it was possible to move all animals in search of better forage while the safety of grazing areas left behind to replenish could be guaranteed, due to strong mutual respect for traditional boundaries. However, in most cases, 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 *madda* fell into different PAs. Mobility soon became seriously 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 impact of the creation of the PAs as perceived by communities can be summarised into the following key points:

- i. Access to grazing areas outside *arda*—though in the same *madda*—is severely restricted
- ii. Grazing areas left behind to replenish are no longer secure since they become accessible to in-comers from within the same new PA, but from different *maddas*
- iii. Increased disobedience to traditional grazing and water management rules and regulations, aggravated by little formal support for traditional institutions, and a conflict of authority between traditional elders and the relatively young chairmen of the peasant associations.

Besides these immediate outcomes, the creation of the peasant associations went hand-in-hand with settlement restrictions and forced sedentarisation, which further constrained mobility. The PA committee had enough power to evict in-comers not belonging to the PA, and to restrict out-migration to other PAs. With these restrictions, mobility was no longer contingent upon the discretion of local communities about whether or not to honour new boundaries but one which obliged community members to remain within their PA or face the authority of the PA committee. Transhumance paths and traditional routes to water points thus became less and less accessible. Water rights, which used to be determined by elders, became subject to the PA-chairman's decision.

The communities responded to these sedentarisation processes by intensifying local land use. In Soble, the respondents noted that annexation of rangeland for private grazing was not only the outcome of forage scarcity due to the ban on fires, but also a response to the restriction of mobility. *Arda*-level enclosures slowly degenerated into encampment-level enclosures, which in turn have now given way to private enclosures. In fact, privatisation at the individual level was never possible before the creation of the PAs when land allocation was purely in the hands of the elders. Now PA committees allocate land in consultation with *arda* elders, which creates room for lobbying by interest groups with diverging interests. The elders in Soble recalled that the divergence in interests between those who could afford to invest in the erection of fences and maintenance of private enclosures, and those who lacked the means to do so, culminated in the emergence of 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, contingent upon the approval of the PA-chairman. Both communities reported that water shortages led to the initiation of pond projects. In Soble, most of the projects were initiated by individuals, and supported by the rest of the *arda* members, and sometimes NGOs. Such initiators enjoy the unique position of 'father of the well' (*Aba-Hirega*), which empowers them to preside over issues related to management and use of the pond. In Arbate, the pond projects were initiated and carried out mainly by the community members as a whole, resulting in more equal access and rights for use among members.

### 4.2.3 Special support for cultivation

The post Derg period (1991 onwards) has been perceived to be one of relaxation of rigid settlement policies and trade liberalisation. The central government has given special support for cultivation and endorsement of private claims to cultivated fields. This policy was implemented through the supply of subsidised agricultural inputs such as improved seeds and facilitating private acquisition of land for cultivation with the endorsement of the PA-chairmen. This was coupled with a steady increase in crop prices since the early 1990s, while livestock prices have slowly declined (relative crop-livestock price ratio from cross-sectional data in 1998 was 1.03).<sup>8</sup> This led to an increase in cultivation in Soble, where the trend continued at the expense of community grazing areas. With the approval of the heads of the peasant associations, private grazing land was annexed. Interest in group enclosures dwindled as areas adjacent to cultivated fields provided more secure alternatives for individual enclosures. In Soble, the outcome of this policy, the ban on wildfire and the partition into peasant associations, led to a gradual privatisation of common pastures under the pretext of cultivation, but actually used for both crop cultivation and grazing. In most cases, however, these were used more for grazing than for cultivation. In Arbate, many attempts were made to induce the

8. Also documented in CARE-Yabello (unpublished data); Southern Rangeland Development Unit (unpublished data), as well as in Coppock (1994) and Kamara (2001).



communities to cultivate but they were reluctant as many believed common grazing was a better option, and everyone was willing to co-operate.

#### **4.2.4. Other policy related events**

Other national-level events noted by the communities were related to the forced conscription of physically fit young adult males into the army, which resulted in loss of labour for herding activities. This reduced the possibilities for herdsplitting and mobility during periods of forage and water scarcity, which aggravated the impact of droughts and led to large cattle losses. The situation contributed a great deal to the adoption of crops in Soble. It was a period of recurrent raids by the neighbouring Somali tribes during ethnic conflicts especially in Arbate. Bisected by a secondary road, this community is very vulnerable during periods of conflicts. This threat of attack is also a disincentive to investment in sedentary activities such as enclosures or cultivation. Both communities acknowledged that marketing opportunities have been increasing since the early 1990s, while tax concessions and abandonment of forced sales has created a relief for them. In recent times however, prices have largely been in favour of crops, which may have motivated some people to take up the activity.

#### **4.2.5. Development interventions**

Major development interventions in Soble and Arbate in the last decades include the construction of ponds, livestock vaccination centres and health posts for humans, as well as road networks to facilitate access to the above services and market centres. Most of the roads were constructed in the mid-1970s through 'food-for-work' programmes by NGOs and government agencies. The roads have improved the access of pastoralists to market centres. Prior to this period, communities in the area were forced to market their livestock through middlemen at much lower prices. Improvement in medical facilities also contributed to the reported increase in the population of both communities, though in-migration of highlanders could also have contributed. Overall, most of the interventions in the two communities were geared towards the creation of permanent settlements and the resulting intensification of land use, private property rights and market integration.

### **4.3 Findings in Didakilensa and Gandulensa communities**

Both Didakilensa and Gandulensa have been in their current locations for about 20 years. The area is relatively far from non-Borana ethnic groups and does not experience frequent conflicts. With numerous ponds and reliable wells in the area, water availability

does not pose a great problem as would be generally expected in Borana. The *madda* in which both communities are located (see Annex III) is bisected by the Addis-Moyale main road and is thus well linked to market centres. One of the three state-owned ranches on the Borana rangelands—the Dembelawachu Ranch—is also located in this *madda*. The communities have also been among the direct beneficiaries of development activities by CARE, and applied research activities by the International Livestock Centre for Africa (ILCA) in the 1980s. The two communities seem to be on similar pathways to land use intensification, though they are currently found at different stages of development. The causes of this trend, as in the latter case, are explored in detail using the timeline presented in Figure 4.

### 4.3.1 Policy-induced changes

As in the other communities involved in this study, the ban on wildfire in Didakilensa and Gandulensa resulted in bush encroachment, tick-borne diseases and dangers from wild animals and snakes. Browsers (goats and camels) were also adopted in both communities to cope with the emerging bush. The extent of diversification was limited since camels are of little use due to relatively easy market accessibility. Changes in land use and property rights over grazing resources were very minimal. Except for the spontaneous adoption of crops by some families in Gandulensa and group enclosures in both communities few major changes were observed.

The creation of the PAs added boundaries. However, traditional arrangements that permitted grazing across *madda* boundaries were disrupted, particularly in Gandulensa. The restriction of members in one peasant association and subsequent congestion, provoked problems of overgrazing which led to low livestock productivity. This prompted some people to take up cultivation in Gandulensa. In Didakilensa, traditional movements to common *warra* areas were still possible and thus there was no incentive to engage in partitioning or cultivation on a large scale.

On the other hand, the formation of PAs made the imposition of many forms of taxation possible, while forced conscription into the national army became relatively easy. The consequent loss of labour force, coupled with high taxes, low livestock productivity and poor market conditions created great difficulties that led people to cultivation (and land annexation near cultivated fields) in many communities including Gandulensa. Crops are absent in Didakilensa, apart from small gardens that started a couple of years ago. Members in this community claimed not to be cultivating because they do not want to put their animals at stake in the sense of being tied down to a single place with segregated pastures. The members of Didakilensa claimed to be determined to conserve their communal grazing areas to avoid what they called 'the negative influence' of cultivation, which divides the interest of the community members. Proximity to the market centre at Dubuluk also facilitates the purchase of grains when needed or for storage when prices are relatively low. Moreover, the traditional herd-splitting practice that requires mobility is still very valuable in this community.

Both communities reported that there was no cultivation or rangeland enclosure prior to the ban on wildfire and the formation of peasant associations. After these interventions, group enclosures soon emerged in Didakilensa, which currently constitute 25% of the total land area (Annex II), but used by all members of the *arda*-community only for calves. In Gandulensa, enclosures appeared much later (around 1978/79) but only by sub-groups of individuals. Thus, the clearest divergence between the two communities is the fact that while Gandulensa took up cultivation (and annexation of adjacent fields) and relied less on enclosures, Didakilensa relied more on enclosures as a means of securing forage.

The enclosed area for cultivation is acquired through the permission of the PA-chairmen who encourage the activity and who are vested with much authority by the central administration to allocate land for cultivation. There were claims of households requiring parcels under the pretext of cultivation but were actually using it mainly for grazing. The acquisition of privatised grazing areas in these communities (which this study could not clearly distinguish from areas actually cultivated) is thus a direct concomitant of cultivation support and the creation of the peasant associations, through the endorsing action of the PA-chairman. Once a plot for cultivation is acquired, large areas surrounding it can easily be fenced-off and used for the grazing of draft animals and calves.

Overall, traditional rules are largely functional in these communities especially in Didakilensa. The two communities (unusually) consist of one encampment each, and population density is comparatively low (Annex III) so that the management of group enclosures is relatively easy. In general, the enclosures are intended to deprive outsiders from grazing within the community. The virtual absence of cultivation especially in Didakilensa makes the enforcement of rules and regulations much easier, as members more or less share the same interests of pastoral production.

### 4.3.2 Development interventions

The development of road networks creating a link to the market centre in Dubuluk (about 13 kms away) facilitated marketing activities. Most of the roads were constructed in the last decade by government agencies and NGOs. Before the establishment of the Dubuluk market in 1992, trekking to markets used to last for several days. Livestock sales were difficult, besides the compulsory sales to the central administration at minimal prices. The emergence of market centres positively contributed to better livestock prices, though livestock prices lagged behind crop prices. The Dubuluk market also offers a good opportunity for the purchase of cereals, which gives them more incentive to sell livestock and buy grains.

ILCA and CARE also introduced haymaking in the area during the late 1980s. This improved the feed situation and reduced mobility. The haymaking activities and the construction of ponds laid a good foundation for sedentarisation. With reduced mobility, some took up to cultivation while others intensified rangeland enclosure for private grazing. The increased aspiration for private land for cultivation was also

attributed to the rising crop prices since the early 1990s. Those who could afford to buy and store cereals did so when prices were favourable. The effects of these interventions also coincided with increased human population due to improved health facilities and weakening traditions,<sup>9</sup> rules and customs.

#### 4.4 Drought events

As the level and distribution of rainfall varies widely across the Borana rangelands, so does the impact of droughts and the response mechanisms developed by various communities. For the communities under consideration, the exploration of drought events for the past three decades reveals an average interval of four to six years between successive droughts. With data that were obtained through narration and references to the oral traditional calendar, these average intervals make a good approximation of drought probabilities suggested by previous studies (Coppock 1994; Futternecht 1997). For the period covered in this study, a summary of the drought events recalled by the respondents is briefly reviewed (Table 2). The rangelands experience a bi-modal rainfall distribution and most of the droughts are driven by deficient precipitation during the long rainy season (April–June) or failure of the short rains (September–October). The analysis is based on the retrospective accounts of the respondents, which include impacts on livestock and human populations as well as mechanisms of adjustments of the four communities.

The impacts of droughts vary across sites and communities, and are often exacerbated by various diseases. Loss of animals through diseases increases the severity of droughts on human population as it renders the carcass inedible at a time when milk productivity is at its lowest and grain prices at their highest. The resulting situation often becomes catastrophic to the point that external relief aid becomes the only rescue. At such stages, camels become very important because of their relatively good milk productivity under arid conditions, and because of their transportation role or in facilitating mobility.

Sudden outbreaks of conflicts and wars also aggravate the impact of droughts. For instance, the impacts of the drought of the early 1970s were worsened by the Ethio–Somalia conflicts. That period also coincided with the change of government in Ethiopia, which was characterised by ethnic conflicts that resulted from the deterioration of security nationwide. While the Ethio–Somalia war was in progress, a conflict between the Borana and the neighbouring Gujji created insecurity all across the southern rangelands so that traditional herd splitting and mobility were hardly possible. A similar experience also occurred in 1991/92, when the transition of power from the Derg regime to the current government resulted in deteriorating security and ethnic conflicts, while severe drought took its toll on pastoralists and their livestock. This clearly shows that the extent and severity of droughts on both humans and livestock is not only due to lack of endogenous responses with mitigation strategies, but also due to exogenous factors such as ethnic conflicts and wars.

9. The Borana culture has provisions for determining marital age, sexual behavior and conception age as traditional methods of controlling human population *vis-à-vis* the grazing resource base. With increased integration into the national economy, most of these customs die away.

Table 2. A diary of droughts and excessive rains in the Borana rangelands (1971-98).

Date/event	Consequences and responses	
	Soble and Arbata	Didakilensa and Gandulensa
1971/72: Long rains scanty Short rains failed completely	- Forage and water scarcity - Outbreak of FMD <sup>a</sup> ; cattle losses - Hunger/diseases/deaths/Somali invasion > Herd splitting and dispersal	- Forage and water scarcity - Outbreak of FMD; cattle losses - Aggravated by Somali invasion/war > Herd splitting and dispersal
1974/75: Long rains failed Short rains failed Exacerbated by ethnic conflicts	> Forage and water problems - Outbreak of FMD - Large cattle losses - Borana-Gujji conflict; human deaths - Ethio-Somalia war > Herd splitting and dispersal	- Forage and water problems - Outbreak of FMD; black fly infection <sup>b</sup> - Large cattle losses - Borana-Gujji conflict; deaths - Ethio-Somalia war > Herd splitting and dispersal
1979/80: Complete failure of the short rains Long rains lasted only a few weeks	- Weak animals and black fly infection - No milk; massive loss of livestock - Starvation, famine and human deaths - Herd splitting and dispersal > Mobility in search of water and forage	- Weak animals; black fly infection - Milk shortage; massive cattle losses - Starvation, famine and human deaths > Herd splitting and dispersal > Partial mobility/transport of water/forage
1980/81: Excessive rains (long rainy season)	+ Forage and water availability + Livestock recovery - Malaria outbreak; human deaths	+ Forage and water availability + Livestock recovery - Malaria outbreak; human deaths
1984/85: Long rains erratic and insufficient Short rains failed	- Forage availability/livestock diseases - Swollen throat/black fly infection - High livestock morbidity and mortality > Herd splitting and dispersal	[Not reported; possibly unaffected]
1991/92: Long rain erratic, unevenly distributed and virtually failed Derg regime falls, conflicts	- No forage, no water, loss of cattle - FMD and black fly infection - Low milk productivity; hunger - Conflicts/starvation/deaths > Herd splitting and dispersal > Mobility in search of forage and water	- No forage, no water, loss of cattle - FMD and black fly infection - Low milk productivity; hunger - Gabbra, Garri and Gujji conflicts - Somali war/starvation/deaths > Herd-splitting/mobility/relief aid
1993: Too much rain	- Outbreak of malaria and deaths	- Outbreak of malaria and deaths
1995/96: Long rains too late Short rains failed	[Not reported; possibly unaffected]	- Shortage of forage and water > No movements/SORDU hay distribution/influx of people
1997/98: Extended short/long rains Excessive rains—El Niño	+ Good forage and water condition + High meat and milk productivity + Expansion of cropping areas - Poor calving rates/malaria/deaths	+ Good forage and water condition + High meat and milk productivity + Calving rates were very good - Malaria outbreak and many deaths

a. Foot-and-Mouth disease; +, - implies positive, negative impact; > implies response/strategy.  
b. A poisonous biting fly that intoxicates cadaver so that it's inedible even to scavengers.

Source: Authors' field survey, 1997/98.

The initial response to droughts by most communities is herd splitting, where dry herds (non-lactating cattle and camels) are separated from the rest of the herd and sent with a few family members to fallback areas with good forage. The concentration of large herds around deep wells is regulated by strict permission of access, and by giving first preference to local inhabitants of the peasant association or *madda* first. Some of the communities, however, asserted that mobility is sometimes risky and could result in massive loss of livestock when the impact of the droughts is pervasive. Herd dispersal into *forra* areas is usually preferred, with transportation of water, trekking animals over long distances to deep wells, and feeding of animals by cut-and-carry. Haymaking is still not very common and is largely limited to communities within CARE's operational areas.

## 5 Development pathways and institutional change in Borana

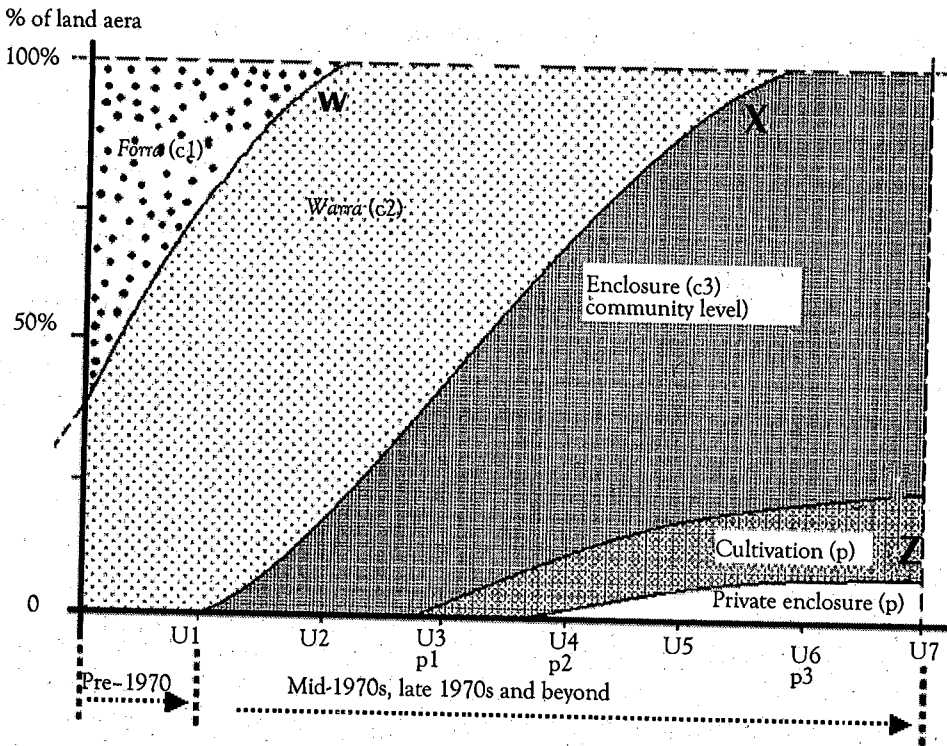
The discussion presented so far indicates the diverging nature of strategies developed by communities to adapt to changes induced by exogenous forces. Despite exposure to similar policies, interventions and natural conditions, Soble and Arbate are currently found on different development pathways: Soble 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 (see Annex III).

Overall, the trends represented by these communities depict different development pathways in response to various forces. Soble is representative of communities that are strictly 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 African pastoralism, and full-scale privatisation with diversification into crops, rangeland enclosures and the establishment of private property rights. As depicted by previous studies in Borana, various trends of property rights and land use are currently observable, which are largely explained by population, environmental factors, social capital and market variables, while the resulting grazing pressure creates an incentive for the acquisition of private rights (Swallow and Kamara 1999; Kamara 2001). While supporting the above view, this paper argues that the conflict of authority between traditional elders and PA chairmen has weakened traditional authority and further exacerbated the process. Natural population increase is attributed partly to improving health facilities, but largely to weakening traditional rules that regulate marital age etc. Valuable grazing areas lost to bush encroachment (ban on bushfire) combined with increasing population also increases pressure on the rangelands. The pressure creates incentive for private rights, which are facilitated and endorsed by the heads of the peasant associations. Community level responses differ greatly but are largely driven by the activities of interest groups, resulting in different development pathways.

### 5.1 Conceptualising land use and property rights in Borana

The results of the in-depth analysis enhance a detailed conceptualisation of the emerging development pathways on the Borana rangelands with regard to the status of traditional land use patterns and property regimes. The trends are presented in a conceptual diagram (Figure 5) that depicts the various institutional arrangements (*warra*, *forra*, enclosures) presented earlier.

As indicated in Figure 5, the ordinate represents the proportion of land area under different activities, while the abscissa represents different land uses and property rights.



Land use type, property rights (c = common; p = private).

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.

Figure 5. A model of property rights and land use change in Borana.

The land areas held under different land use types and property rights are denoted by U1 to U7, and range exclusively between 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 as *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.

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. This form 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 on enclosures at the *arda*-level for grazing by all members, while minor cultivation is carried out in naturally suitable areas such as bottoms of valleys and water swills. The scale of cultivation is very minimal and crops are not used as a pretext for annexing pastures. These 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) 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 getting restricted to *warra* grazing areas (C2), and *warra* areas gradually getting 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 get 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 only yield equal returns until all the relatively high potential areas are exhausted, joint maximisation under different forms of managed common property arrangement (C3), and community level open grazing (C2) are likely to continue, to facilitate mobility and pulling across pastures of varying primary production potential. As already suggested by the descriptive statistics (Figure 3), the distribution of the 40 communities peak 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).

## 5.2 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, little or no enclosures, with browsing animals and small ruminants for mobility and adaptation to varying forage conditions—indicated by  $P_1$ , and prevalent during the pre-1970 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 encampment levels, and little or no unrestricted communal grazing areas; private rights to rangeland 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 little cultivation, private enclosures are acquired with or without the pretext of cultivation—indicated by  $P_3$ .

These three pathways can be 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 paper 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 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 require flexible response mechanisms for long-term sustainability. These may include flexible institutions with transient rules and regulations that adjust to seasonal forage and water availability, and flexible property boundaries that guarantee pooling across rangelands of varying characteristics. These attributes are very 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.

### 5.3 Conclusions

The findings of the paper largely conform to the propositions of the 2nd Section of the paper about population and market-induced changes in Borana. These propositions are derived from the fact that these variables induce pressure on the rangelands and hence create incentives for individuals to take to crops or acquire private grazing land, and

thereby diminish negative externalities generated on the commons by overstocking. While acknowledging these facts, the in-depth analysis further establishes that various forms of national level policies and development interventions have equally contributed to the observed changes.

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 previous 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 not only a function of demographic and socio-economic variables, but also environmental variables such as bush encroachment. The paper reveals that the current trend of bush encroachment is a direct result of a policy intervention in mid-1970s. So the resulting high livestock densities and land use changes should be seen more as an outcome from an interaction between environmental, socio-economic and policy variables, where policy variables are largely envisaged as co-actors or facilitators of institutional change. This conforms to the key hypothesis of the paper about the possible role of policy variables in driving changes in land use and property rights in Borana.

Third, the roles of development interventions and droughts are also worth reiterating. The development of road networks and market centres in the last decades increased the interaction of pastoralists and neighbouring agro-pastoral ethnic groups. This interaction could be associated with incentives such as lower information and learning costs for the adoption of crops. The impact of droughts should also be recognised in the sense that many communities reported the drought prone nature of the area to be the primary reason for staying together as commons. That is, the maintenance of common property grazing arrangements and the failure of some communities to adopt crops are motivated by a desire to guarantee mobility at all times. However, without an in-depth analysis on specific drought cycles, little can be said about the long-term impact of droughts on livestock and rangeland dynamics, which this study can only recommend as a task still ahead.

## 5.4 Policy implications

The implications of these findings are two fold. First, development interventions may specifically have to pay attention to their impacts on traditional values that regulate both human and livestock populations. Second, the possible impacts of development interventions on equity, which could be affecting community level co-operation in managing stock levels, needs to be examined. More precisely, drought management programmes need to be seriously assessed 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 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.

It is also observed that demographic change in Borana is related to endogenous factors such as weakening of traditional practices on marital age etc. The gradual withering away of traditional values is directly related to the devolution of authority from elders due to the presence of the formal heads of the peasant associations. Therefore strengthening the traditional authority to help implement such rules, through a minimised influence of formal authorities could be a milestone towards restoring stability and sustainability in the Borana pastoral system. While acknowledging that not all traditional rules may have a positive effect on resource management, it is desirable to recognise and strengthen those that positively affect resource use among local communities.

Among environmental variables, the paper recognises that the considerable loss of pastures to bush-encroachment creates pressure on the rest of the rangelands and is thus a crucial determinant of stock densities on the remaining resource base, with restricted mobility and subsequent congestion. Although diversification into browsing animals is an evident adaptation, the ultimate response to uncontrolled bush encroachment may be the abandonment of grazing areas or migration. This creates a dire need to support the stability of the Borana pastoral systems through the provision of non-traditional pasture improvement methods as alternatives to the traditional bushfire, on which they relied since history, but which had to be abandoned so suddenly. The limited pilot programme of bush clearing and reclamation of communal pastures initiated by the German Agency for Technical Co-operation (GTZ) is desirable and should be emulated in the rest of Borana.

More crucial, perhaps, is the adoption of crops and concomitant annexation of pastures in favourable rainfall areas, especially in communities closer to market centres. 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)—the trend is likely to decrease after such potential areas are exhausted. Again, as argued already, the proposition may not obtain for communities where crops are adopted merely as a pretext for the annexation of private grazing areas. The agro-ecological diversity of the Borana rangelands calls for selective policies that support the adoption of crops where the natural conditions deem it appropriate, and extensive livestock production where suitable. The 'one policy fits all' approach in a heterogeneous system clearly has its shortcomings and limitations. These examples are valuable lessons that should be recalled in planning and policy design, not only at the national, but also at the regional and zonal administrative levels.

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## Annexes

### Annex I. Level and variability of rainfall across selected sites, 1982–96 (n = 40)<sup>1</sup>

Site/ station	Characteristics	Mean <sup>2</sup>	Standard deviation	CV	No. selected
Sarite	LR, LCV	469	103	0.2199	3
Wachile	LR, HCV	473	222	0.4683	5
Web	LR, HCV	399	199	0.4987	4
Dembelawachu	LR, HCV	353	130	0.3682	2
Dillo	HR, HCV	499	170	0.3401	3
Yabello	HR, HCV	519	230	0.4432	5
Arero	HR, HCV	873	374	0.4286	4
Negelle	HR, HCV	739	241	0.3267	3
Moyale	HR, HCV	869	588	0.6768	2
Hidilola	HR, LCV	717	203	0.2838	4
Did-Yabello	HR, LCV	496	141	0.2850	1
Teltele	HR, LCV	634	135	0.2131	4

1. The stratification into high and low rainfall is largely for analytical purposes, as the area is semi-arid. It is based on the minimum threshold level of rainfall for the viability of crop production, intra-annual variations of forage availability and the relationship between divergence in rainfall variability and the productivity of rangeland ecosystems (Billé 1983; Shepherd and Coughley 1987).

2. Aggregate annual mean in mm p.a.

CV = Coefficient of variation

LR = Low annual mean (< 495 mm p.a.)

HR = High annual mean (> 495 p.a.)

LCV = Low coefficient of variation (CV < 30%)

HCV = High coefficient of variation (CV > 30%)

Source: Authors' field survey, 1997/98.

### Annex II. Physical characteristics of the four communities in the detailed analysis

Variable	PA: Wachile		PA: Dembelawachu	
	Soble	Arbate	Didakilensa	Gandulensa
Size (km <sup>2</sup> )	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 <i>kalo</i> (%)	0	0	25	15
Common grazing area <i>warra</i> (%)	70	100	70	75

Source: Authors' field survey, 1997/98.



### Annex III. Demographic attributes of the four communities in the detailed analysis

Variable	PA: Wachile		PA: Dembelawachu	
	Soble	Arbate	Didakilensa	Gandulensa
No. of settlements ( <i>Olla</i> )	7	5	1	1
Total number 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 <sup>a</sup>	17	49	12	18
Sex composition				
Number of males	163 (51)	146 (53)	56 (49)	77 (55)
Number 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) <sup>b</sup>	186 (58)	136 (49)	34 (30)	41 (29)

Figures in parathesis show percentages.

PA = peasant association.

a. People per km<sup>2</sup>.

b. Children are not entirely dependent as most of the home based herding activities is carried out by children mainly of the ages of eight years and above.

Source: Authors' field survey, 1997/98.