Incentives and Outcomes of Rangeland Enclosures: A Comparative Institutional Analysis among three (Agro-) pastoral Districts in eastern Ethiopia

F B Kenee (PhD)[1]

Abstract

A growing body of literature underlines the gradual dismantling of common property grazing land, as range enclosure tends to expand. This paper aims to examine the driving forces (external or internal) for enclosure and its consequences. Evaluating them helps predict whether enclosure practice aids in attaining income security and ensuring household welfare by supporting livestock development. Moreover, it explores the role of customary authorities in defining and enforcing rights to private use of land and attempts to scrutinize whether informal rules emerge to respond to these needs and even become an incentive to establish private enclosures. A broader aim is to compare the motivations and consequences with respect to land enclosure and to delineate the processes and actors involved. Based on survey of 160 households and focus group discussion with customary leaders and state agents, results indicate that there are endogenous and exogenous driving forces for range enclosure and change in land use with the advent effect of incompatible demands (conflict of interest) on resource and unstable property rights. Although unreliable, private benefits from enclosure may still continue to be tempting for individual households to practice it. But its expansion in connection with short-term gains does not generally increase the welfare of (agro-) pastoral community in the longer-term as it is causing extensive rangeland degradation, bringing irreversible damage to the ecology. In general, variation is observed across the cases studied in terms of rule enforcement, benefits from enclosure and the underlying incentives. Though signs of state support for enclosure are evident via assessing the role of lower level state administrators in allocation of land for private grazing, policy support for private land use cannot fully explain the gradual shift in property rights to the rangeland. The role of socio-economic and ecological changes is much more important and has widespread influence. The overall evidence reiterates the concern of others who underline the "less clear-cut" role of government policies in speeding up rangeland enclosure. Finally, it makes explicit on the influence of economic changes on norms favoring private use of the range.

Keywords: *Rangelands, incentives, disputes, customary leaders, degradation*

[1] Director of the Institute of Pastoral and Agropastoral Studies, Haramaya University, Ethiopia. Email: keneefbk@yahoo.com Tel: + 251 25 5530314 Fax: + 251 25 5530325

1. Introduction

A growing body of literature underlines that the reasons for the gradual dismantling of common property (grazing land) are attributed to the shift in land tenure policy from communal to individual landholdings and an increasing trend in the income diversification of the households. Diversification has been a necessity since pure reliance on livestock, as income source, does not meet subsistence requirements (Thornton et al. 2006; Lesorogol 2005; Mearns 2004; Little et al. 2001). Expansion of land markets where part of the communal land is privately appropriated and leased out for sharecropping is typical in east Africa (Woodhouse 2003). This move towards greater exclusivity of rights on pasture use is also observed in areas with high demographic pressure and where technological advances have created the incentive to privatize (Peters 1992). Others believe that such range enclosure may continue until potential land is exhaustively fenced (Kamara, Swallow and Kirk 2004). But a number of studies reported in Lane (1998) confirm the negative effect of privatizing range resources on rangeland management.

Though range enclosure is not entirely a new practice, it is important to learn how it is governed and the dynamics in the allocation of rights to enclose. A few study reports generally indicate that different actors may enforce collective rules in granting rights to individuals to enclose land among (agro-) pastoralists of Ethiopia. The right to land for private use has been granted by clan leaders and enforced by community elders (Luseno et al. 1998; Bruce, Hoben and Rahmato 1994). In some cases, the village chief undertakes land allocation decisions and facilitates mediation for possible disputes using institutions that are jointly developed by a community. The community gives responsibility for the chief to enforce such collective decisions (McCarthy, Kamara and Kirk 2001). For example, the right to establish private enclosure among the Afar is granted through the request to the clan authorities given that a household is member of a clan (Kassa 2001).

As common property is theoretically assumed to be equitable under some conditions, equity concerns should be properly addressed in the case of enclosure. Some indicate that the demand for land enclosure may vary, with wealthier households being more likely to claim enclosure rights (Swallow and Kamara 1999). They have shown that the poor join wealthy group by occasionally assisting in fencing to secure some form of grazing rights during the dry seasons. On the other hand, as poorer households cannot afford to erect their own fences, some of them simply oppose enclosure practice. But the wealthy ones are able to secure their enclosure through their strong affiliation with the heads of peasant associations (ibid: 267). From this, we understand that the rules do not necessarily discriminate the poor rather than their capacity to invest in fencing.

Rangeland enclosure has been observed among (agro-) pastoralists of eastern Ethiopia quite for some time but systematic analysis of such property rights change is lacking. Livestock production in the semi-arid regions is organized under variable and risky environment. A crucial question is *why is enclosure expanding in a risky environment where a herder may not generate dependable economic rent from a specific plot of enclosed land?*

In this paper, I intend to examine the driving forces (external or internal) for enclosure and its different consequences. Evaluating these consequences helps predict whether enclosure practice aids in attaining income security and household welfare by

supporting livestock development without negatively influencing the rangeland resources. Second, I explore the role of customary authorities in defining and enforcing rights to private use of land and attempt to scrutinize whether informal rules emerge to respond to these needs and even become an incentive to establish private enclosures. After a critical review of the literature pertinent to the issue, I compare the motivations and consequences with respect to land enclosure. In doing so, attempts will be made to capture the processes and to identify actors involved in the granting of rights (institutional arrangements) to enclose. This would help us draw lessons on the local 'legitimacy' of informal rules, assess their strength to enforce collective agreements and understand the entire process of resource commoditization in semi-arid areas.

Results indicate that there are endogenous and exogenous driving forces for range enclosure and change in land use with the advent effect of incompatible demands (conflict of interest) on resource and unstable property rights characterized by distributional imbalances. Although the unreliable private benefits from enclosure may still continue to be tempting for individual households to practice it, its expansion may not generally increase the welfare of (agro-) pastoral community in the longer-term unless some measures are introduced. Variation is observed across the case study sites in terms of rule enforcement, benefits from enclosure and the incentives for practicing it. Moreover, signs of state support for enclosure are evident via assessing the role of lower level state administrators in the allocation of land for private grazing at least in agropastoral areas. Nevertheless, policy support for private land use cannot fully explain the gradual shift in property rights to the rangeland via enclosure. The role of socio-economic and ecological changes is much more important and has widespread influence. This case reiterates the concern of Woodhouse (2003) over the "less clear-cut" role of the government policies in rangeland enclosure. Meanwhile, it takes a stock of the argument by Ensminger (1997) on the influence of economic changes on norms favoring privatization.

2. Explanations For and Against Enclosure

The general increase in the trend of exclusive property rights through enclosing of the grazing commons has given a rise to debates over reasons and effects of such a practice. Whoever is involved in allocation of private use rights (state authority or customary leaders), the review made here emphasizes the *reasons* and possible *outcomes* of range enclosure. Historically, enclosure marks the process through which private property rights to land were created, as in Europe (Allen 1982). In the contemporary pastoral and agropastoral regions of Africa, it also serves to underline the historical specificity of the patterns of change in land use (Woodhouse 2003). Particularly, under the condition of improved investment (technical change and improved market) and change in stocking policy, the incentive that enclosure creates for range privatization may support efficient use of grazing land (Wilson and Thompson 1993). For example, donor-driven investment in boreholes and private ownership of water points has increased the value of land around the water points in the rangelands leading to a demand-driven expansion of enclosure (Grell and Kirk 1999; Tache 2000; Woodhouse 2003).

However, the functioning of the microclimate influences the value of land around these water points in particular and the demand for private grazing in general. Under

predictable rainfall condition, there could be institutions favoring enclosure since little variation causes relatively permanent allocations of specific parcels by group members with inheritable rights (Nugent and Sanchez 1993). Where low variability of rainfall predominates, the benefits accrued to enclosing land would create greater investment incentive (de Bruijn and van Dijk 1999). An example is the western ranch model that individual ranchers successfully manage their grazing area by adjusting stocking decisions. Nonetheless, in a state of large variability, investment has limited potential to improve resource productivity, making the cost of enclosing higher. Moreover, high cost of specifying and enforcing rights to prevent encroachment makes it infeasible (Mace 1993; Taylor 2006). This eventually increases *ex ante* uncertainty (Nugent and Sanchez 1999).

In fact, increasing competition of communal grazing land with other activities, on one hand, and the ecological variability, on the other, has progressively divided the views of scholars on the desirable land tenure policy (Fratkin 1997). Though it is often argued that the need to enclose arises as an internal response to compete for land with the encapsulating sedentary agricultural groups, the emergence and expansion of markets creates growing divergence in property rights preferences among different groups using communal land. The findings reported in Ensminger and Rutten (1991) indicate that dispute over communal grazing area emerges between those who tend to be commercial (beef) producers and others who are not. This takes place as the former category demands for expansion of restricted grazing area and the latter contravenes it. These empirical examples point out the existence of collective action in land enclosure to protect own commons, while there is conflict of interest within the collective on how grazing land should be used. Hence, the 'competition' (internal and external), often seen as effects of economic growth, and 'ecological variability' arguments compel us to explain the behavior of individual herders towards range enclosure in a very different way.

Moreover, allocation of the grazing commons to individual private owners occurs when a state: 1) considers it as a modern form of livestock production, 2) assumes that privatization will encourage a more responsible use of land and 3) believes that communal use of land has led to range degradation due to overstocking (Williams 1996). Of course, private property will be optimal when the management of the common rangeland is so poor and individual appropriation will increase the general welfare (McCarthy, Kamara and Kirk 2003). Ideas in favor of enclosure seem to have emerged from the anticipation that communal tenure undermines potential benefits that capable individuals could otherwise obtain through private appropriation of the range (Ho 1996). This will ensure redistribution of income from the commons to the private rights holders (Allen 1982).

A number of empirical studies among different (agro-) pastoral regions of Ethiopia also disclose five important reasons for the expansion of enclosure: (1) a response to external encroachment, putting pressure on already scarce grazing, such as state action in allocating pastoral land to highlanders which is seen as a legacy of the 1955 constitution (Abdulahi 2003)[2], (2) as a private grazing area where the reserved fodder

[2] According to this constitution, "all property not held and possessed in the name of any person…belong to the state" (IEG 1955: Article 130, sub-article (d)). Laws enacted based on this encouraged holding

serves as feed source for lactating stock during long dry season (Sugule and Walker 1998; Abule, Synman and Smit 2005; Kamara, Swallow and Kirk 2004), (3) a reaction to the declining pattern of mobility due to an increase in human population (Tilahun et al. 1994), (4) a need for cultivation due to a declining benefit from the livestock enterprise or leasing out enclosed land to outsiders with better farming knowledge (Hogg 1997; Gebre 2001, 2006) or due to the possibility to practice irrigation farming (Aredo and Ame 2006) and (5) the establishment of service facilities and systematic interference by political actors favoring private holdings (McCarthy, Kamara and Kirk 2001). The land reform in 1975 has also resulted in a growing trend of privately used parcels where communal pastures were falling into the hands of 'cultivators and pretenders' (Tolossa and Asfaw 1995).

What have been the impacts of enclosure? A number of studies indicate that the process of range enclosure may result in some undesirable consequences. One is allocation of poor pasture to some groups and better pasture to the others creating *inequity* and *social tension*. As Taylor (2006) found out, it resulted in increased income disparity due to allocation bias in favor of large herders. This was observed where state implemented large-scale sub-division (Mwangi 2005) or establishment of range cooperatives has occurred (as in Somalia in the mid-1970s) leading to instability because of mismatch between "grazing areas reserved for the cooperatives and the needs of herds" (Unruh 1995: 24). In addition, promoting enclosure simply to protect small isolated fields dedicated to poorly financed fodder production can lead to range degradation (Williams 1996). This makes range privatization "in modernizing pastoralists" less meaningful compared to equitable access through common property, involving least cost institutional arrangement (Taylor 2006).

In eastern Africa, extensive comparative studies carried out a few decades ago stressed on the negative impact of enclosure on livelihoods of pastoralists (Graham 1988; Behnke 1984, 1985). Dairy producers residing outside of the pastoral system benefited most by creating alliance with powerful traditional leaders to enclose a large area of potential land and to graze their animals on this land. Where this situation recurs, special interest groups within the community involved in commercial activities may establish a joint venture with outsiders who are not members of a community. Weak groups with customary rights to the land are then being pushed further to the marginal lands (Graham 1988; Behnke 1986). Comparison of such a case with the previous arguments on rainfall variability (Nugent and Sanchez 1993; de Bruijn and van Dijk 1999) will lead to the general understanding that although competition for various reasons (economic incentives) produces a temptation to enclose land for private use, ecological factors (particularly rainfall variability) undermine stability of private land use. This socially inefficient system arises from increased uncertainty on land productivity (Howitt 1995). The results presented in the following sections is based on the survey of 160 households and focus group discussion with customary leaders and state agents in three pastoral and agropastoral districts in eastern Ethiopia where livelihoods of herders is based on livestock production and there is an increasing trend in communal rangeland falling under private use.

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private parcels near the grazing commons which served as an implicit means of protecting apprpriation of communal land by outsiders (Gebre 2001).

3. Endogenous Motivating Forces

Across the study sites, a number of factors have become an incentive for the widespread practice of rangeland enclosure. First, ecological change[3] has become a driving force for establishing it. It has significantly affected livestock production strategies and has given a rise in demand for range resource. Herders have observed changing herd composition: with an increasing number of browsers (camel and goat) at the expense of grazers (cattle and sheep) due to feed scarcity for the latter livestock category. This might vary across locations. For example, a study conducted on perceptions of rangeland degradation in the region (including Mieso) indicates a decrease in grass growth after rain by 96%, grass cover by 92% but an increase in barren land by 88% in the last two to three decades (Baars and Aptidon 2002). On the other hand, an assessment of local perception of herders reveals an increase in browse species up to 50 % since the drought of 1974 (Sugule and Walker 1998). Currently, as the survey shows, 33 % of sample households rear camel, 62% shoats (sheep and goats) and 84.1 % keeping cattle.

In the study region, (agro-) pastoralists observe a change in biophysical environment. For example, there has been emergence of new browsing species whilst a few grass species were disappearing over the last 40 years. This seems to create a favorable environment for production of camel and goats rather than sheep and cattle. As this continually occurred, land enclosure is seen as herders' response to gradual ecological change in the region characterized by a decline in quantity of grass species on communal land. Because herders still tend to maintain grazers in their herd for economic and socio-cultural reasons, they do fence potential grassland. Such grass is also used for thatching, granaries and feed storages. The multiple purposes that grass serves has given rise to rivalry to fence relatively better grassland. At the same time, pastoralists are aware of the side effect of enclosure in reducing the medicinal value of milk from cows as it restricts their chance to feed on a variety of forage resources.

The second source of motivation is the increasing market value of enclosure through time. Though it is a recent phenomenon, selling grass from enclosed land becomes widespread in connection with increasing severity of feed shortage. For example, relatively better off households revert to such market whenever the livestock feed on common pasture becomes inadequate. In this particular context, the "owner" of the enclosure arranges contractual grazing with livestock owner who can graze on the enclosed land for some time. The cash value of enclosed land depends on the grass species available on it and the total area enclosed. The income generated from it varies annually in response to rainfall patterns.

[3] The general ecological change herders observe over the last couple of decades is the declining quantity of grasses, increase in non-edible plants by cattle, and increased frequency of short droughts. It is important to note that the major causes of ecological change are exogenous to the system.

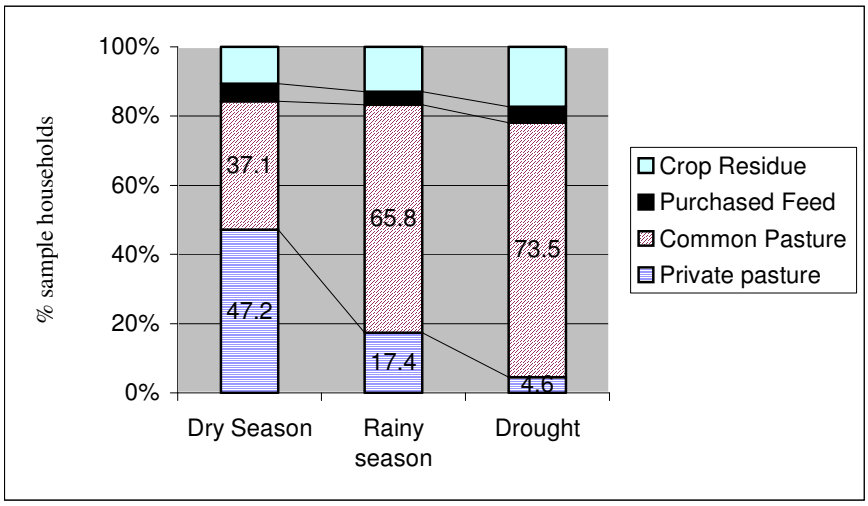

Figure 1: Livestock Feed Sources in Different Periods

Source: Survey Data

The third and most fundamental reason for rangeland enclosure is that private pasture serves as dry season feed reserve. Figure 1 displays assessment of the sample households over the different types of feed sources during the two main seasons and drought conditions. From this Figure, 47.2 percent of the sample households consider enclosed area as dry season grazing place. Whereas the chance to find feed on private pastureland is extremely low during drought periods as only 4.6 percent of the respondents have reported. In the rainy season, enclosure serves as source of feed for lactating cows. This maintains the productivity of dairy cows and will be crucial for household food security. Those without private grazing for various reasons (see Table1) have access to that of others through some forms of contracts as mentioned previously. Because the emergence of enclosure historically differs in the three sites, the following sub-sections provide some more details, first separately, and then compare the collective rules, actors involved and land allocated to private grazing.

3.1 Land Enclosure in the Pastoral System

Though precise records are absent, informal local sources confirm that land enclosure in Harshin district started in early second half of the twentieth century when settlers from highland areas started cultivation in *Tuguchale* in the Northwest of Harshin district. The intention was to discourage these farmers from extending private use of land. Some studies report that this had begun in 1970s increasing dramatically afterwards in the 1980s and 1990s in connection with competition for land between pastoralists and those returnees and refugees from Somaliland (Hogg 1993, 1997; Sugule and Walker 1998). Through time, access to land for enclosing was not random though it started spontaneously, but rather led to the emergence of some kinds of informal rules.

Focus group discussions with elders from 8 villages in Harshin district confirm that clan members of Isaaq are allowed to enclose whether they have livestock or not, and this informal provision is characterized by impartiality. In addition, there is no restriction

on the area of land to be enclosed but on the number of parcels, although permission of elders is needed to gain social acceptance (legitimacy). The right holder has the right to exclude others when required as far as he/she is entitled unless in principle the clan leader dispossesses such a right because clan land is basically considered as common property of a clan. But there are two different situations that could lead to surrendering of private rights to the land. First, when land quality deteriorates and the settlement area changes within the clan territory, there is a chance for the enclosed land to be converted to communal land. Secondly, relinquishing of private rights can be found in the form of a self-imposed action in which a household bequeaths already fenced land to his close kin. In Harshin, some households have taken over their parent's fenced land. In fact, transferability of use rights is specified in the current national land administration law. In general, to overcome the likely disputes in instances of trespass by users of communal land and to reduce cost of monitoring, elders advise villagers not to enclose land far away from residential areas. Unexpectedly, this has given rise to internal competition over access to land close to settlements.

A distinguishing feature of this district is fencing of land around cisterns. Those households who afford to invest will enclose land to claim that the intention is to protect the water point. There is a close link between expansion of enclosure and an increase in water points. Households fence communal land around private cisterns and ponds where they use these water points as a means to legitimize their action (and subsequent claims) to the rest of the community members. This shows the systematic impact of an increase in water points on property rights to grazing land. That is the rising water scarcity and water prices motivate herders to establish enclosure around water points. Thus, investment in water points precludes competing claims to land around the water points. The mechanisms how customary property rights institutions operate indicate how one rule is nested within the other. The right to establish water points paves the way for the right to enclose land. Though it leads to disputes, pastoralists some times initially invest in water points without the knowledge of the customary authorities and then later claim for private access to land around it. This situation indicates that prior investment in water points serves as a means to lay claim to private use of land.

Although the right to have enclosure is unrestricted for clan members, Harshin pastoralists have developed some rules of exclusion for non-members who are recognized as outsiders. These are members of other clans who have settled on the Isaaq clan territory and have unlimited rights to the communal grazing area. There is a general convention among communities of the Isaaq clan that non-clan members are not allowed to enclose a piece of land from their territory. In many cases, outsiders' long-term community membership is required to secure access to land for private exploitation. Elders call it '*integration period*' that systematically delays claims by others, which is a preemptive measure. In rare cases, marital relations can create a room for non-members to enclose land on the Isaaq clan territory. In general, there is a strong social control involving monitoring by members of the clan and protecting one another's private enclosure. Nonetheless, outsiders can engage in grazing contracts with insiders. After this integration period is over, non-clan members would enjoy equal rights. However, as elders observe, most productive grassland has already been enclosed in the Isaaq clan territory.

Lastly, there have been instances when disputes occurred *from within* the Isaaq clan in the process of establishing enclosure due to competition for relatively better pastureland. For instance, Hagmann (2003) succinctly presents an increasing rate of dispute cases over land enclosure since the early 1990s, occasionally growing into violence. The effort of elders to stop further enclosure in response to such disputes has not been successful and large portion of grazing land is being enclosed since the mid-1990s. The *Deris* elders (elders from close families) will settle land related dispute between individuals.

If this fails, the next step will be to take the case to the formal district court other than the clan head though 60.3% of the respondents prefer disputes to be resolved customarily. Indeed, district level formal decisions are made on the basis of information from local elders though there is still suspicion whether district level judgments will always be fair and transparent. This is because elders working at district level are believed to be corrupt. The frequency of disputes settled by district court is generally lower. In any case, there is a cross-influence of customary and formal procedures in settling disputes associated with enclosure[4]. In addition, to overcome the crises associated with disputes, the clan encouraged the establishment of new settlements in different parts of the district. This may even contribute to expansion of the enclosure.

3.2 Land Enclosure in the Agropastoral System

a) Kebribeyah District - Land enclosure began to be observed in the late 1950s. Social and environmental events such as demographic change and drought related shocks have increased the competition for relatively productive land. A resulting uncertainty on the possibility to acquire such land in the future created unstable conditions whereby disputes over private use of land arose in this period. To overcome such disputes, customary procedures were set up by the clan head that required a claimant to apply for private use of land to elders. This practice has existed during the imperial and military government. Retrospective analysis of land use development in the district uncovers that the initial motivation for enclosure was to acquire land for private grazing by large herders as a dry season feed reserve. As the value of land has increased not because of change in its natural quality but due to demographic change and increase in land allocated to farming, pre-existing allocation rules have shifted to accommodate poor herders.

At present, allocation of rights to use land privately is the joint decision of the customary and formal authority. Like in the case of pastoralists, the enclosed land remains under the control of the right holder for years unless he gives it up. That is, the right holder has an exclusive right to restrict others' access. But in contrast to the institutional practice in Isaaq territory, the private grazing land and the number of parcels are formally registered. For the poor herders, enclosed land generates income either through contractual grazing or crop cultivation even if this is often variable due to erratic rainfall. This trend has increased the commercial value of enclosure in particular and land value as a whole.

[4] As stated in Ethiopian consititution, the state gives "official recognition to religious and customray courts" [Article 78, No. 5].

Though every household is eligible to hold land privately, the size of land and parcels allocated depend on household size rather than on livestock wealth. For example, the survey shows that a household with 5 family members enclosed on average 0.3 ha, whereas the one with 9.5 members fenced 1.6 ha. The reason for choosing household size might be related to the fact that traditional authority is influenced by the state based administration favoring crop production because the enclosed land can also be cultivated. The rule seems to be unfair from the point of view of the relatively large livestock owners, but it benefits the poor and those with few livestock since they earn income from private grazing land via grazing by others in exchange for cash or in kind. For instance, they obtain small ruminants in return for permitting others to graze on their private parcels. This incentive to enclose land is expected to minimize dependence of the poor on others.

There is a difference between the two peasant associations studied in the district in terms of driving forces for enclosure. In villages of *Gerbi*, expansion of private land use from the neighboring Jijiga district from the west brought about competition for land, creating uncertainty and pressing for the need to fence the land. But those villages in *Guyow* located 17 km in the east of the district capital enclose land partly to cultivate (maize and sorghum) and for grazing. But they do not encounter competition from others, as there is yet a vast barren land between them and the neighborhood Harshin pastoralists (the Isaaq clan).

Though the success of dryland farming has been questionable in the region, a study shows that nearly 0.4 million hectares of land is under cultivation in the entire Somali region. In recent years, expansion of irrigation projects have caused a conversion of 28,000 hectares of grazing land into farmland through large and small-scale investment projects by private investors through water harvesting, by individual pastoralists and state sponsored activities[5] (e.g. in Gode). Such irrigated farming can be practiced only in specific areas of the region along perennial riverbanks. It also indicates that 32 % of the land in Kebribeyah district has been under cultivation. The reason for such conversion is successive droughts that have caused loss of pasture and widespread of unpalatable plants as livestock feed (Lautze et al. 2003).

b) Mieso District – Historically, the purpose of thorn fencing was to use it as a technology to protect destruction of crop fields by wild beasts. The initiative behind fencing was that these beasts would not directly enter the maize field even if they break the fence. Through time, agropastoralists began to recognize the value of grass around farm boundary in response to growing scarcity of grazing resources on common pastureland. The space between the crop field and the fence is left for growing grass, which can be used for grazing in the months of October through December. During this harvesting season, grazing on enclosed land saves labor that could have been split up between herding and harvesting. Similar to other districts, the purpose is to maintain animal productivity during dry season besides the use of crop residue. In some cases, market based access by others generates additional income for a household.

[5] Some wealthy households along Shebelle river in Kelafo District of the region, for example, invest in irrigation facilities to grow onion for export. Nevertheless, there were disputes around Government sponsored dam in Gode between beneficiaries from Gode irrigation scheme and others in Kelafo who faced shortage of water due to diversion of more water into the dam. This occured in early 1990s and early 2000s (Devereux 2006: 40).

In this district, enclosing land requires the permission of the village leader (or chief) who is administratively accountable to the chairperson of a peasant association (Figure 2). A household has a right to fence only once in an attempt to prohibit unlimited expansion of the area enclosed. This deters the practice of expanding farmland through fencing land for grazing. The collective rule permits those who do not have livestock to fence but they must have a farm. For those households who do not cultivate and rely on livestock, enclosing is forbidden. This is believed to serve as a crucial step to prevent landless "migrants" from enclosing land from communal grazing. These are displaced people who temporarily settle in the district but are originally from elsewhere. Finally, location of the farm itself is a constraining factor because those without open space next to their farm cannot enclose land.

Allocation of right to enclose land is currently vested with the authority of village chiefs. However, the role of elders in enforcing those rights is quite common. In the past, villagers have developed internal (informal) rules to punish those grazing on one's enclosure without the consent of the right holder. There are two steps involved in this. First, elders advise violator of the norm and prompt him to ask the right holder for excuse. Second, frequent violation of rules could lead to payment of compensation to the use right holder – locally termed as *Aflama.* Accordingly, trespassing charge is fixed to be 10 Birr per animal (usually cattle). The use of A*flama* as rule enforcement mechanism is not confined to protection of one's rights to enclosure. It is an institutional practice widely applied in instances when one's animals cause damage to other's crops. However, in some of the villages of *Malkahora* PA, there is a tendency for the PA administration to take over the task of enforcing such informal rule whereby the fines paid by rule violators become the revenue for the PA. There is seasonality in this rule where trespassers are often accused when the feed from the enclosed land is highly in need.

3.3 Local Institutions and Enclosed Land

3.3.1 Diverse Rules and Practices

The empirical cases described earlier have shown the diversity of institutions and practices. *First*, there is variation across the sites in terms of decision-making units in allocating the rights to enclose land for private use. These units take actions either based on the collective agreements or based on state land law that safeguards the rights to land for private use. While village leader permits access to land for enclosing in Mieso, this is the task of clan leader and elders in Harshin and joint decisions of village leader and elders in Kebribeyah. Even though state structure poorly functions in most pastoral and agropastoral areas of the region, it is more functional in Mieso than in Kebribeyah and Harshin. As a result, formal authority tends to take over the duties of customary elders in the enforcement of rights to private enclosure in Mieso. Assessment from the survey covering the three districts reveals that 49 % and 32.4 % of the respondents reported that elders and clan leaders respectively are decision makers in granting rights to a household to enclose land, while 18.6 percent of them consider village chief as legitimate body to grant right to a piece of land.

Second, there is also divergence in terms of requirements to secure the rights to enclose or 'access qualification' between agropastoral districts (Mieso and Kebribeyah)

in the process of granting rights to enclose. In Mieso, one is eligible to establish enclosure from communal grazing area only if he has a right to land for cultivation and there is 'open space' to communal land. While this rule supports land consolidation perhaps favoring productive use of it, it remains a challenge for early settlers of the district whose farmland is located in the middle of a village. However, this is different in Kebribeyah and Harshin because non-cultivators are eligible to enclose. It is not compulsory to hold a farmland to qualify for access[6].

In both Mieso and Kebribeyah districts, a right holder to an enclosure cannot have all forms of alienation rights other than transfer to heirs from his own family, i.e. the right to inherit. This right to land also exists in the formal land law. Households in Harshin experience a new practice going beyond inheritance. Those with large enclosure sell land to outsiders for settlement in exchange for cash. This is not an exceptional practice as it takes place among agropastoralists in the Middle Awash Valley (Gebre 2006: 6). Among the Afar, enclosed land is sold to immediate family members where this land is allocated to irrigated farming (Aredo and Ame 2006: 131).

One needs to be aware that it is not always the permission of elders or a village chief that determines the possibility to enclose land. The physical attribute of the rangeland plays its own role. There are differences in the prevalence of enclosing land even within a district. Fragile or degraded communal grazing areas are not preferred for enclosure, as in the case of *Bililo* villages in Mieso where the communal land is invaded by cactus species. Table 1 indicates three important reasons for some of the sample households not to have private enclosure. While 19.6 percent of those without enclosure experience institutional constraint to fence the range, the majority (65 percent) could no longer find potential land to be enclosed, and many of them are in Mieso. Analysis of cases from the three districts studied supplements that of other studies carried out in other pastoral regions of the country in that in the event of ecological change, areas with better fodder may be enclosed as they create high scarcity value than other places (Swallow and Kamara 1999).

Table 1: Households without Enclosure and Basic Reasons Mentioned

Districts	Reasons		
	Not Interested	Prohibited	No Suitable land
Mieso	3	10	30
Kebribeyah	4	0	6
Harshin	2	2	4
N	9	12	40

Source: Survey Data

[6] Similarily, there is variable allocation rules for enclosure among different groups of Borana pastoralists in southern Ethiopia (Kamara, Swallow and Kirk 2004: 398).

3.3.2 Land Allocation to Private Grazing

The prevalence of various allocation rules in different districts have resulted in the allocation of land for private grazing as displayed in Tables 2 and 3. The two tables provide a comparison of land enclosed but with different points of emphasis. Table 2 considers wealth category and compares land holding for poor and better off herders[7]. It includes land under grazing and the overall land under private holdings including cropland. Though not all households (only 61.6%) enclose land for grazing, nearly all sample households (97%) have access to land for crop farming. In addition to this, an independent sample t-test statistic for equality of means shows that land under private grazing of better off groups is larger than poor herders[8]. This is statistically significant at 1% level. The same holds true for total holding.

A further simple correlation test shows that there is also significant positive relationship between livestock ownership and area fenced ($r = 0.27$, $p<1\%$) but this relationship is suspected to be spurious given the independent effects of the two variables as indicated in Table 3 and non-linearity of the relationship depicted in Figure 2. A similar test statistic indicates a strong association between household size and livestock ownership that implies more labor can be deployed to fence larger area. From Table 2, greater proportion of large herders (70 %) has been allocated the right to private grazing than poor herders (54.5 %) but both use nearly equal proportion of their private holding for grazing.

Table 2: Average Land Holding Under Private Appropriation

Land use	Wealth category	N	Mean (ha)	Std. Deviation
Private grazing	Poor	54	1.14	1.09
	Better off	39	1.75	1.18
Total holding	Poor	99	2.12	1.21
	Better off	56	3.37	2.05

Source: Survey Data

The comparison given in Table 2 does not inform on possible differences across the study sites. Using livestock ownership as a close proxy for wealth, the result reported in Table 3 shows a slight difference between better off and poor herders in each site. For instance, poor herders tend to enclose larger area than better off herders in Harshin as compared to agropastoral districts. This result is expected because informal rules are more relaxed in Harshin than in the other sites.

[7] While comparing, the categories 'poor and better off' and 'small and large' are used synonymously throughout the text.

[8] Expert interviews indicate the presence of skepticism on fairness in the allocation of land for enclosures as better off households obtain relatively better quality land.

Table 3: Comparison of Enclosed Land for Grazing (ha) by Districts

Locations	Wealth category	
	Poor	Better off
Mieso	0.48 (1.76)	0.38 (2.17)
Kebribeyah	1.47 (2.45)	2.11 (4.24)
Harshin	2.08 (3.24)	1.55 (2.90)

Note: Total private holding reported in the parenthesis

Source: Survey Data

A further differentiation in terms of wealth quintiles is required to examine if there is observable distinctions and patterns in the three districts (Figure 2). In the case of Harshin, pastoral households in the lowest wealth quintile (0 to 2.2 TLU) fence slightly more land than others. The survey data showed that households in this quintile lived on average 16 years in the same village in the district indicating that they might have occupied relatively better pasture resources than those who settled recently. The situation in Kebribeyah is different where an increase in area fenced with livestock ownership is observed. In this district, households in the highest wealth quintile fenced more than two hectares of land. An interesting observation in Kebribeyah district is that though household size has been taken as a criterion for size of parcels enclosed, this variable is correlated with wealth. In Mieso, those households with middle wealth group have on average larger fenced land. The reason could be linked to the variation in access qualification and limited option for allocating land to private grazing in Mieso.

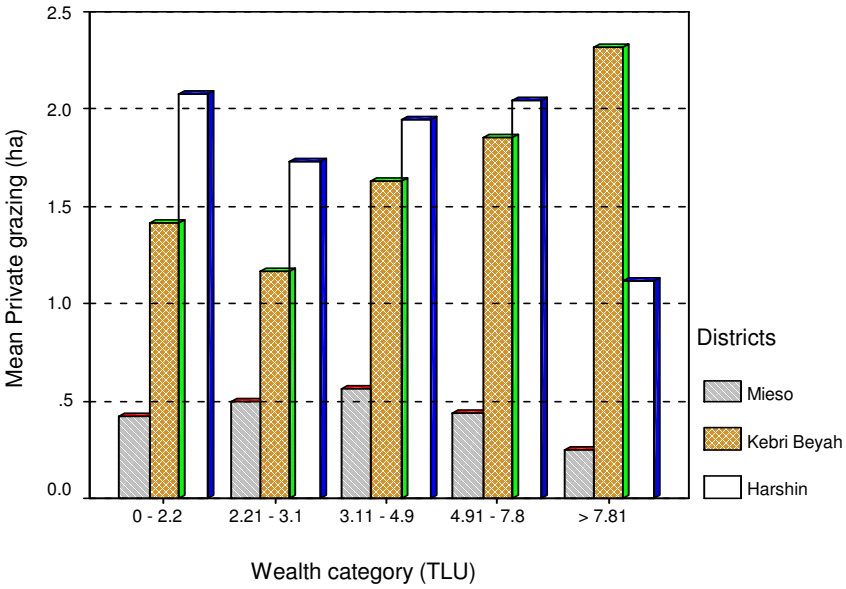

Figure 2: Mean Private Grazing by Wealth Category

Source: Survey Data

Comparing the three districts, more land was allocated to farming in Mieso while expansion of private land appropriation has relatively been a recent event in others. The average area enclosed by individual household in Mieso is the smallest and somewhat comparable to that of the neighboring Karrayu (0.64 ha) pastoralists (Abule, Synman and Smit 2005). In general, the area enclosed in the three sites may not be large enough to support livestock of an individual household. The highest wealth quintile in Harshin fenced less than others, perhaps heavily relying on feed from communal land, or might be engaged in contracts with those who fenced. The experience in Harshin seems to contradict the empirical review presented in Section 2. Internally arranged grazing contracts are more common in Harshin than in others. Hence, alternative analysis of the case does not guarantee the generalization that relatively wealthy members of the community always enclose larger area than the poor clan members.

4. Exogenous Driving Forces

Many have argued that state development interventions since the 1970s have been important sources of change in land use in pastoral and agropastoral areas of Ethiopia with a direct effect on change in property rights (Kamara, Swallow and Kirk 2004; McCarthy, Kamara and Kirk 2001)[9]. One of these interventions currently in place is the promotion of improved technological package as a component of the national agricultural development strategy to achieve food security even in semi-arid regions. To evaluate whether access to improved crop technology favors the enclosure practice, comparison was made between those who fenced and others who did not with respect to time horizon in which they have been involved in agricultural extension services, particularly taking the number of years of using improved crop varieties. On the basis of the results, it is convincing that enclosed land is eventually converted into crop field. Also, as is often hypothesized, benefit from the improved technology creates economic incentives.

The comparison made using Figure 3 shows that 44.9 % of the subgroup with enclosed land has had access to improved seed for some years (14% for more than five years); whereas, this is found to be 60.6 % for those without fenced land for grazing. Alternatively, a simple correlation test between area enclosed and years of access to improved seed by taking only those who have private enclosure shows the absence of positive association between the two variables. Therefore, the result here gives a strong support to reject the hypothesis that access to improved seeds (technology) motivates for land enclosure.

Nevertheless, a simple correlation test proves a statistically significant relationship between cropland holdings and private grazing ($r = 0.18$ and $p = 5\%$) indicating that those who enclose more tend to rely more on crops than others. In Mieso for example, the initial practice of enclosure emerged from the need to cultivate the land although part of the enclosed land is allocated to private grazing. This implies that without having

[9] Swallow and Kamara (1999) provide both endogenous and state-supported individualization where the latter is generally seen as one step ahead in the state's effort towards sedentarization of herders. Others argue that the state's influence is the single great transformation to pastoralists' way of life and their communal tenure, as African states perceive them as 'potential threats to security and evaders of fiscal dues' (Lane and Moorehead 1995: 123-127).

access to improved seeds, households may allocate enclosed land to cultivation[10]. A simple ranking exercise done by surveyed households indicates that 52 % of them judge expansion of farming as the principal cause for a decline in communal grazing space.

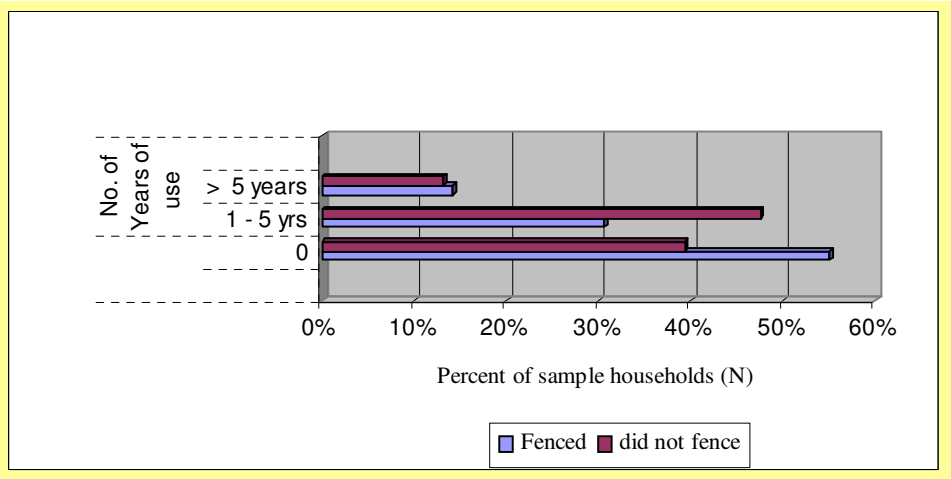

Figure 3: Access to Improved Seeds by Those Fencing and Other Households

Source: Survey Data

Other external sources of motivation can be linked to the role played by the Somali regional agricultural research program that implicitly advocates private land use. The regional research institute has formed 22 farmers' research groups in Kebribeyah who contribute land for experiments. They take part in such research under the framework of 'farmers research group' – a model adopted from the research carried out in the highlands by the different research centers. The objectives are twofold: to transfer agricultural knowledge and to create an incentive for participation in the research process. To achieve the latter, each household who is member of the research group earns 2500 Birr per year as a compensation for contributing land. This leads one to anticipate that those being attracted to such reward for the allocation of their land to field experiments may enclose more land within the limit of the prevailing rules of access.

Finally, the state agricultural extension service has introduced fattening programs in agropastoral districts. To this end, district rangeland management departments have been distributing improved forage species and provided training. Though this activity is not confined to those with enclosure, it encourages households with fenced land to manage their grazing plots. On a larger scale, the state agricultural extension agents distribute seedlings of perennial fodder species to individual pastoral households encouraging private land use. This has been widely implemented in Kebribeyah as well. Whilst the sustainability of this practice is in question based on experiences of

[10] For a fuller treatment on this, see Gebre (2001: 272 – 280, 2006).

development interventions of the 60s and 70s, the intent of the intervention as a range management practice is to encourage investment on the improvement of private grazing areas other than managing communal grazing land. The argument is that those interested in such services may prefer to claim for private grazing land.

5. Consequences of Enclosure Practice

There are several consequences associated with the emergence and expansion of enclosure. Even in some cases, it is not easy to distinguish the motivations from consequences in a wider social context because what is observed as a consequence for a particular household becomes a motivation for his neighbors. But, as a whole, the classification provides a clue on the key variables that are essentially related to the change in land use and property rights in different production systems among heterogeneous groups of herders. In the subsequent sub-sections, two questions are central in understanding the outcomes: what could right holders do with their enclosure? And, what effects have been brought in as a result of enclosure? It is essential to ask these questions in light of the basic arguments from property rights theory.

5.1 Socioeconomic

An important socioeconomic consequence is the gender-biased distribution of benefits from enclosing the commons. In all case study sites, the right to enclose is confined to married men and affianced males. The latter are allowed to enclose so that they would purchase breeding herd and become independent from families. There is an informal rule in place denying women's right to enclose. As elders' account indicates, allowing women to enclose creates inequitable system where men with polygamous marriage disproportionately fence the commons. Even a widow does not have the right to fence; rather, she is counted as the family member of the married brother of the late husband. Such customary law shows the unwritten social rules of a community derived from shared values based on tradition favoring continuity of the patrilineal system.[11]

Secondly, practicing enclosure opens the path for income diversification. It creates greater benefits for poor families compared to using communal grazing land alone. Though it is very small in scale, it strengthens the emerging economic opportunity in connection with commercial livestock production. For example, households in Mieso are involved in fattening programs by combining industrial input with pasture. Grass reserved for dry season as livestock feed enables households to sell their animals at better prices. As livestock and grain prices change inversely, selling animals in wet season is not a profitable economic decision. As a result, many agropastoral households use fodder from enclosed land to generate better income from their livestock by selling in dry season. This practice is more common in Mieso than in the other two districts because households in Mieso have *reliable* access to market and to improved agricultural extension services. The survey data shows a strong correlation between the annual cash income earned and enclosed land by households (r= 0.23,

[11] This evidence reconfirms the general observation that customary laws in many African countries do not allow women to own land. See for example Kameri-Mbote (2006).

p<5%). Moreover, a simple mean comparison reveals that higher income is earned from livestock sale among those who are fencing than those who are not.

Moreover, those households who lost most of their livestock due to drought or diseases use land enclosure as an opportunity to sell grass to livestock owners when environmental conditions are favorable. Unfortunately, only a few of the sample households (4 %) with enclosure have cut and sold grass. However, a major practice is that the livestock owner agrees to keep his cattle within the area fenced (contractual access). 'Owners' of an enclosure use personal connections to inform others to find a market for the livestock feed reserved on the fenced land. The contractual arrangement involves payments to the right holder either in cash or kind. There is no fixed value and the amount is based on deals made between the contracting parties. The contracting process involves a simple negotiation and agreements without written records.

The above two examples (selling grass and contracting) indicate a case in which market development creates preference for private grazing land. This could in turn lead to change in livestock production strategies. Assessment of income from livestock sales develops this speculation. For example, 80 percent of those households who enclosed land and changed their cattle breed earn better income than others from livestock sales (Figure 4). The result displayed here suggests that land enclosure alone may not improve income unless supported by other livestock development programs.

A new phenomenon that evolved along with the establishment of enclosure is charcoal making. The rising price of charcoal, the expansion of export markets and the birth of charcoal associations have collectively given a momentum for this practice to be pervasive and persistent in the region. As some have assessed, about 15,000 sacks of charcoal a month are exported (by smuggling) through Harshin to Somaliland and the Gulf (Lautze et al. 2003: 92).

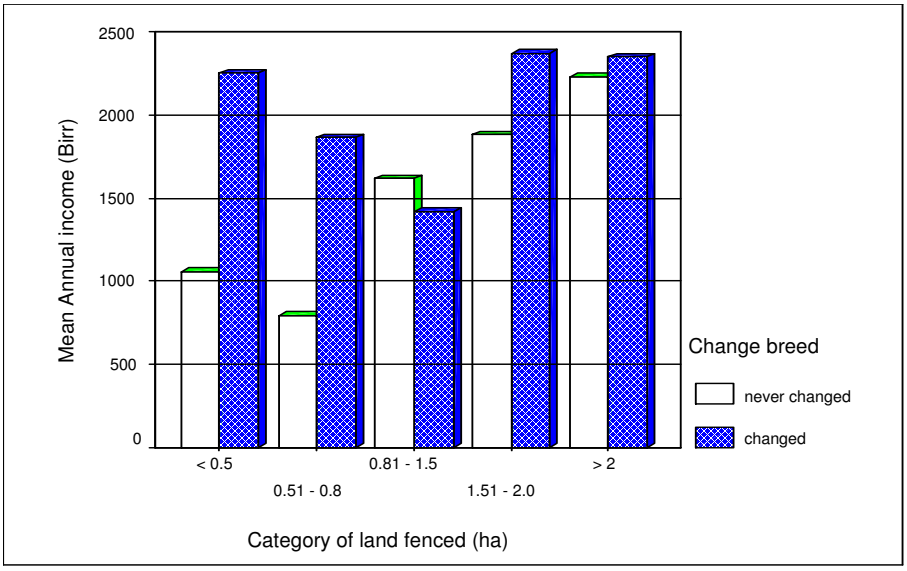

Figure 4: Comparison of Average Income by Livestock Production Strategy

Source: Survey Data

Households in various villages are highly involved in the production of charcoal from their own private land, selling it to traders and exporters. The presence of rules for fencing the range for private use has increased the chance to do this. It provides freedom for private right holders to enter into contract with charcoal exporters and sell the trees once they enclose them from the communal land and declare them as 'private property'. Discussions with elders have indicated that in the recent past charcoal making was not the primary motive for enclosure. However, an increase in fuel cost elsewhere external to the system has created a market opportunity. Allotting the rights to fence a plot of land for such purposes may not produce a favorable outcome as trees providing a base to sustain livelihood activities are lost to meet short-term objectives. When the incentive for enclosure is associated with charcoal making as a livelihood activity, it produces adverse effects, which carries a menace to the natural ecology and produces long-term negative environmental effect. This deteriorates the future potential of the rangeland to generate inputs for livestock production.

Table 4: Average Earning from Charcoal Making by a Household

Districts	Fencing	Mean (Birr)	Std. Deviation
Mieso [a]	No	489.1	972.2
	Yes	360.8	397.5
Kebri Beyah	No	0	-
	Yes	90.1	218.4
Harshin	No	50.0	96.9
	Yes	193.3	326.7

[a] Charcoal making from communal land is uncontrolled in Mieso (internally open access).

Source: Survey Data

Community elders are aware of the problem but do not seem to have the means to stop the action. At the regional level, there is a general perception that those generating income from charcoal share part of their income to elders who are supposed to discourage such action. As a result, elders often take a neutral position. This brought a challenge to the regional environmental protection office to rely on local elders to introduce regulatory measures. Though the rights and duties of the private land use for pastoralists and agropastoralists is clearly put in the federal land use proclamation, customary leaders are only concerned with the rights rather than duties. The proclamation prohibits undertaking such destructive economic activities but favors private use of land so long as the right holder prevents damages to the land. However, village level data show that de facto private use right to enclosed land is recognized as "full ownership" to this piece of land giving the rights to produce charcoal. This leaves an implication for the need to concentrate on the way customary rights are defined and enforced.

A simple mean comparison shows a statistically significant difference in earnings from charcoal between households who fence and others who do not (Table 4). On the contrary, comparable revenue is generated from charcoal making by both groups in Mieso. Such disparity arises as charcoal making from communal grazing area is somehow controlled in both Harshin and Kebribeyah in which collective action in the form of sharing monitoring costs is practiced. It involves punishment of one hundred Birr if a person is found cutting a tree and this is reported to elders (Devereux 2006: 79).

Indeed, the penetration of charcoal association into the area was possible when the largest refugee camp existed in Kebribeyah and when most members of these refugees (from Somaliland in the late 1980s) created link with their home friends as business partners in exporting charcoal. Since then the challenge to customary authorities in organizing sanctions and managing their commons had continued to exist. Individual households continued deviation from the pre-existing norms preventing cutting of trees for charcoal making. In general, the political crises in the neighboring Somalia and the expansion of charcoal markets (domestic and international) have introduced new threats to common property resources (a turning point) upon which livelihoods depend.

The example of charcoal making indicates the inappropriate prediction provided by the general theory of property rights change in favor of efficiency gains in practicing rangeland enclosure. While private property rights encourages long-term investment in the management of key resources, granting private use rights via land enclosure in this particular case leads to the destruction of the trees on privately used land[12]. In this isolated and marginal environment, households seem to put every possible effort to ensure survival other than long term plans in resource use, somewhat resembling the scenario explained by Larson and Bromley's (1990) model. The authors develop a dynamic model to examine a household's incentives in resource use under private and common property in developing countries. Their model rejects the conventional wisdom giving a rise to optimality of private property to prevent resource degradation. The argument of Perrings (1989) also suggests the need to look at the immediate economic motive for a household enclosing land in situation where poverty governs prevailing production decisions and forces one to ignore future consequences of his or her action.

5.2 Effects on Property Rights

The fundamental principle organizing property rights among (agro-) pastoralists in eastern Ethiopia is a clan based common property. And allocation of rights to enclose the rangeland forces us to examine the wider social impact of enclosure, as it variably affects the welfare of communal right holders. This step will generate an interesting insight on how private land use, such as land enclosure from the commons, introduces new inevitable threats to common property and ecologically induced risk management. The following two sub-sections give emphasis to this by considering the relationships among multiple rangeland users and land allocation decisions.

[12] This evidence on customary practice matches with the findings of Place and Hazell (1993) where land rights in some African countries do not significantly determine investment in land improvements.

5.2.1 Relationships among Multiple Resource Users

Longitudinal observation by inhabitants has shown that since the early 1950s, the expansion of private use of land has influenced property rights among multiple resource users. First, enclosing land close to settlement increases grazing pressure at the territorial boundaries of different clans during rainy seasons and causes disputes between neighboring clans. In Kebribeyah, for instance, disputes with the neighboring Ogaden clan have become common because enclosing land for private use has led to relatively permanent grazing at the boundary compared to the past. Since enclosed land is used as dry season grazing reserve, it pushes rainy season grazing frontier towards territorial boundaries. As elders reported, there has been a reaction from Ogaden clan by: damaging crop fields, intruding on enclosed land in the rainy season and burning of thorn fences in the dry season. A related study reports on inter-clan conflicts when the communal land between Kebribeyah and Jijiga districts was allocated to private land users for *t'chat* production (Lautze et al. 2003).

Second, if enclosed land is located along the transhumance routes, trespassing will generate conflict temporarily when a group of herders cross the area to extend their grazing into other clan's territory. A clan's capacity to protect its members private grazing parcels from other clans' intrusive access is a costly exercise as grazing resource becomes scarce. Members ability to protect one another's private grazing is also limited. Access becomes a question of physical force. This has always been the case in many places, particularly between ethnic groups in Mieso[13]. In this district, the expansion of enclosure has become one of the reasons for conflict between the two ethnic groups. Granting the right to enclose land among agropastoralists while the neighboring pastoralists do not practice enclosure either for cultivation or grazing is a costly move in terms of ensuring stable land use system in the area. Thus, as communal rangelands support multiple users roaming around to fulfill the biological needs of their herd, the expansion of enclosure and private land use is likely to reshape the relationships among multiple users. This could result in resistance to change by some. And such resistance proceeds from the anticipation of possible loss of land through expropriation by neighbors who use state legislative action to realize land allocation for private use.

Thirdly, enclosure affects the relationship among co-users of a grazing commons (clan members) depending on the types of resource they require for the animal species they keep in their herd. Since investment in enclosing land requires the use of tree from communal land to construct thorn fence serving as a demarcation for the boundary of enclosed area, it reduces the resource base for browsers. In extreme cases, outright topping can prematurely kill the trees where they can no longer be available for browsing. This leads to conflict of interest on resource use between those enclosing and others rearing browsers which indicates a potential overlap of incompatible tenure niches. In this case, rules favoring enclosure undoubtedly undermine the interest of herders inclined to browsers (camel and goats) as an adaptation strategy in the changing biophysical environment. Then, there is a challenge to delineate rights to households engaged in diverse livelihood activities. Though there is a difference in the

[13] This occurs since the Aflama rule does not apply at this level because Aflama as a rule for enforcing rules gains acceptance and functions within a village alone.

average ownership of browsing species between the two (fencing and non-fencing) groups, the statistical analysis (not reported in the text) shows the absence of any predictor that discriminates between the two groups. A much larger sample might be required to see the difference clearly.

From this, we can see that there are greater external effects arising from the way land is privately used as the delimitation of boundaries for private claim entails greater cost to de facto co-owners of the communal grazing land. Meanwhile, there is no visible option for those who enclose to internalize their investment effects. Absence of mechanisms of internalization of the effects leads to the condition where the outputs from practicing enclosure are judged differently by de facto co-owners of the communal grazing land and others who enclose. In light of the basic theoretical prediction of private property rights, pressure from others (fellow members of the (agro-) pastoral community) will cause either change in rules or alternative means to demarcate the boundary in such a way that the property rights security of those who do not enclose will be attained.

This reflects that we need to evaluate the consequences of enclosure not only in economic benefits accruing to individuals who practice it but also in terms of its effects on property rights and resource use relations among multiple resource users with diverse and contradictory motives. Hence, only a customary tenure system that harmonizes different interest groups within a given production system can succeed in establishing socially efficient tenure systems. As will be indicated in the explanation of the next section, enclosure represents a 'default mode' of private property and remains to be characterized by instability and uncertainty.

5.2.2 Land Allocation

Over three decades of enclosure experience in the case study sites indicates that there has been a process of *de facto* property rights change from pure common property to dual form of land use with different property rights. As discussed earlier, such change seems to have been influenced by the interaction between market forces and resource conditions. Nevertheless, property rights have been observed to be unstable due to natural disasters like drought that force households to drop using a piece of land enclosed for either of the activities discussed earlier. They stay away for an extended period of time until the stress period passes. After return from migration individuals will start enclosing a new piece of land to practice normal activities. Those households who face a complete herd collapse (destitute) and migrate to cities or refugee camps for relief support may not come back to their original village. As a result, the land they enclose falls once again into common property. The total land area falling under private enclosure at community level does not increase indefinitely. But this might vary from place to place.

In an effort to establish a model showing land use and property rights dynamics, Figure 5 illustrates (as a preliminary step) the transformation of property rights to the grazing commons where this transformation is non-linear and swinging. This is an attempt to move from the ground up. Discussions that follow are entirely based on the results presented earlier. To accommodate all possibilities, the sketching displays two extremes: 1) where land is perfectly communal and there is no private parcel (0C') and

2) where clan communal grazing land is entirely divided; rights of use are purely private[14] and no grazing land remains as a customary common property (0F'). A large body of empirical work in general confirms that no pastoral and agropastoral system has so far succeeded, though experienced, in adopting tenure systems resembling situation (2) above[15]. Instead, there have been mixed outcomes in which several factors produce opposite forces in keeping land either in communal use or put partly under private appropriation. The results indicated that in an increasingly settled (agro-) pastoral system, there is a mix of communal land (CL) and privately used land (PL). Let us assume that the total area of clan grazing land is fixed. Given this, at C1 only F1 will be enclosed and at C2, more land as much as 0F2 can be enclosed.

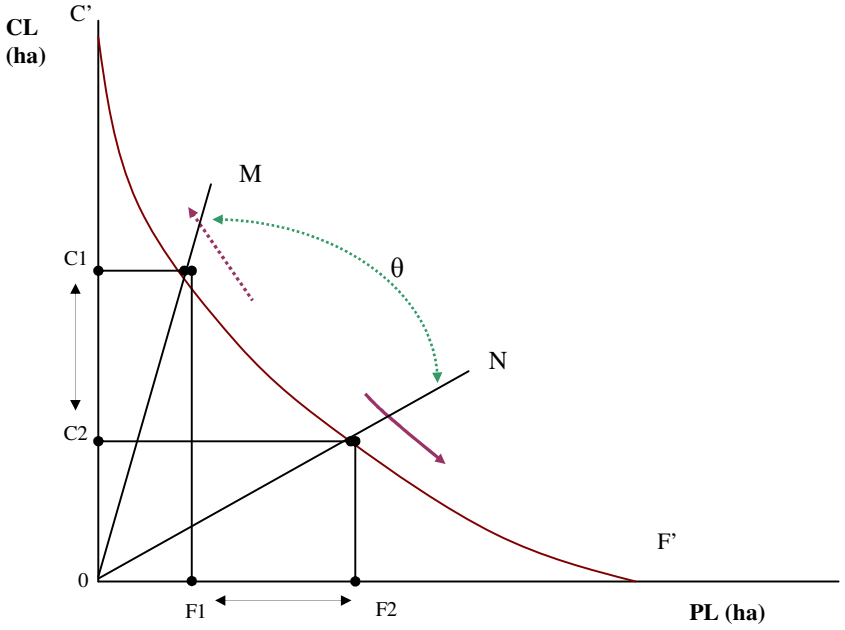

Figure 5: Transformation of Property Rights to the Grazing Commons

Source: Own Design

The findings show that periodic shifts along the 'transformation' curve C'F' (particularly between the points C1F1 and C2F2) depend on weather fluctuation, markets, demographic pressure and the extent to which clan rules permit or prohibit enclosure. Full or partial conversion of fenced land from the commons into cultivated plot mainly due to a decline in livestock number is increasing in agropastoral areas, following

[14] In this context, enclosure does not represent a formal private property rights (full ownership) but merely a private use rights granted by state or customary authorities, in which case the alienation rights are limited to transfer to kin members.

[15] For example, see the work of Burnsilver and Mwangi (2006) in the case of Kenya, and Peters (1992) and White (1992) on Botswana.

severe droughts when good rainfall arises (Hogg 1997; Hagmann 2003). Allocation of land to farming generates better returns than animal husbandry in the post drought condition, as herd rebuilding takes longer than crop harvest. But cultivation changes the natural conditions of the land. For example, land cultivated among households in *Bililo* villages in Mieso was abandoned when some villagers were resettled in other parts of the region due to recurring drought. Others who remained in those villages observe that it has remained degraded.

Therefore, the transformation is presumed to take place between lines M and N as accounted for by the expression:

$$ {}^{0F1}\!/_{0C'} < \theta < {}^{0F2}\!/_{0C'} \qquad (1) $$

Where θ is simply a parameter capturing the proportion of communal land transformed into private uses as conditioned by variance in land productivity, possibility to enforce private use rights, the decisions of the agents, the expected benefits and the decisions of others to fence. Where permanent investment is impossible, opportunistic farming reduces land productivity as it affects the rangeland in a way that it will no longer be able to support grazing. Only in those areas receiving relatively reliable rainfall for sometime, herders may be able to use crop residue as livestock feed. As similar studies specify, land enclosure continues to occur until potential areas are fenced off. Thus, there is a natural limit to move beyond line N as indicated in Figure 5. An increase in the value of θ may require technological change that has to improve land productivity[16]. In a fluctuating weather condition, change in property rights and land use can be reasonable only if access to extension service (technology, drought tolerant improved crop varieties) and investment in water management are able to contribute to an increase in land productivity. Where customary authorities (and the state agents) define and enforce the rights to enclose land, decisions to allocate more land to C influence the activities of individual members by restricting the amount of land available to F. Rules at clan level can reduce uncertainty arising from the external economies of scale. That means clan rule is instrumental in reducing externalities that individual's decision to allocate more land to F would produce to de facto co-owners of the grazing commons. Otherwise, each herder will remain doubtful about the behavior of his neighbors on their allocation decisions to the commons, i.e. whether more land is going to be fenced or not through application to the legitimate authority. This occurs because enclosing permits dual grazing in which a household reserves feed for later use while sharing common pastures and adding more pressure.

Although competition and uncertainty arising from this action is unavoidable, each clan member considers that production risk will be minimized if more land remains under common grazing in a variable resource condition for two reasons: 1) it provides clan members freedom of mobility (tracking strategy) and access to various grazing patches within the clan territory and 2) it supports a clan to get involved in reciprocal

[16] The survey data further show that on average a household operates crop farming on 1.63, 1.76 and 1.42 hectares in Mieso, Kebribeyah and Harshin respectively. Further, it shows that a very low proportion of households generate their livelihoods only from livestock (16.2 % in Harshin, 7.5 % in Kebribeyah and 3.75% in Mieso) though a greater proportion, as large as 70% in Harshin and 56% of agropastoralists, indicated livestock as the primary livelihood source.

grazing with its neighbors, which has been a common practice among many herding groups. In this case, more communal land implies greater collective action resource to buffer against risk.

When the grazing resource gets scarce, incursion into one another's private grazing plots increases the total number of conflicts beyond which it is not manageable, a force that may result in land allocated to C other than remaining in F. This force comes from an increase in number of conflicts between intruders and de facto right holders that may increase the transaction cost of resolving conflicts. High exclusion cost and boundary management will lead to the emergence of institutions supporting common property. In pastoral areas, where fencing is mainly for grazing and livestock remains the major source of livelihood, drought pushes households to put their individualized parcels back to the commons. This occurs when they change their settlement. A similar situation may be observed when the primary motive in fencing is charcoal production involving temporary seizure of land after which the land resources are exhausted.

As results suggest, an individual herding household's preference to hold land in private ($L\theta_i$) is determined by the expected benefit from the land enclosed or to be enclosed (B_{ei}), the transaction costs of enforcing rules (T_{Ci}) and exclusion cost (E_{ci}). Rule enforcers share a greater proportion of the transaction costs. As explained in the second section, a choice for land allocation to both F and C (higher or lower θ) should rely on the variance in land productivity over space and time (σ^2_{lp}). Where greater local variability of rainfall is experienced, institutions may favor allocation of land to C in order to enhance the welfare of members and non-members. In such situation, investment in mobile assets (livestock) generates secured income if resources are held in common (Nugent and Sanchez 1998). Hence, we have the expression:

$$L\theta_i = B_{ei} - [(E_{ci} - T_{ci})\,(\sigma^2{}_{lp})^{cv}] \qquad (2)$$

Where CV is the coefficient of variation of rainfall that determines land productivity in the arid and semi-arid regions. It is assumed that E_{ci} always exceeds T_{ci} based on the arguments of Field (1989) in that exclusion costs are higher than governance costs (transaction costs) as the number of firms in the commons reduce while moving towards more privatized parcels (Figure 2-1). As can be deduced from the expression (2), a rise in the value of CV above 1 (or 100%) produces disincentives to hold land for private use. As results also reveal, it is the variance in land productivity that entails mobility and hence makes intrusion into others' private grazing land an unavoidable phenomenon. This inflates the costs of enforcing private rights. These two factors in the model (T_{ci} and σ^2_{lp}) reinforce each other. In addition, the cost of exclusion involves two components – labor allocated to thorn fencing and monitoring (Lc) and the physical resource invested (Ic). Thus,

$$E_{ci} = L_{ci} + I_{ci} \qquad (3)$$

But the simple technology of exclusion (physical resource for fencing) is not the cost incurred by a household, but transferred to other co-owners of the commons. This is a social cost attributed to generating private benefits. Amongst those clans where there is a limit to land enclosed by an individual, members may tolerate this cost given the rules. In other cases, instability and conflict may continue to exist mainly where land quality

does not permit permanent use and a household is motivated by immediately earned income as in the case of charcoal. The technology of exclusion, as explained earlier, has a direct negative effect on the common property resources by impeding the potential to attain long-term security in generating benefit streams.

However, as production decisions tend to be market driven, the expected benefit (B_{ei}) can be a function of terms of trade between livestock and crop (Kamara 1999). This circumstance generates an incentive to use land temporarily (or permanently) as determined by σ^2_{lp}. If market conditions generate a favorable terms of trade for livestock against crops, a fair decision for the customary authorities is to introduce disincentives to allocate private land to crop farming. This means that the transaction costs (T_{ci}) in equation (2) will be lower. Household welfare can rather be justified through regional integration of the (domestic) economy by facilitating exchanges and specialization other than diversification at household level – taking the comparative advantage into perspective[17]. Under this situation, a household can easily abandon the enclosed land (for grazing) when deemed necessary because there has not been much investment in it other than labor allocated (employed) in fencing. But this is far from reality as terms of trade continued to deteriorate since the mid-1990s against livestock producers in the region (Teka and Azeze 2002).

There is a general assessment that livestock produced in the commons are of poor quality to improve the terms of trade in favor of animal husbandry which is currently seen as a major obstacle to integrate herders into the market economy. Here, on one hand, we have traditional production strategies governed by herd mobility and reciprocity as stock saving mechanisms that do contribute to poor animal quality and continued deterioration of the terms of trade. On the other hand, enclosure by causing range degradation will have a multiplier negative effect in achieving security in the long-term. Thus, reciprocal grazing and range enclosure, preferred to achieve different objectives, seem to result in different outcomes and compel us to define property rights security in quite different ways while both being determined by a similar variable (σ^2_{lp}).

Moreover, the available rainfall data for Kebribeyah and Harshin are inadequate to guarantee generalization on the variance of land productivity. With this limitation in mind, a comparison shows that the variability in rainfall for Mieso is not high with the coefficient of variation (CV) over the 43 years period being 25.4%. However, it is fairly high for Kebribeyah (34.2%) and Harshin (42.3). According to the standard rainfall CV set for a disequilibrium system[18], the condition in Mieso does not seem to discourage investment in private use of land unless other factors inhibit such practice (Figure 6). In fact, for the whole of Somali region (excluding Mieso), rainfall variability has remained a

[17] As others argued, although specialization into livestock increases labor productivity, diversification into opportunistic crop farming (being one of the reasons for dynamism in property rights) would enable herders to prevent sales of livestock to buy grains as well as a forage source (Bayer and Waters-Bayer 1995). As Barbier and Hazell (1999) deeply reviewed, there has been a debate between: (1) those proposing that pastoralism is bound to disappear and will be replaced by mixed crop-livestock systems and (2) others who rely on empirical results and indicate that mixed crop-livestock is less suitable than pastoralism owing to erratic rainfall condition. The authors make a point in that this debate does not seem to end at all. But both disregard the transaction and exclusion costs indicated in the above model that could even exceed the benefits in certain situation.

[18] A rangeland condition with rainfall CV greater than 33 % is classified as a disequilibrium environment where erratic rainfall determines forage productivity than livestock densities (Ellis 1995: 43).

major factor rather than a decline in the amount of rainfall over the last few decades (Devereux 2006: 13). A much more detail analysis and discussion is warranted but not possible due to data limitation on spatial land use. This would have been, otherwise, useful in indicating the trend of land use change in different periods.

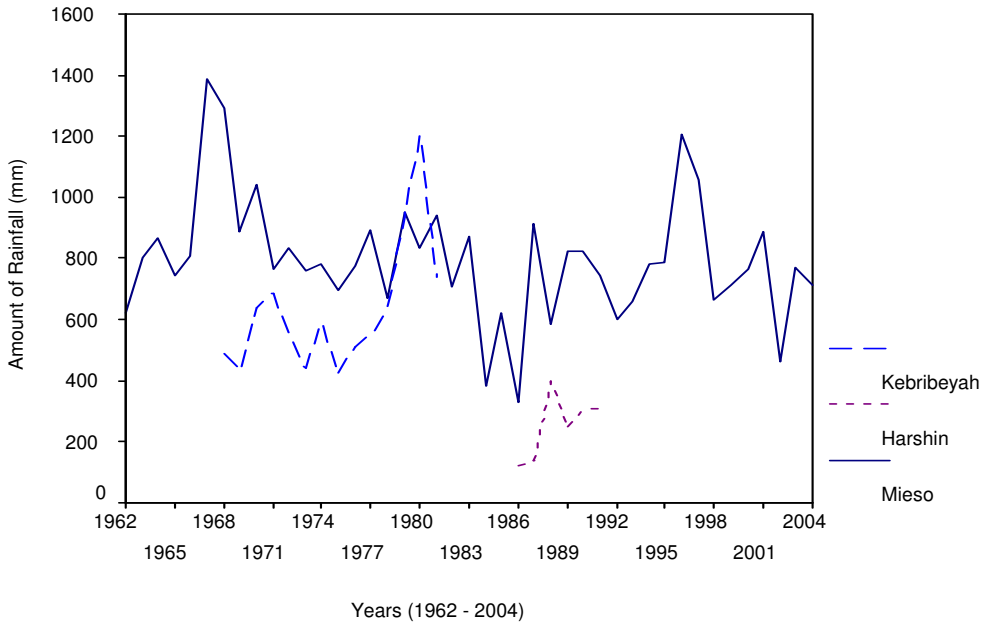

Figure 6: Total Annual Rainfall Received in Different Years

Source: Computed from Ethiopian National Meteorology Data

The simple model from equation (2) gives a general indication on how property rights and land use becomes unstable in the semi-arid pastoral and agropastoral regions and the major determinants. This model could be expanded to accommodate other variables with the use of insights from other studies, for example the effect of demographic shift and the demonstration effect of an individual household on others' incentive to put claims.

6. Concluding Remarks

The historical accounts of the cases studied indicate that customary institutions evolve in response to the demand for private land use. This demand arises from the interaction among changes in biophysical environment, economic and demographic factors, in conjunction with state policy, that have increased the value of controlling quality pasture nearby settlements. The case studies suggest that a gradual shift in property rights is a response to internal and external forces. Results have shown that governance structures (rule enforcers) differ between agropastoral and pastoral production systems. While the role of the state and customary leaders is conflated in the former case, that of customary elders is extensive in the latter except in few cases of dispute settlement. On the other hand, the incentives for the state to share the transaction costs of defining and enforcing individual rights is still ambiguous. It might be related to empowering

customary elders or to correct for injustice inherent to customary decisions towards certain groups or to accelerate the process of private land allocation using enclosure as an entry option to the customary land use system.

Whether enclosure is a sign of frustration, a prompt action to capture rent from better quality land or a normal practice as a response to emerging markets for livestock feed, it has enabled the poor clan members to generate an income stream in a way it has not been experienced earlier. But there is no clue showing that a household has been denied the right to enclose land merely because of its poor economic status. Contrary to the empirical evidence elsewhere, the rights to enclosure is non-contingent upon investment in other assets (e.g. water points). In that sense, the rules adopted in all study sites do not necessarily marginalize poor herders even if one cannot be fully optimistic given the judgment of the experts who believe that poor households are allowed to enclose only poor quality land. But abandoning enclosure benefits those who can capture income streams from common pasture other than poor herders. Empirical studies elsewhere indicate that while there appears to be economic differentiation between losers and winners from the trends of enclosure expansion, enclosing land is practiced whenever opportunities to generate high returns from the grazing land exist (Woodhouse 2003).

While the income from investment in enclosure is unreliable, its ecological damage is noticeable particularly when it serves as a means to prepare charcoal. This is determined by immediate economic gains from it and the failure of customary authorities in imposing sanctions. This leads to the question: should new economic incentives lead to the destructions of the commons? Similarly, in many Asian countries, increased market integration due to proximity to markets for fuel products has undermined communal forest management in which shirking on duties among the traditional authority because of corruption has been found to be the underlying cause (Baland and Platteau 1996: 271). In this study, however, enclosing becomes a strategic action to isolate a resource unit from the commons, serving the purpose of 'legitimizing' individual action. As this occurs, it may be unfair to judge that an individual herder violates commons institutions; instead, he uses clan rules to undertake a new action that external economies have prompted.

Moreover, cost of exclusion by making use of fences involves external costs to other members of the village who do not enclose. This cost will become much higher if a household has to maintain the fences every year. From within a particular group (e.g. a clan), investment in enclosure increases social costs; at the same time, it secures one's private benefits. It has created a new threat to herders' livelihood security when it is practiced on a large scale leaving less land for communal grazing, with consequent grazing pressure while allowing some to practice dual grazing. This can easily cause resistance by neighboring groups because it externalizes "privatization" costs to other clan members and even to other clans. This has been clearly observed though it did not deter the process because individual actors recruit state power when required to gain legitimacy for their action as in the case of Mieso. In a few cases, internal resistance by fellow clan members is almost non-existent while it is imagined to be the main source of action against enclosure. Indeed, senses of unease and frequent disputes remain to be inherent features because range enclosure has introduced shifts in options and constraints to secure livelihoods.

Other authors hold similar views that inequity concerns cannot be adequately addressed via supporting individualized enclosure since grazing land is not uniform in quality (Taylor 2006; Unruh 1995; Williams 1996). In this particular case, when the three cost components (exclusion and maintenance, dispute settlement and ecological damages) are compared with the economic rents generated via enclosure that has been observed to be unreliable, the practice of enclosure in general does not represent a transition from a less to a more efficient land use system. The marginal increase in these costs exceeds the marginal benefits from enclosing additional unit of the rangeland. The background of the cases, though they vary to some degree, shows that households give more emphasis to the possibility to control a plot of land than the prospect of continually generating sizeable income from the land they enclose. This raises the need to undertake further research to examine whether range enclosure has any link to the policy gap in recognizing communal land rights, as such a gap could be a source of uncertainty.

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