



## Pastoralism within land administration in Kenya—The missing link

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### ABSTRACT

In land administration (LA), the right to exercising property/ownership rights on land is based on cadastral processes of adjudication, survey and rights registration. Private ownership rights are now being taken up in pastoral areas, where they must contend with pastoralists' land rights. Pastoral land use requires seasonal migrations determined by climatic conditions. This study aimed to find out how well the existing land laws and property rights in LA are able to serve the requirements of pastoralists land use, identify mismatches and put forward possible solutions. A case study was carried out in the Samburu–Laikipia–Isiolo–Meru landscape in Kenya. Data on the degree of livestock dependency among pastoralist communities, the spatial extent and patterns of dry season migrations, the resulting encounters between herders' and non-pastoralist land use actors, and the perceptions of land rights held by actors were collected through a variety of methods and analysed. The results show that pastoralism is still active. The migration corridors reveal that herders maintain extensive dry season mobility, even though some of the corridors currently overlap with areas where land is privately owned by non-pastoralist land use actors. Moreover, the results show that most non-pastoralist land use actors have their land rights registered, but seasonal encounters with migrating pastoralists persist as pastoralists continue to exercise customary rights of communal use. We conclude that existing land laws and property rights in LA are suitable for sedentary land use, but do not address how to serve pastoralists land rights in time and space. The pastoralist's migration routes and patterns obtained indicated that it is possible to predict where pastoralists will be at a given time/drought period. This information could be used by decision makers and land administrators to identify where and when pastoralists' land rights apply. This could provide the foundation for including pastoralists' spatiotemporal land rights in LA. Arguments emphasize that adjudication, surveys and registration of rights should focus not only on ownership and full control of land, but also on defined periods when spatiotemporal mobility and access rights could be granted to pastoralists.

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### Introduction

The primary objective of a land administration (LA) system is to support the operation of the land market – and in turn, support economic development– environmental management and social stability in both developed and developing countries (Williamson, 2001). This is achieved through legal, regulatory, fiscal and information management, the components of LA (Palmer and McLaughlin, 1997). Rights or rules on cadastral parcels and land are exercised through a number of property rights regimes, depending on

the form of land tenure (Dale and McLaughlin, 1999). It is upon the processes of land survey and registration that property rights can be exercised based on four qualities: universality, exclusivity, transferability and enforceability. Universality is about ownership rights, exclusivity about the rights to benefit from land, transferability about the rights to transfer property rights to another owner, and enforceability provides a structure of penalties that prevent others from encroaching on or taking over property rights without the agreement of the owner (Tietenberg, 1992; Dale and McLaughlin, 1999). These institutions form the norms and rules of LA (Molen, 2003), and are supported by laws and mandates that legitimize regulation of activities, such as holding rights to land, economic exploitation of land, and control over land use and development (Enemark and Molen, 2008). These LA notions are well recognized and respected by citizens in developed countries,

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and are backed by theoretical and legislative frameworks that have evolved over hundreds of years (Bennett et al., 2008). In developing countries such as Kenya, however, these LA notions may fail to achieve their purpose in landscapes where varied land uses such as pastoralism and sedentary land use exist side by side.

Pastoralists, or mobile pastoralists – these terms are used interchangeably in this paper – depend on livestock for their livelihood and live in climatically marginalised environments. Their strategy for providing year-round food for their herds is to move livestock to pasturage, rather than bringing fodder to their herds (Chang and Koster, 1994; Dyson-Hudson and Dyson-Hudson, 1980; Fratkin, 2001). The time and pattern of movement is determined by climatic conditions (wet and dry seasons) and the availability of pastures, among other physical and biotic factors (Dyson-Hudson and Dyson-Hudson, 1980; Fratkin, 2001). The dry seasons are most demanding for pastoralists (Oba and Lusigi, 1987). They move to areas with higher rainfall where the vegetation persists, moving back again to their home areas at the onset of the rains to take advantage of the new grass (FAO, 1999). The variability in pasture availability forces pastoralists to be alert and take advantage of fodder when it becomes available, and to plan ahead and safeguard against disasters (Anderson and Broch-Due, 1999). Anthropological studies have observed pastoral systems of pasture utilization to be sustainable and compatible modes of exploitation (Homewood and Rodgers, 1987; Fratkin, 1997), although the areas of land involved and the migration routes or corridors are considered to be fuzzy or ill defined (Goodhue and McCarthy, 1999; Scoones, 1994; Toulmin, 1993).

During seasonal migrations, pastoralists' may cross into non-pastoral areas, which can lead to encounters with land users outside the pastoral community. When pastoralists enter non-pastoralist land their interests may temporarily overlap or conflict with those of the land users. Such conflicts may be heightened when non-pastoral land users have their lands surveyed and their property rights registered, confirming their rights to the land. Formalization of property rights excludes overlapping interests because it creates exclusive forms of ownership of resources (Meinzen-Dick and Mwangi, 2009), obstructing pastoral movements essentially by depriving them of access rights (Brink et al., 2005). The pastoralist practice of repeatedly renegotiating temporary and flexible access rights to resources is becoming more problematic in a landscape that is progressively being surveyed, demarcated and allocated (Homewood et al., 2004). This has caused a decline in the social and economic welfare among pastoralists (Swallow and McCarthy, 1999). According to FAO (1999), pastoralists are exposed to unprecedented pressures and are unable to respond appropriately to meet the requirements of their traditional mode of production.

Conflicts between pastoralists and non-pastoralist land users are usually about property rights issues (Brink et al., 1995). Tietenberg (1992) states that ill-defined property rights are behind the problems that are putting pastoralist livelihoods in danger (Fratkin, 1994; Cotula et al., 2004; Deininger, 2003). However, little is known about why/the degree to which land laws and property rights in LA fail to address the spatiotemporal dimension of land rights in pastoral production systems, the seasonal migrations. To address this gap, current pastoralist practices were investigated by studying the magnitude of livestock dependency and the spatial extent and patterns of seasonal migrations. The interaction between migrating pastoralists and non-pastoralist land use actors was analysed. Perceptions of land rights were assessed by finding out how aware the land use actors were about land registration systems for their lands in northern Kenya. Drawing on the results, the paper discusses possibilities for using land administration systems to secure pastoralists' spatiotemporal land rights.

## Study area and methods

The case study area, the Samburu–Laikipia–Isiolo–Meru landscape in Kenya, was selected because of the diversity of land tenures and land use actors found there. The land use actors are pastoralists and non-pastoralists with varied forms of land tenure. Land tenure forms for pastoralists are based on two systems: statutory and customary tenure. Statutory tenure is legislated for in Chapter/Cap. 287 of the land law, which contains provisions for group ownership of land known as 'group ranches'. A group ranch is a large tract of land that is delineated and registered, and which is owned privately and used equally by the group members. Group ranch ownership is obtained by representatives of a group of owners of land registering their ownership under the Land Adjudication Act (Cap. 284). Pastoralists communal land use and livestock movement within the group ranch boundary is permitted. The second system, customary tenure, is exercised through traditional communal practices in trust lands occupied by pastoralists. Trust lands may be described as areas where no adjudication and demarcation of individual or group tenures has taken place. Section 69 of Cap. 288 allows the occupiers to enjoy land rights according to their customary law, including any subsequent modifications of the land rights, but only as long as such rights do not conflict with any of the provisions of the Act or rules made under it, or to the provisions of any other law currently in force.

Non-pastoralist lands are held under statutory tenure, in the form of individual holdings or government land. Private tenures are mostly held by individuals outside the pastoral sector, but some pastoralists do own private land. Private tenures can be obtained by surveying boundaries and registering individuals as proprietors of the land, as provided for in Cap. 300 of the land laws. Upon registration, absolute ownership is conferred to the owner, with a title deed or a certificate of lease. This permits land owners to exercise their rights of universality, exclusivity, transferability and enforceability provided by LA. Cap. 300 also provides that, upon registration, land owners are not obliged to respect needs/uses of their land by other parties', as long as their interests and claims not shown in the register. Penalties for trespassing on private land are provided for in Cap. 294.

Government land is covered by Cap. 280 of the land laws. Frameworks for conservation of biodiversity and wildlife are also incorporated into legislation on government land in the Forest Cap. (385) and Wildlife (Conservation and Management) Cap. (376). Cap. 280 on government land is rather flexible, including provisions for access to resources such as water within the government lands. However, unauthorized occupation of unalienated government land, in any manner whatsoever, is liable to penalty.

The land use activities in the study area are diverse. For this study, six categories of land use actors were identified and each treated as a unit of analysis: pastoralists, farmers, private ranchers, urban residents, wildlife park wardens and forest officers. Fig. 1 shows that pastoralists are mainly found in the drylands of Samburu, northern Laikipia and Isiolo districts. They make seasonal migrations across large areas in search of pastures in response to climatic conditions. Pastoralist tenures range from individual tenure to group ranches and trust lands. Farmers are mostly located in the more productive areas of the Isiolo and Meru regions, practising subsistence and cash crop farming. Private ranchers are found mainly in the Laikipia landscape, where they practice a variety of activities, such as wildlife conservation, forestry, farming and ranching. The urban residents of Isiolo, Wamba and Nanyuki towns were selected for the study. Isiolo and Nanyuki are more populated and developed urban centres; Wamba is an important trading centre in the pastoral areas and contains residential areas. Wildlife parks and forest are private lands owned by the government or

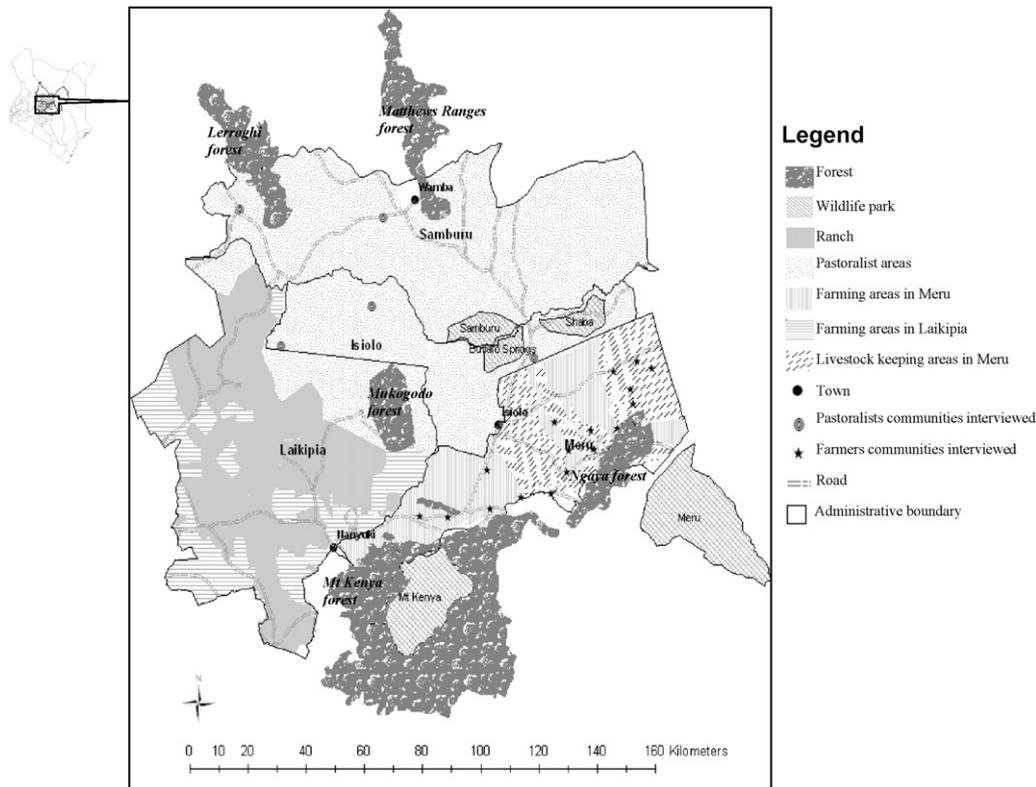


Fig. 1. Study area, land use and land use actors within the Samburu–Laikipia–Isiolo–Meru landscape.

local authorities. For this study, farmers, private ranchers, urban residents, wildlife park wardens and forest officers are categorized as non-pastoralist land use actors. Their tenures are commonly private ownership, either individual or government land ownership.

The diversity in the study area provided an ideal context for exploring interactions between pastoralists and non-pastoralist land use actors in relation to land laws and the property rights provided by LA.

Fig. 1 was compiled from a map showing livelihood zones and a map showing property (land) ownership, and from additional GIS layers. The livelihood zones map is a national database accessed via the Community Based Livestock Early Warning Systems (CBLEWS) of the ASAL (Arid and Semi Arid Lands) Based Livestock and Rural Livelihood Support Project (ALLPRO) in Nairobi. The livelihood zones show pastoralist areas in Samburu, northern Laikipia and Isiolo districts, as well as farming and livestock areas in the Meru landscape. The 'livestock keeping areas' classification designates occupation by different livestock rearing communities from both the pastoral and non-pastoral sectors. The property map contains cadastral information on individual ranches. The details of each property, such as cadastral boundaries, were not used in this research owing to the sheer size of the study area. The map was obtained from Africa Wildlife Foundation (AWF) in Nanyuki, Kenya. The GIS layers with information on administrative boundaries, forests, wildlife parks and roads were obtained from ILRI (International Livestock Research Institute) in Nairobi.

## Methods

Data were obtained to assess how appropriate the existing land laws and property rights in LA are to the needs of pastoralist land use in northern Kenya. Current pastoralist practices were investigated by studying the magnitude of livestock dependency,

the spatial extent and patterns of seasonal migrations, the resulting interaction between pastoralists and non-pastoralist land use actors, and the perception of land rights based on how much the land use actors knew about the registration systems for their land.

A case study approach was used as it is well suited to investigations of interactions between phenomenon in their real-life context (Cassell and Symon, 2004; Yin, 1994). It is also an appropriate method for descriptive studies where the goal is to describe the features, context and processes of phenomena (Yin, 1994), which is the purpose of this study. As the study consists of six units of analysis, the embedded case study approach was used. It is one of the most appropriate research strategies for conducting studies containing more than one sub-unit of analysis, in which detailed information on each unit of analysis is integrated in the final analysis (Scholz and Tietje, 2002; Yin, 1994). A further advantage of case-based research is the range of possible methods for information gathering and analysis (Glesne, 1999). The data for this study were obtained from semi-structured questionnaires containing both open and closed questions, conducted in face-to-face interviews and via email.

The questions varied slightly between actor groups depending on the information required. Pastoralists were asked about: (i) current pastoralist tenures and seasonal migration practices; (ii) delineation of pastoralist seasonal migration routes and patterns for the two dry seasons—this is because climatic conditions in this northern Kenya drylands is bimodal (having two rainy seasons and two dry seasons) (McClanahan and Young, 1996); and (iii) their awareness of registration systems used for their land. Non-pastoralist land use actors were asked about: (i) whether they had conflicts with migrating pastoralists and (ii) their awareness of registration systems used for their land.

Fieldwork was conducted between November 2007 and February 2008. Various sampling methods were used to identify interviewees. Pastoralist communities were chosen using the cluster

sampling method ( $n=5$  from 72 participants) in a non-random manner, based on factors such as location and accessibility. Information was obtained through focus groups composed of from 8 to 20 men of various age groups. Besides answering the questions, the focus groups discussed seasonal migrations for the early-year drought (usually January–March) and the late-year drought (usually around July–September/October) and formulated general patterns of movements. The participatory mapping approach was used to record pastoralists indigenous knowledge on the timing and routes of seasonal migrations by translating the information onto a map. Indigenous knowledge is a unique, traditional local knowledge that has developed within the specific conditions of people indigenous to a particular geographical area (Grenier, 1998). To facilitate the mapping exercise for pastoralists, GIS layers with information on administrative boundaries, areas of private ranches, towns, wildlife parks, forests and roads were overlaid on a Landsat TM at 30 m resolution. This was printed on A0 size paper, on which pastoralists drew their migratory routes. The migratory route maps were later geo-referenced, digitized and visualized in GIS.

For the non-pastoralist land use actors, farmers were identified using quota sampling ( $n=21$ , from 71 farmers), and both individual and group interviews were held. The quota sampling used a non-random approach based on factors such as location and accessibility. Questionnaires were sent by email to 26 private ranchers whose contact details could be found. Of these, 6 responded ( $n=6$ ). Urban residents were identified using quota sampling in the three urban centres ( $n=25$ , from 40 urban residents—approx. 10 interviewees per urban centre). A condition for selecting urban residents was that they practiced some form of farming, such as kitchen gardening. Both individual and group interviews were held. Individual interviews were held with wildlife park wardens ( $n=4$ ) and forest officers ( $n=8$ ).

In total, this resulted in 72 completed questionnaires, of which 5 were from pastoralist communities and 67 from non-pastoralists land use actors.

### Analysis

Due to the unequal sample sizes, cross-tabulations are used to represent the frequencies of distribution of the responses from each category of land use actors. The interactions between the land use actors that were studied are shown in Fig. 2. Digitized layers of pastoralists' migratory routes obtained from the participatory mapping sessions were overlaid with land use maps. As shown in Fig. 1, some areas in the Meru landscape are classified as livestock keeping areas. During fieldwork, however, it became apparent that crop farming was also practised in these livestock keeping areas. Given this situation, permission was sought from the Community Based Livestock Early Warning Systems (CB-LEWS) to include farming and reclassify the livestock keeping as farming areas, consisting of a mix of livestock farming and cropping. As the cadastral maps could not be accessed, the land use map was used instead to represent pastoral areas, farming areas, urban centres, wildlife parks and forests. The land use map therefore

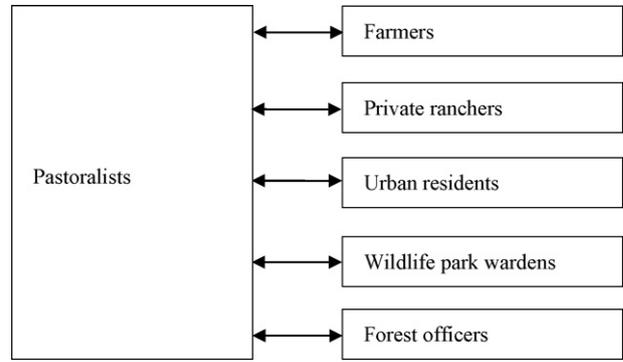


Fig. 2. Interaction between pastoralists and other land use actors in the study area.

shows pastoral areas where tenures are mostly communal, and non-pastoral areas where tenures are mostly private. Overlaying the migratory routes on the land use map, an analysis was made of areas where migration routes approach, encroach on or cross-areas used by non-pastoralist actors. The results are given in two tables, one for each drought period. The study looked at pastoralists' relationship to the land, and did not consider pastoralist stocking rates.

## Results

### Current mobile pastoralist practices

Table 1 lists the tenures and current practices in five pastoralist communities. The Mbaringon community owns land registered as group ranch ownership, while the Lodungokwe, Longopito, Namelok and Ngaremara communities live on trust lands. The proportion of families dependent on livestock for their livelihood is 100% in all communities except Ngaremara (25–50%). Clearly, pastoralism is active in all communities except Ngaremara. The lower dependency on livestock in the Ngaremara community reflects a shift from livestock keeping to crop farming. Livestock raids between pastoralist groups, with a major raid in 2001, encouraged many community members in Ngaremara to settle down and change their livelihood. Those who did not change to crop farming mentioned keeping smaller herd sizes than other pastoralist communities.

All communities confirm relating to land through the customary norms of communal use, and that migrations still occur in dry seasons. This includes the Mbaringon, whose members move out of their registered land, and the Ngaremara, whose members have smaller herd sizes. This suggests that seasonal migrations are still perceived as a viable traditional practice to sustain the pastoralist livelihood through drought. During migrations all pastoralist communities agree to encroach on non-pastoralist lands when the resources they require are on those lands. The reason for encroachment was that non-pastoralists do not easily allow access.

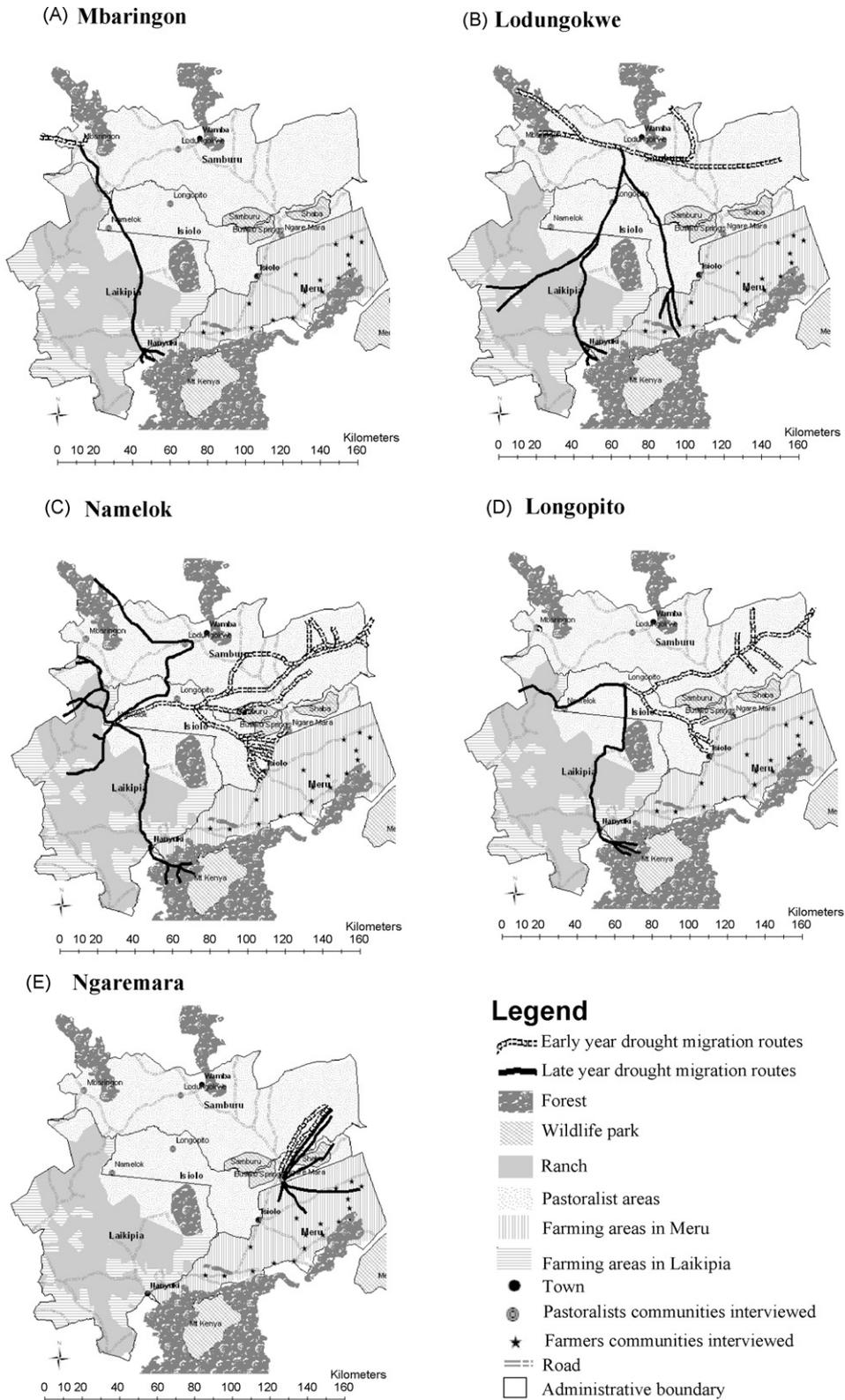
Table 1  
Pastoralist tenures and current practices in five pastoralist communities.

Pastoralist community	Tenure type	Estimated proportion of population dependent on livestock	Livestock migrations in both dry seasons	Encroach on other peoples' lands in droughts	Relate to land via traditional norms of communal use
Mbaringon	Group ranch	100%	Yes	Yes	Yes
Lodungokwe	Trust land	100%	Yes	Yes	Yes
Longopito	Trust land	100%	Yes	Yes	Yes
Namelok	Trust land	100%	Yes	Yes	Yes
Ngaremara	Trust land	25–50%	Yes	Yes	Yes

*Spatial extent and patterns of seasonal migrations*

Fig. 3 presents the results of the analysis of the spatial extent and patterns of seasonal migrations for the five pastoralist communities. The maps show the normal patterns of movement during the

early-year and late-year droughts. From their home areas (group ranch or trust land), migrating pastoralists follow the same routes to and from the drought grazing areas. Although these routes are standard and are followed each year, they may change (shorten, lengthen or sometimes a shift in direction) depending on the



**Fig. 3.** Seasonal migratory routes drawn by pastoralists in participatory mapping sessions.

**Table 2**  
Pastoralist migratory routes in the early-year drought (January–March).

Figure	Migratory routes in the early-year drought approach or cross into non-pastoralist land uses				
	Farming areas	Private ranches	Urban areas	Wildlife parks	Forests
3-A	–	–	–	–	+
3-B	–	–	–	–	+
3-C	+	–	+	+	–
3-D	+	–	+	+	–
3-E	–	–	–	+	–

Key: + = yes; – = no.

**Table 3**  
Pastoralist migratory routes in the late-year drought (July–September).

Figure	Migratory routes in the late-year drought approach or cross into non-pastoralist land uses				
	Farming areas	Private Ranches	Urban areas	Wildlife parks	Forest
3-A	+	+	+	–	–
3-B	+	+	+	–	+
3-C	+	+	+	–	+
3-D	+	+	–	–	+
3-E	+	–	–	+	–

Key: + = yes; – = no.

intensity of the drought. Pastoralists report that on arrival at pastures, the herds spread out to graze. This phenomenon appears as a delta-like feature on some of the migration routes. Pastoralists report that this spreading out could mean that the migration routes extend further into non-pastoral areas than shown on the map.

As can be seen from the maps, the early-year drought migration routes (shown in dotted lines) spread out farther to the east, towards a place the respondents called Losesia. During this period many pastoralist groups converge here—as shown in Fig. 3B–E. Respondents mentioned the availability of pastures in the Losesia area during the early-year drought. The land in the Losesia area has not been registered, so when pastoralist groups converge they can move freely to graze their livestock before heading back at the onset of rains. In the late-year drought, the migration routes (shown in thick black lines) advance northwards, westwards and southwards, to where the land tenure is mostly in the form of private holdings or government land. A noticeable feature in Fig. 3A–D is that migration routes converge and follow one route further south towards Mt Kenya forest. This is because herders follow a main public road which leads to Nanyuki town before advancing further

into Mt Kenya forest. They follow this public road because the land on both sides of the road is mostly in private ownership.

The estimated spatial extent of migrations and the pattern of movement can be influenced by the distance between community lands and the drought season grazing areas. Fig. 3A, for example, the early-year drought migration route shows movement to the north-west which continues out of the study area, in contrast to the other communities, who move eastwards. Fig. 3B–D shows migrations over long distances up to 200 km in both the early-year and late-year droughts. The migration routes shown in Fig. 3E are shorter than those of the other communities because of the community's proximity to the Losesia as well as the farming areas.

During seasonal migrations, the livestock not only have to move, but also need to feed. This suggests that non-pastoralist land use actors along or near migration routes are likely to encounter migrating herders. Tables 2 and 3 show whether or not the pastoralists' migration routes and patterns approach or cross into the different categories of land uses within the study area.

Comparing Tables 2 and 3 we conclude that fewer pastoralist communities approach farming areas in early-year drought than in late-year drought; none of the pastoralist communities approach

**Table 4**  
Land use actors reporting conflicts with pastoralists.

Category		Land use actors experience conflict with migrating pastoralists			Total
		No	Sometimes	Yes	
Farmer	Count	0	0	16	16
	% within category	0%	0%	100.0%	100.0%
Private ranchers	Count	0	0	2	2
	% within category	0%	0%	100.0%	100.0%
Urban residents	Count	0	1	12	13
	% within category	0%	7.7%	92.3%	100.0%
Wildlife park wardens	Count	0	0	4	4
	% within category	0%	0%	100.0%	100.0%
Forest officers	Count	0	1	5	6
	% within category	0%	16.7%	83.3%	100.0%
Total	Count	0	2	39	41
	% within category	0%	4.9%	95.1%	100.0%

**Table 5**  
Land use actors' awareness of the registration system for their land.

Category		Land use actors aware of the registration system for their land (whether land rights registered or not)			Total
		Don't know	No	Yes	
Pastoralists	Count	0	4	1	5
	% within category	0%	80.0%	20.0%	100.0%
Farmer	Count	2	3	11	16
	% within category	12.5%	18.8%	68.8%	100.0%
Private ranchers	Count	0	0	2	2
	% within category	0%	0%	100.0%	100.0%
Urban residents	Count	0	1	12	13
	% within category	0%	7.7%	92.3%	100.0%
Wildlife Park wardens	Count	0	0	4	4
	% within category	0%	0%	100.0%	100.0%
Forest officers	Count	0	0	6	6
	% within category	0%	0%	100.0%	100.0%

private ranches in the early-year drought, but more communities do in the late-year drought; fewer pastoralist communities approach urban areas in early-year drought than in late-year drought; more pastoralists approach wildlife parks in the early-year drought than in the late-year drought; and lastly, fewer pastoralist communities approach forests in early-year drought than in late-year drought. Apart from the wildlife parks, the late-year drought presents a period with more interaction between migrating pastoralists and non-pastoralist land use actors than the early-year drought.

Table 4 shows that the percentages of non-pastoralist land use actors reporting conflict with migrating pastoralists are high for all categories: farmers (100.0%), private ranchers (100%), urban residents (92.3%), wildlife park wardens (100.0%) and forest officers (83.3%). Farmers, private ranchers and urban residents stated that conflicts were caused by pastoralists entering their land without permission and destroying fences and crops. Wildlife park wardens mentioned that often herders would graze their livestock at a distance from the parks, but let their livestock move into the parks uncontrolled. Park rangers are often forced to confiscate livestock and wait for the owners to come and collect them. In forests, conflicts arise between migrating pastoralist and forest rangers when livestock graze on seedlings, or when pastoralists occupy the forest. However, conflicts did not always arise, as indicated by the 7.7% of urban residents who allowed pastoralist herders access, but experienced conflict if a fence was destroyed or herders stayed longer than the agreed period. Similarly, 16.7% of forest officers indicated that livestock grazing in forests reduced the chances of forest fires in the dry periods.

Table 5 shows awareness among land use actors of the land rights that LA provides and of pastoralist customary land rights (communal), as an indication of their awareness of the registration system for their lands; in other words, whether the actors have their land rights registered. Table 5 reveals that the percentage of pastoralists with registered land was the lowest (20.0%), while a high percentage of all the categories of non-pastoralist land use actors were registered: farmers (68.8%), private ranches (100.0%), urban residents (92.3%), wildlife parks (100.0%) and forests (100.0%). These non-pastoralist land use actors can exercise their rights against intruding pastoralists. A small group of farmers (12.5%) rented land from other people and did not know whether this land was registered or not. These, as well as the 18.8% of farmers and 7.7% of urban residents who did not have their lands registered, reported having their lands fenced and exercised absolute rights as provided by land laws and by LA. Most pastoralists, on the other

hand, do not have registered rights, but were aware of their customary rights of communal use, on which seasonal migrations are based.

## Discussion

This study set out to investigate current pastoralist land use practices and interactions with non-pastoralist land use actors in the context of existing land laws and property rights. Much of the pastoralists' dependency on livestock and the spatial and temporal variability of their migratory routes in northern Kenya has been described. Conflicts resulting from seasonal encounters with non-pastoralist land use actors and the perception of land rights among the different categories of land users are also described.

Livestock dependency is observed to be high among pastoralists. Seasonal migrations are held regardless of pastoralist tenure types, whether group ranches or trust lands, as shown by the results of this study. This is because pastoral lands are considered common and open to all, and that mobility and access to drought resources (perceived as areas with more rain and plentiful good quality grass) occur regardless of the pastoralists' locations (private or communal) (Fratkin, 2001; Ngugi and Conant, 2008). These active pastoral practices sustain pastoralists' livelihoods, but are being affected by the expansion of other land uses into the rangelands (Fratkin, 1997). These effects include settling down and the diversification of livelihood activities in response to declining livestock productivity in the rangelands (Fratkin, 1997; Western, 1982). Where pastoralism is still the dominant mode of livelihood, however, seasonal livestock migrations are still an important management strategy for drought survival (Oba and Lusigi, 1987). This research has similarly shown that even with the existence of non-pastoral tenures adjacent to pastoral areas, pastoralists tend to maintain their seasonal migrations, whether they lead them onto non-pastoral lands or not.

Migration corridors from pastoralist homelands spread out over a wide area and into non-pastoral areas. Extensive mobility allows herders to exploit different ecosystems in different places and times to compensate for fluctuations in pastoral production (Goodhue and McCarthy, 1999). Under Acts 287 and 288 of the Kenya land laws the pastoralist communal land use and livestock movements are supposed to be practiced in pastoral homelands, within the group ranches and in trust lands. These laws may be effective in the wet seasons, when climatic conditions support pasture and resource availability in pastoral homelands, but they do not contain provisions for pastoralists to move out of the group

ranches and trust lands during droughts, the periods when pastoral land use system demands mobility. The case of the Mbaringon group ranch in this study, for example, is comparable with the experiences of group ranches established in pastoral areas in southern Kenya, where adjudication authorities ignored the migration routes and the group ranch boundaries were not drawn to accommodate the main traditional methods of livestock management, such as seasonal migrations (Coldham, 1979). BurnSilver (2005) notes that even though the purpose of group ranches was to settle pastoralists and incorporate them into the market economy, pastoralists continued to manage their herds largely according to subsistence strategies, moving their livestock across group ranch boundaries when climatic conditions demanded it, a picture that is reflected in the results of this study. Migrations beyond group ranch boundaries or trust land highlight the significance of mobility for pastoralism. They still occur, even though they are not supported by land laws or property rights in LA.

The results of this study show clear differences between the migration patterns in the early-year and late-year drought. This is in line with Blench (2001), who states that although pastoral migrations may seem opportunistic by moving from pasture to pasture, they generally follow established seasonal migratory routes. The maintained migration routes and the differences in movement patterns make it possible to predict to a certain degree where, when and which non-pastoralist land use actors are likely to encounter migrating pastoralists. Fig. 3 shows that the migration corridors of the late-year drought cross into non-pastoral areas where tenure types are mostly private (individual holdings or government land) and the property rights of universality, exclusivity, transferability and enforceability are exercised. We can therefore predict that most non-pastoralist land use actors, such as farmers and ranchers, are more likely to encounter pastoralists during the late-year drought than the early-year drought. Despite this predictability, the land laws and property rights contain no provisions supporting temporary access by pastoralists. Instead, they enhance private ownership rights by allowing penalties to be imposed on intruders/trespassers—including pastoralists.

As pastoralists ignored group ranch boundaries on their migration routes in southern Kenya, ignoring their need for wider access has no effect on their traditional grazing patterns (Coldham, 1979). Our research similarly showed that pastoralists are likely to ignore the boundaries not only of group ranches and trust lands, but also of private lands along the migration routes or where pastures exist. This is probably because pastoralists' customary land rights are non-excludable (Fratkin, 2001), and so they see their traditional migrations as conferring access rights, even in non-pastoral areas. The fact that all the non-pastoralist land use actors – farmers, private ranchers, urban residents, wildlife park wardens and forest officers – experienced conflict when encountering migrating pastoralists (see Table 4), implications are that pastoralists do not consider what the land is used for when they encroach on private land, but are probably attracted by any available resources on any property along their migration paths. Galvin and Ellis (2007) state that the pastoralist land use system is not concerned with exclusive ownership of land, but with access to the required resources. Yet again, land laws and property rights do not take into account the need to give pastoralists temporary access during their seasonal migrations, challenging the very functioning of pastoralism in non-pastoral areas.

While most non-pastoralists had their land rights registered, most pastoralists did not, but were aware of their customary rights (see Table 5). This is evidence that pastoralists may not be aware of what land laws and property rights in LA consist of. Herders may believe that their customary rights of communal use and unrestricted access should extend even to non-pastoralist

areas. Pastoralists may be ignorant of statutory rights, just as non-pastoralists may be about pastoralist customary land rights. But if pastoralists are aware of statutory rights, by encroaching on private land they contravene their obligation to keep off the land. Perhaps migrating pastoralists do not perceive private tenure as a factor that stands in the way of access. This further suggests that the probability of recurrent encounters and conflicts will remain high.

The results presented in this study force us to consider land rights that accommodate both pastoral and non-pastoral rights within LA as a potential solution to this long-standing problem. There are calls for pastoralists to abandon their way of life by modernizing and settling down, but this would jeopardize a sustainable pattern that has survived a harsh environment for millennia (Toulmin, 2009). Alleviating the land rights problems facing pastoralists may lie in supporting them—for example by supporting herders' rights of way along the agreed migration corridors, as outlined in the legislation in some West African countries (Touré, 2004). Other measures are guaranteeing security of mobility and access rights, legal recognition and formalization of essential rights, and introducing processes that enable groups to identify rights holders and resolve conflicting claims, with consideration for the scales to which these rights could be applied (Mwangi and Dohrn, 2008).

Legal recognition requires the state to acknowledge and respect pastoralist rights and practices as being legitimate by giving them formal legal validity (Toulmin, 2009; Hobbs et al., 2008). The recognized rights (including unwritten customary or indigenous norms and values) then become eligible for LA, as long as the rules for allocation, acquisition and transfer are known (Molen, 2002). The advantage of registering the existing land tenures is that it provides the legal basis by which legally recognized rights are held, at the same time it ensures the certainty and validity of rights, unless they are revoked in a legal and comprehensible way (Molen, 2002; Dekker and Dekker, 2006; Zevenbergen, 2004). Registered information usually includes the spatial extent and the nature of the interests in the land, and other interests (Dale and McLaughlin, 1999).

While LA focuses on the cadastral parcel as the basic unit for managing land information (spatial extent, nature of rights, etc.) (Kraak and Ormeling, 2003), the attributes of pastoral land rights differ in the sense that they constitute changing routes and areas at different times. Eligibility for LA would mean that the cadastral processes of survey, adjudication and registration would have to accommodate the dynamics of the spatial and temporal components of pastoral rights, and record these in the registry. Their migration corridors, shown in Fig. 3, could perhaps be used to inform land administrators of the scale on which herders' rights apply. It would therefore be necessary to secure spatiotemporal rights through survey, adjudication and registration such that mobility is not obstructed even with the expansion of private tenures.

Under Cap. 300 of the Kenya land laws, once land is allocated to private ownership (even when the land lies within herders' migration routes), land owners do not have to take account of other interests if they are not recorded in the register. Including herders' mobility rights in LA could follow the approach taken in Malawi, where adjudication statutes allow the conversion of customary rights to equivalent statutory and registerable rights, including customary rights of way through easements, the details of which should be entered in the final adjudication record (Lawrance, 1985). Lawrance (1985) points out that those details are crucial for the future completeness and correctness of the land rights on which land registers depend. Securing pastoralists' spatiotemporal rights through adjudication and registration could provide a measure of

security against loss, destruction or fraud, at the same time ensuring legal empowerment should herders lose their rights (Dale and McLaughlin, 1999). Moreover, if the land owners decide to sell or transfer land, the continuation of easements crossing private land, which enable herders to exercise their spatiotemporal land rights, is assured. This approach could perhaps be used to secure migration corridors for the early-drought period within the trust lands of northern Kenya, as land awaits subdivision into either group or private tenures.

In the late-year drought, pastoralists' migration routes currently cross private tenures. From a legal perspective, herders' rights have effectively been terminated. Pastoralists migrations here are therefore illegal within the formal system, but are legal under their customary rights. Pastoralism is recognized as a viable production system that contributes to livelihoods and national economies. If the need to secure herders' access rights in non-pastoral areas can be established as being urgent and requiring as much support as other production systems, then the information on the spatial extents of migration corridors could be used to inform land administrators about overlaps between herders' rights and non-pastoralists statutory rights. This in turn could be used to find possible solutions. However, the lack of understanding of existing and possible tenure arrangements and the actors involved, and past failures to accurately record existing information about land rights in the formal system, makes it difficult to identify appropriate land tenure arrangements that would adequately deliver the services required to secure tenure, land markets, planning, taxation and management of resources for all parties (Molen, 2002; FIG, 1995).

Instead of emphasizing ownership rights based on land parcels, land administrators should be challenged to design a flexible system able to accommodate a variety of rights, including overlapping land rights. An ongoing investigation suggests that overlapping land rights could be accommodated in the Social Tenure Domain Model (STDM) (Lemmen et al., 2009). The STDM is a LA tool currently under discussion and development by the International Federation of Surveyors (FIG), UN-Habitat and the Global Land Tool Network (GLTN). According to Lemmen et al. (2009), the STDM should be able to capture all land rights as they exist in reality, including all forms of rights holding and all kinds of property/spatial objects, regardless of their level of formality. By capturing an inventory of land rights as they exist, such as the spatial and temporal aspects of pastoral land rights revealed in this study, the STDM could provide a basis for documenting and securing pastoralists spatiotemporal land rights.

A detailed inventory of such rights could support land administrators in making decisions, for example on mechanisms for enabling the co-existence of pastoral and non-pastoral tenures and maintaining social relations between the actors. Local conventions applying participatory processes have facilitated negotiation, regulation and resolution of land use conflicts between farmers and pastoralists in Mali (Betke, 2006). According to Betke (2006), these local conventions have been observed to bind actors to agreements because the regulatory mechanisms are initiated and supported by the actors themselves and are recognized by the state authorities. Some have even been adapted and passed into law. These examples could inform Kenyan actors about possible approaches to supporting pastoralism and easing the problems arising from the continued exclusion of pastoralists from the legal system. Besides denying pastoralists access to required resources (Brink et al., 2005; Meinzen-Dick and Mwangi, 2009), the exclusion puts them in a weaker legal position than non-pastoralist land use actors.

The results provide an evidence base to meet the purpose of this research: to investigate current pastoralists land use prac-

tices and their interactions with non-pastoralist land use actors in the context of existing land laws and property rights, and to feed the discussion on possible solutions for pastoralists spatiotemporal land rights within LA. However, the population sizes used for the different categories of non-pastoralists land use actors may not be adequately representative of the populations within the study area. The sample sizes were limited by time constraints, as the post-election crisis of December 2007 and January 2008 in Kenya interfered with the data collection process. However, although the sample size is small, the results are considered valid in view of the similar opinions and sometimes marginal differences in the responses. Another limitation is the method used to gather the information for the migratory routes maps in Fig. 3. Although unique material described by herders themselves, this map may not be very accurate. Nevertheless, it evidently portrays current migratory behaviour in search of drought season resources. Pastoralists were able to delineate their standard migratory routes by discussing the names of places and identifying features on the satellite images.

## Conclusions

The research demonstrated that mobile pastoralism is still active in northern Kenya. Seasonal migrations are extensive and based on communal tenure and unrestricted access. Traditional migration corridors lead away from pastoral home areas and sometimes cross non-pastoral lands, where tenures are mostly private. The resulting encounters between migrating pastoralists and non-pastoralist land use actors – especially in the late year drought season – lead to conflict over seasonally overlapping rights. However, their differing land rights are legitimate and based on either statutory or customary rights sources. Although pastoralists' problems have been known for a long time, land laws, property rights and land administrators have continuously neglected the issue. Nevertheless, seasonal migrations persist. How actors manage the seasonally recurrent encounters and conflicts is a topic for further study.

While this study may not offer new insights into the consequences of the exclusion of pastoralists in LA, evidence from the results shows that it is possible to predict where (spatially) pastoralists are likely to be in defined drought periods (temporal aspect). Instead of disregarding herders' rights, the spatial element could be used to inform land administrators of the locations and coverage of pastoral land rights. The temporal aspect could inform them of the periods in which those rights should apply. In the context of existing laws and property rights, we argue that transferring pastoral rights into the formal system, for example by registering them in form of rights of way and recording the information in the land registry, could offer protection against loss of herders' rights, thereby sustaining pastoral livelihoods. To start with, this approach could be used for the early-year drought period in northern Kenya, where migration corridors seem to be concentrated within the pastoral home areas and where the land has not yet been divided into private holdings. Pastoralist's seasonal migrations could then be kept unobstructed, even when private tenures expand into pastoral areas. In places where former migration corridors and dry season grazing areas currently coincide with private tenures, the spatial extents of migration corridors could be used to identify where pastoralists and non-pastoralists' land rights overlap. This would be needed to re-establish herder's lost rights, or for alternative solutions.

This research suggests that understanding tenure arrangements that can accommodate both pastoral and non-pastoral rights may make it possible to deliver the services that LA should to all the

actors involved. Guidance and regulatory and institutional frameworks to support the co-existence of pastoral and non-pastoral land rights are needed. Land laws, surveys and land registration should not focus just on ownership and full control of land by individuals, but also on defined periods where temporal rights of access are granted to pastoralists. Non-pastoralist land use actors would be better prepared for encountering pastoralists, possibly reducing conflicts.

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