



Dynamics of Land Management and Implications on Pastoral Livelihoods in Northern Tanzania

Pius Zebhe Yanda¹ · Edmund Mabhuye¹  · Anselm Mwajombe¹ · Namkunda Johnson¹ · Lucas Elius Yamat¹

Received: 18 May 2021 / Accepted: 11 November 2021 / Published online: 26 November 2021
© The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2021

Abstract

Pastoralism as a mode of production has had an important bearing on the livelihoods of many people in arid and semiarid environments. In the recent decades' policies for land management in pastoral communities have changed from customary to statutory policies. This study analysed the dynamics of land management and their influence on the pastoral livelihood system at Kimana and Njoro villages in Kitemo district, northern Tanzania. Data for the study were collected from two focus groups, six key informants at the district level, and 296 households (equivalent to 10.1%) using household questionnaires. Findings show that whereas land is managed under customary and statutory laws, the emphasis is more on statutory laws. Statutory laws foster individualization of land ownership to some activities such as crop production, whereas communal lands are left for animal grazing only. Under statutory laws, individual land ownership is likely to be influenced by crop production, male-headed households, climate change, and resource use conflicts. However, statutory laws cannot guarantee sustainable resource management as the natural resources management institutions cannot dictate activities done in individual lands, as opposed to traditional systems. There is a need to harmonize traditional and modern forms of land management for increasing productivity and enhancing sustainable natural resources management.

Keywords Pastoralism · Statutory laws · Customary laws · Traditional system · Modern system · Livelihoods

Introduction

Land is the main resource encompassing the surface (soils) whereby economic, social and ecological issues are said to be contained (Rwegasira 2012). In pastoral systems, land plays a key role in maintaining rangeland resources and the habitat of terrestrial wildlife (Nelson 2012). Historically, pastoralists used to manage land-based resources (e.g. pasture, water) based on traditional rules designed to protect, regulate the use, avoid degradation and conserve for the future. In Australia, for instance, pastoral land-care in rangelands has comparable outcomes in terms of the creation of opportunities for improved learning among landholders (Neely and Bunning 2008).

Pastoralism¹ is often conducted in arid and semi-arid areas where lands are considered unsuitable for cropping. This livelihood system occupies about 25 percent of the earth's surface, mostly in developing countries (Gaur and Squires 2017). However, population growth, economic development and land use changes (Platteau 1996, Kratli et al. 2013) have been driving land transformation and livelihood dynamics in most of the pastoral lands across the globe. In East Africa, pressures of liberalization for land and natural resources have subjected pastoral lands to marginalization as well as fragmentation (Platteau 1996).

In Tanzania, the pastoralist land tenure has been the subject of conjecture and turbulence from the colonial era through the independence era (Olengurumwa 2010). Policies that promote foreign investments in commercial agriculture and wildlife-based tourism are also influencing changes in land management systems in most of the pastoral lands (Okello 2005, Ogutu et al. 2014). The National Land

✉ Edmund Mabhuye
edmund.mabhuye@gmail.com

¹ Centre for Climate change Studies, University of Dar Es Salaam, Dar es-Salaam, Tanzania

¹ Pastoralism is a way of livestock production in which livestock keepers move their cattle, sheep and goats from place to place to take advantage of pasture and water which are available at different times during the year (Olengurumwa 2010).

Policy of 1997 considers customary or communal land ownership as insecure and unsustainable. As a result, the policy fosters private ownership of land and defines different modes of land user rights. However, private ownership of land does not entail communal ownership systems, including traditional approaches for land management (Kipkeu et al. 2014).

Communal land ownership under pastoralism is viewed as the cause of environmental degradation, land use conflicts and therefore, policies tend to foster individual land ownership. For example, the URT (2006) in Tanzania gives priority to the modernization and commercialization of livestock production by involving the private sector in value addition activities. The land policy (URT 1997) insists on settled livestock farming as opposed to mobility recognized by livestock policy (Mwamfupe 2015). Implications from contradicting policies and laws on pastoralism are intense and diverse across cultural, political, economic, social and ecological dimensions. Owing to conflicting policies and laws of post-colonialism among bordering countries, pastoralists were alienated from siblings and forced to confront cultivation which is highly favoured by modern land policies (Anebo 2016).

In their immediate environment, pastoralism is in direct competition with wildlife and often the latter is highly favoured although benefits accrued do not directly benefit pastoralists and that change in land tenure systems threaten and can potentially wipe out traditional pastoralism (Leshan and Standslause 2013). Pastoral households have diversified to agriculture as the best option for securing their lives under current dynamics of social, environmental and political processes. For example, pastoral communities in semi-arid areas of Northern Tanzania are practicing transhumance² after the fade of nomadism. Under the transhumance system, the pastoralists usually depend somewhat less on their animals for food than nomadic does and they often undertake small-scale vegetable farming at their permanent villages (Leshan and Standslause 2013). Consequently, land demands for livelihood diversification and settlement development become imperative.

A wide range of studies has been conducted in arid and semiarid areas, where pastoralism is a dominant livelihood covering a wide range of issues that prompt sedentarisation in pastoral societies (e.g. Leshan and Standslause 2013, Lind 2016, Haile 2017). We seek to explore whether or not the following expectations hold in the area:

1. That socioeconomic characteristic influence land ownership in pastoral communities.

2. That individual land ownership influences changes in the pastoral livelihood system.

The next sections present methods used for data collection and results. Discussion follows in the aftermath whereby conclusion and policy implications finalize the paper.

Study Area and Methodology

Study Area

This study was conducted in Kiteto district, the Manyara region. Kiteto is one of the six administrative districts of Manyara region. The district covers an area of 16,685 square kilometres. It borders Simanjiro District in the north, Kilindi District in the east, Kilosa and Kongwa Districts in the south. In the west, Kiteto District borders Chamwino and Kondo Districts. In August 2012, the population of Kiteto was 244,669 of whom 120,233 were males and 124,436 females with an average family size of 4.8 (National Bureau of Statistics NBS (2013)). The key land uses in the district are predominantly crop production (3800 sq. km) and livestock keeping (11,111 sq. km). Forests and water cover 1,674 sq. km (10.0%) and others occupy 100 sq. km (0.6%). According to Kiteto District Council KDC (2013)'s strategic plan, there is 380,000 ha of potentially arable land, whereas small-scale holders who produce crops for food dominate production. It is estimated that 60% of the arable land (i.e. 217,000 ha) is under small-scale and medium-scale farmers who cultivate between 2 and 20 ha. Nonetheless, 217,000 ha are under cultivation. Whereas 90% of the district's inhabitants engage in those two livelihood sources, 10% engages in other activities (trade, small-scale industries, and beekeeping) (Kiteto District Council KDC (2013)). There are three main ethnic groups in the district: Maasai (32%), Gogo (27%), and Rangi (18 %), Nguu (2.6%), and others 20.4%. Maasai is traditionally nomads, however, owing to social-cultural changes, they are sedentarising and engaging in crop production as well (Leshan and Standslause 2013). There are two rainfall seasons in the district, the shorter starts from October to December while the longer starts in January to May with dry spell in February. Rainfall ranges from 450 mm to 1200 mm/year and average temperature from 13 °C to 33 °C.

Selection of the Study villages

From Kiteto district, two villages namely Kimana and Njoro were selected to represent pastoral communities (mainly livestock keeping) and agrarian communities (mainly crop

² Transhumance refers to seasonal migration between locations in which they have regular settlements with permanent houses See Leshan and Standslause (2013).

production), respectively. Njoro is predominantly occupied by the agro-pastoralists whereas pastoralists inhabit Kimana. Crops grown in the area include in both villages include maize (150,000 ha, which is 80% of the total cultivated area), beans, finger millet, groundnuts, potatoes and sunflowers. Land management and administration differ significantly between the two villages. Moreover, Kimana village has a land use plan, unlike Njoro village.

Data Collection and Analysis

The study employed a mixture of qualitative and quantitative research approaches. Participatory approaches used for the collection of data include the household surveys and Participatory Rural Appraisals (PRA-Focus Group Discussions (FGD) and Key Informant Interviews (KII). Participatory methods are also useful for comparing the relationship and differences in participants' views, an aspect, which is necessary for making a better analysis of the conversation (Morgan 1996, Gibbs 1997, Redmond and Curtis 2009). After obtaining research clearance from the Kiteto district council, we conducted Informant Interviews with district officials to obtain insights into the study areas, including livelihood assets and activities using informant interview checklists. From these interview sessions, insights on the study areas with regards to community livelihoods in space and time were provided. Information from these sessions was used to improve survey questionnaires in terms of clarity. Six (6) key informants were interviewed from district natural resources, agriculture and cooperatives, livestock and fisheries and district community development departments.

Data collection was preceded by two sessions of FGDs, one per village. The information generated from these sessions was used to improve questionnaires in terms of clarity. An interview checklist to ensure that the responses generated reflect the objectives of the study guided the sessions. FGDs consisted of a moderator who supplied a topic and monitored the discussions and so provided an excellent opportunity to listen, observe the amount of interaction, explore issues in-depth and obtain insights that might occur without discussion (Tynan and Drayton 1988). The selection of discussants was purposive based on their long-term experience with pastoralism activities, land use, and land acquisition in the villages. Participants in each FGD were obtained following recommendations from village leaders. Each FGD session consisted of 8 discussants per discussion group were chosen, both males and females to easily manage the discussions consistent with Boyce and Neale (2006) and Arsel (2017). Issues discussed in FGDs included types of land ownership, criteria for land distribution, perception of land values as well as roles and responsibilities at a household level relative to land as well as climate change impacts.

To examine the value of land, during FGDs, respondents were required to describe the meaning of "value" from a pastoralist perspective and subsequently, rank land values they cherish most. As such, they were presented with 100 maize grains whereby each grain represented a 1 percent value. They were also presented with words like "economic value," "spiritual value," "social value" and "ecological value" representing differentiated forms of understanding on intended value in the Kiswahili language. Such words were written on four blank A4 paper sheets representing the values being rated. Respondents themselves then placed the grains on written pieces of paper. Since each grain represented 1%, the total number of grains on a piece of paper represented the percentage value corresponding to the word on it. The results were recorded (see Fig. 1). The purpose of the exercise was to portray the form of land values most prospered.

Informant interviews were also conducted at the community level in the aftermath to obtain insights on changes in land management in space and time, sourcing information from the famous elders. Those who had vast experience in natural resources management were interviewed. As these elders were Swahili illiterate, a bilingual person from the Maasai community served a translator role. The informant interviews checklist probed into the difference in land ownership under customary and statutory laws, natural resources management under statutory and customary laws, forms of land ownership under statutory laws, roles and responsibilities of various social groups in natural resources management, climate implications in land management and administration, implications of statutory laws in natural resources and community livelihoods.

The household surveys commenced in May 2017 by obtaining the subjects for the study targeting the household heads. Simple random sampling was used to select 140 households from Kimana village out of 1390 households out of which 140 households were selected equivalent to 10.1% whereas in Njoro village, out of 1486 households, 156 households were chosen for the study (10.5%) totaling up to 296. First, 10 questionnaires were tested in terms of collecting relevant data. The tested questionnaires were retained in the main sample.

The main household survey followed in the aftermath, whereby researchers were oriented to sampled households by hamlet chairpersons. Questionnaires were administered face to face in the Kiswahili language. The questions included household-level characteristics (age, sex, education, livelihood activities and migration patterns, household assets, wealth characteristics, land ownership) and the village level data (land resource use and management, natural resources endowments, land use planning). Where the respondent failed to respond in Kiswahili, any bilingual person was used to interpret the questions asked. A

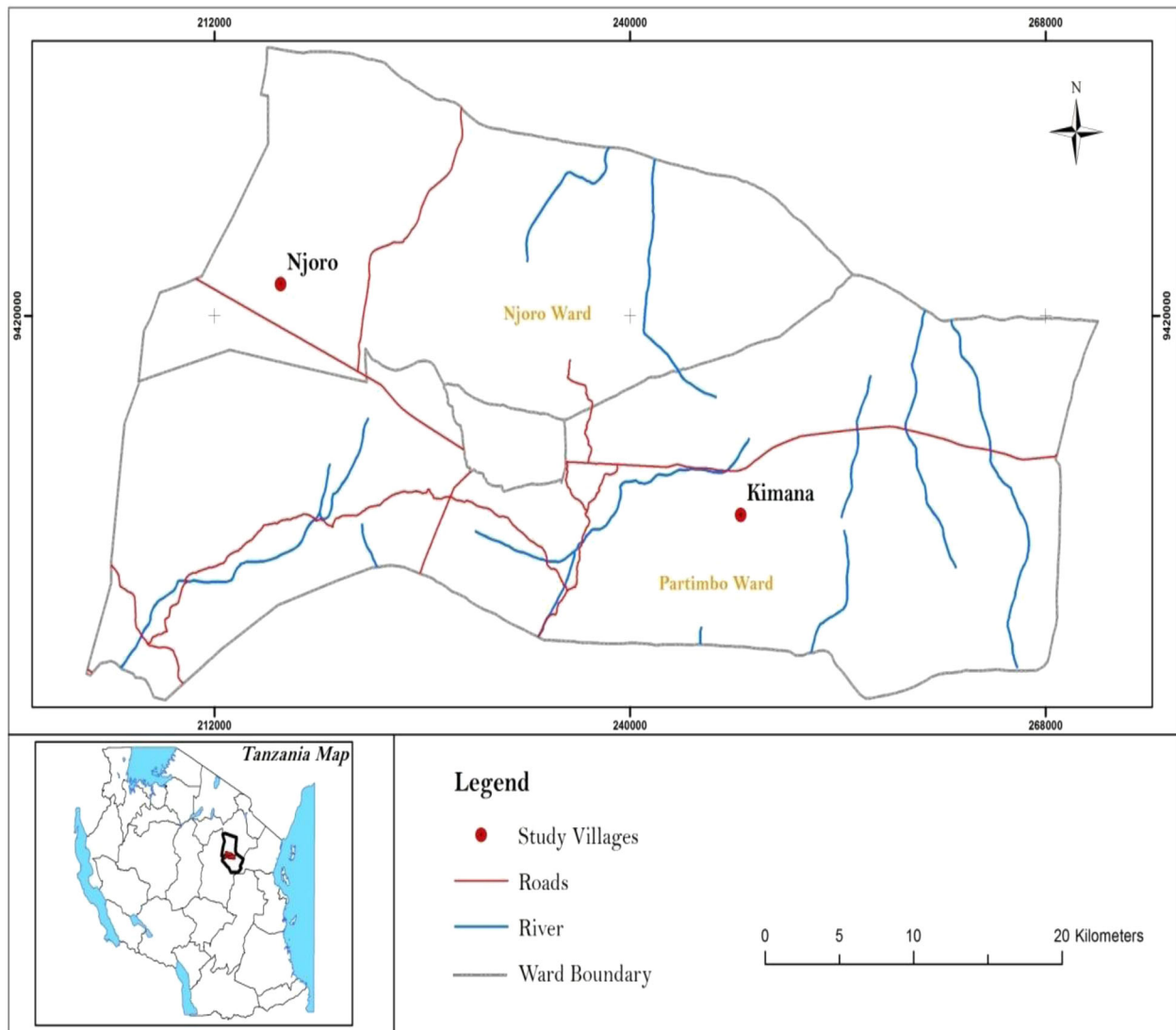


Fig. 1 Proportion of households reporting forms of land value. Source: Field data (2017)

respondent was to recall value estimate of an acre of them would-be sold/purchased piece of land ten years back from the time this study was conducted, and the value of the same acre at the time of this study, which was given in Tanzanian Shillings (TZS), such value differed in space and time.

Datasets were analyzed separately depending on their nature. Qualitative data were sorted and arranged in thematic areas whereby they were subjected to content analysis. As themes were developed, similarities and differences emerged which enabled us to discern trends and patterns. On the other hand, quantitative data were sorted, edited, coded and classified. Descriptive statistics were used to show the magnitude of land ownership, wealth variations, etc. The Chi-square statistic was used to discern relationships between data, for example, age, sex, occupation, education, etc. against individual land ownership. The

binary logistic regression was used to deduce the relationships of not only categorical variables but also when the continuous variable was a dependent variable. In all statistical analysis, a Statistical Package and Service Solutions (SPSS) computer software was employed.

Results

Descriptive statistics show that for the surveyed households, 75% of respondents were males ($N = 222$) and 25% were females ($N = 74$). The largest proportion of respondents (77.4% $N = 229$) were age 25–54 years old. The livelihood sources were livestock keeping (51.4%, $N = 150$), crop production (93.8%, $N = 274$), business (7.5%, $N = 22$), artisanal work (6.2%, $N = 18$) and salaried employees

(2.1%, $N = 6$). There were more crop producers (52.1%, $N = 151$) and fewer livestock keepers (15.8%, $N = 45$) in Njoro, whereas there were more livestock keepers (47.3%, $N = 138$) than crop producers (41.8%, $N = 122$) in Kimana village. About 47.3% ($N = 140$) of the surveyed households heads were born within the village, whereby 52.7% ($N = 156$) migrated from outside the study villages. There were more migration cases in Njoro village (73.7%, $N = 115$) than in Kimana (29.3%, $N = 41$). The extent of immigration from outside the villages than those born within villages of domicile implies increasing pressure on land resources. Reasons for migration were as follows; following parents (21.5%), search for grazing areas (31.7%), and search areas for crop production (32.7%), business opportunities (4.2%), wage employment (1.8%), and marriage (8.1%).

Land Ownership in the Area

Descriptive statistics show that 90.2% of surveyed households owned land whereas 9.8% did not. Of those who owned land, 17.4% from Njoro and 25% from Kimana rented, 12.8% from Njoro and 62.1% from Kimana inherited, 32.2% from Njoro and 12.9% from Kimana were village offers whereas 37.6% of surveyed households in Njoro had rented (Fig. 2). Land purchasing entails transferring ownership of land to another household when the amount of money determined by a seller is paid. It is not always affordable to consult a lawyer; therefore, villagers often sell their land under the witness of the hamlet chairperson or a member of the village government council. Inherited ownership entails transferring ownership from parents to children normally of the same family. Results further land in Kimana as more inherited than Njoro, a question that can be linked to immigration. The village offers involves the village government giving land to individuals for large-scale production. Land given by the village government is usually large, at most reaching 50 acres under her mandate. In allocating areas for pastoralism, several factors are considered. These may include such as

availability of livestock infrastructure (dipping, watering points) and availability of fodder. These form the basis for decision-making during land use planning.

Land renting was done by payment in monetary terms or crop harvest. An acre was rented at TZS 10,000 (USD 4.47) –30,000 (USD 13.41) or harvest of value equivalent to that amount. The land was also acquired informally by invading unoccupied land that seemed to lack a strenuous monitoring system. These areas include the general lands or village forests/wild environments. Households that overstayed on invaded lands without obstruction from the relevant authorities created confidence to inhabitants that their stay in such lands was legitimate. Interviews and discussion results show that such ownership was recognized under customary law and it can be formalized by issuing rights of occupancy approved by village meetings. The approved documents are then forwarded to district authorities for further approval, verification, and validation. Ultimately, the district issues the right of occupancy certificate. In practice, rights of occupancy are yet to be granted to 54.9 percent of surveyed respondents in studied villages.

Form of land ownership

Descriptive statistics indicate that 83.4% of surveyed households ($N = 247$) possess the land by customary laws compared to 16.6% ($N = 49$) who possess the land by statutory laws. Households possessing land by customary laws in Njoro village were 73.7% of surveyed households ($N = 115$). Concerning statutory laws, 26.3% of sampled households ($N = 41$) in Njoro and 5.7% of households ($N = 8$) in Kimana covered this category (Fig. 2). Overall, a customary form of land ownership based on the traditional system dominates land ownership over statutory form. The chi-square value is 22.956 (at one degree of freedom), whereby a P value of $0.00 < 0.05$ implies the significant difference in land ownership by these two forms in the area.

Interview results show that the land management using customary laws was done through a well-defined traditional governing system. Maasai pastoralists, in particular, understand that land and associated resources such as water points, forests, and herbal vegetation were entrusted to elders including traditionally appointed people known as *Ilagwanak*. Such elders serve as advocates for the rights of a community, clan, or group within the clan such as *enkaji* and *olaji*. The *enkaji* are identified in two groups, *orok kiteng'* and *odo kiteng'*. The *Olaji* is comprised of different age set groups of persons already circumcised who form the hierarchy of the Maasai age-set system. The land is divided into proportions according to community needs for grazing in different seasons of the year. For instance, the land parcel for use during the dry season is called *engaroni/aroni*, and land used during the wet season is called *eleng'on*. The land parcel for use *engaroni* or

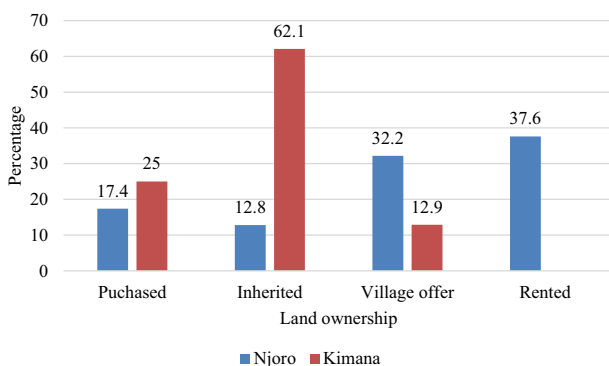


Fig. 2 Land ownership Source: Field Survey (2017)

eleng'on is allocated by Maasai pastoralists using four important aspects, water availability, soil structure, wildlife habitat, and availability of unique resources.

Availability of water in the area particularly during the dry season through streams, rivers, natural dams, or swamps, may be parcelled for use as *engaroni*. If it can only provide water during the rainy season, then it may be parcelled as *eleng'on*. Soil structure/nature entails suitability for use during the rainy season due to the nature of the soil. Black soil (clay soil) retains water for a long period, can strand livestock walking on, and therefore, can only be used during the dry period or the extended dry spell. Wildlife habitat or breeding zone are given importance by the Masaasi pastoralists to keep wildlife breeding sites particularly those used by wildebeests and antelopes though may contain infectious pathogens that can affect the livestock. Such areas are normally used during the dry period and they are evacuated once the wildlife breeding season is underway. Nonetheless, areas with unique resources such as medicinal plants, salt licks, full-time water reserves and nutritious biomass are often reserved for neither individuals nor seasonal use. Such areas are communally utilized and managed to benefit the whole community.

Land parceling in pastoralist communities is further done by identifying areas suitable for livestock according to animal age and type. Young livestock cannot travel a longer distance in search of pasture and water. As such, the Maasai introduced an *Olalili* or *Olokeri* to be used by young and sick animals. Areas close to *boma*³ are also made available to small stocks such as sheep and goats. Elders are vested with the power of custodianship over land, organizing meetings safeguard land uses. *Olalili* (also *Olakeri*) in Maasai literally means something with an unpleasant *smell* - denied access by customary laws/rules over such resources without owners or community collective consent. Management of *Ollili* is also evolving despite being traditionally managed by a clan or a *boma* (*olmarei*) who have the right to manage and use such a special piece of land. The *Olalil* is always close to the *boma* because it is used by young livestock (calves, kids and lambs) or by sick livestock. Traditional land management has been practiced for many years in pastoralist communities. Population growth led to land parceling according to their clans allowing communal utilization with smooth restrictions to safeguard the use of certain areas such as those with special animal feeds, herbs, vegetation, water sources and salt licks (Figs. 3, 4).

Factors influencing land ownership under statutory laws

Results from logistic regression show that ownership of land is likely to be influenced by several aspects; gender of

³ The Maasai compound.

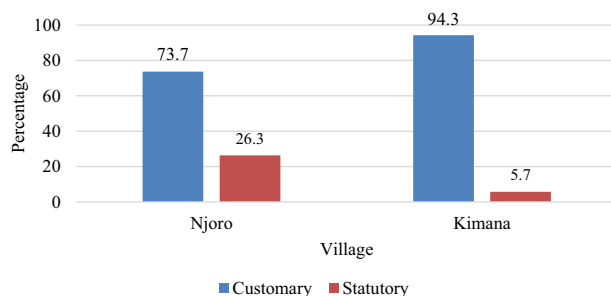


Fig. 3 The study villages in Kiteto District. Source: GIS, UDSM (2017)

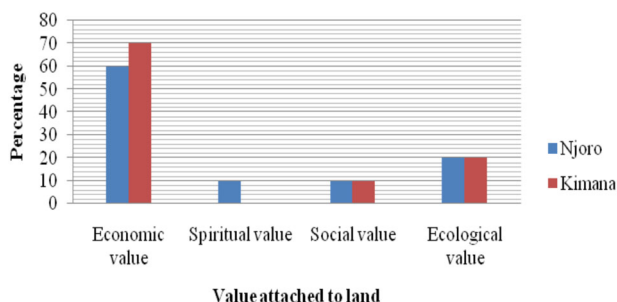


Fig. 4 Forms of land ownership: Source: Field Survey, 2017

household head, crop production, and resource use conflicts. Male-headed households are likely to own land when compared to female-headed households. Households engaging in crop production are more likely to own land, whereas climate change does not influence land ownership (Table 1). Provided that land ownership had occurred, security to ownership is more likely to male-headed households. This is not a surprising result owing to the social position of women in pastoral communities, whereby a man dominates household assets. At this instant, climate change becomes the strong influencer to secure land ownership, unlike land resource use conflict. This is a surprising result because resource use conflicts could be expected to be alleviated by the security to land tenure. However, to the extent that climate change is expected to constrain land resource availability, the majority of expected resource use conflicts will be amplified by the climate change impacts. Nonetheless, households engaging in crop production are likely not only to own land but also to ensure that such ownership is secured. Pastoralists seek to secure land ownership following sedentarisation that has taken place, as well as alleviation of possible land resource use conflicts in the future under the new regime.

Conflicts are sometimes specifically arising at the family level (*almarei*) or household level, clan level and community level. Under the customary system, conflicts arising from the family level are resolved by a household head (often by a father), depending on their cause. Conflicts

Table 1 Characteristics influencing household ownership of land

Dependent variable: household ownership of land (based on $x/(1-x)$ transformation)	
Male headed household	1.384 (3.991)
Female headed household	-116.115 (0.0)
Family size	-19.819 (0.0)
Crop production	99.094 (1.086E + 043)
Resource use conflicts	0.0 (1.0)
Climate change	0.0 (1.0)
Dependent variable: security to land ownership (based on $x/(1-x)$ transformation)	
Male headed households	21.203 (1615474473.097)
Female-headed households	0.0 (1.00)
Household size	0.0 (1.00)
Crop production	0.0 (1.00)
Resource use conflicts	-21.203 (0.00)
Climate change	21.203 (1615474707.730)

Significant at $P = 0.05$ Significance Interval: Total observations = 296

arising from the clan level are resolved by *ilagwanak* through clan meetings of elders often from among causers' households. More often, offenders who are prosecuted are fined accordingly within specified deadlines. Conflicts arising from the community level are handled by *ilagwanak* but from different clans resolving the conflicting parties. Once again, fines and other punishment mechanisms are subsequently imposed on culprits. Fines as the conflicts resolution approach over land resource utilization are employed at clan level, community level and family level. Chronic conflicts at the family level or clan level may be taken to higher decision-making structures for resolution.

In the surveyed villages, a large proportion of households across our sample (90.6%, $n = 268$) have been differently suffering from impacts of climate change at different points in time in different ways. The impacts were profoundly through a drought (53.3%); livestock and human diseases (1.2%); unpredictable rains (12.8%); high temperatures (3.7%); and short rain season (19.6%), which imply the short growing season. These climate challenges have led to declining in fodder and water in pastoral livelihood systems, spurring adverse land resource use conflicts. Household size, female-headed households and crop production can influence security to land ownership to some degree, whereas land resource use conflicts have no effects on influencing land security. Surprisingly, land resource use conflicts do not seem to influence land security.

Complementation of formal and traditional land parcelling system

Recently, despite the little emphasis on possession of Certificate of Customary Right of Occupancy (CCRO), existing

laws in Tanzania do not recognize communal land parceling. Thus, the traditional land use system does not complement formal land use plans. The formal land use plans and management are currently under land tribunals at district and village levels, which replaced the traditional land use management among pastoralist communities. The formal systems define areas for village forest, grazing land, social services, agriculture, and any other uses in the village.

Influence of Individual Land Ownership on Pastoral Production System

Land use planning

There are currently formalized ways of planning land resource use matters bestowed to different authorities stemming from the community level. 24.4% of surveyed households in Njoro ($N = 38$) and 87.9% ($N = 87.9\%$) in Kimana villages pursue their livelihood activities in the areas planned for different land uses, unlike the rest (75.6% in Njoro and 12.1% in Kimana). The differences between these villages are significant at $P < 0.05$. The possible explanation for the discrepancy is the high immigration of people from other areas to Njoro in search of farming areas when compared to Kimana as noted in the previous sections. Hence, land use planning done initially in the area was inadequate to accommodate the ever-increasing number of immigrants in the area for agricultural activities. This can be a possible reason for the non-compliance to the existing land use plans in the villages whereby 27.6% and 63.6% in Njoro and Kimana villages respectively did not comply, a variation of which is statistically significant at $P < 0.05$, whereby a chi-square for the test is 38.715 at 1 degree of freedom (Table 2).

Under customary laws, Maasai pastoralists decide on land use through traditional meetings whereby *Ilagwanak* convene people to obtain consensus on land utilization. Rules laid down to protect any decision reached are enforced through fining, depending on the magnitude of fault committed by a community member. Often the biggest ox is slaughtered in case of the highest degree of negligence, whereas a healthy (a mature castrated male goat) is slaughtered in case of moderate negligence. Other mechanisms put forward to safeguard land use for avoiding conflicts, in general, include uttering traditionally curse words for anyone who will go against the plans.

Under statutory laws, land use planning targets both crop production and pastoralism, which are the major livelihood sources in the area. Whereas agricultural land is issued on an individual basis, rangelands are issued communally. Every form of land use is to comply with the village land use plan, whether for housing construction, agriculture, or

Table 2 Proportion of households engaged in land use planning

Issue	Njoro*		Kimana*		P value**
	Yes	No	Yes	No	
Conducting livelihood activities in the planned areas	24.4% (38)	75.6% (118)	87.9% (123)	12.1% (17)	0.00
Complying to existing land use plans	27.6% (43)	72.7% (113)	63.6% (89)	36.4% (51)	0.00

*Total observations = 296; **Significant Interval $P = 0.05$

Table 3 One-acre monetary value of land

	Village		
	Njoro	Kimana	Total
The contemporary land value/acre	%	%	%
From TZS 100,000 (USD 44.71) to 150,000 (67.06)	33.3	43.2	76.5
Above TZS 150,000 (USD 67.06) and at most TZS 200,000 (USD 89.41)	13.6	0.0	16.0
Above TZS 200,000 (USD 89.41)	3.7	6.2	13.6
Total	50.6	49.4	100
The land value/acre 10 years ago			
From TZS 10,000 (USD 4.47) to 40,000 (USD 17.88)	46.9	37.0	84.0
Above TZS 40,000 (USD 17.88) and at most 80,000 (USD 35.77)	3.7	12.3	16.0
Total	50.6	49.4	100

Source: Field Data (2017)

animal husbandry. The process of establishing grazing lands entailed village governments establishing inter-village common grazing land. Initially, the plan was expected to allow free movements to grazing areas and migratory routes. For instance, in consultation with each other, three villages Oлектikti, Lergu and Ngapapa formed the OLEN-GAPA rangeland to be used by these three villages.

With regards to land planned for agriculture, farmers had land ranging from 1 acre to above 100 acres. People seeking the land of more than 50 acres had to provide the following information during application; nationality, residence; age (≥ 18 years); description of land use intentions; and land ownership background information. Land needs for marginalized groups were also considered. Village authorities may allocate a maximum of 50 acres per person. Practically, land use planning is incomplete due to the unavailability of funds, leading to uneven implementation and so invasion cases for lands, which are not currently uninhabited, are prevalent. Although communities portrayed readiness, local government responses are often slow. There is a risk of further agriculture expansion as opposed to intensification due to invasion of unutilized land parcels if planning issues are not timely addressed.

Increase in value of land

It was assumed by this study that the adoption of agriculture in the pastoralist livelihood system has changed the

conception of the value of land from communal to individual ownership. Such an assumption was based on respondents' interest to own permanent areas for conducting their livelihood activities particularly agriculture for all households visited. To examine the extent that land value influences individual land ownership, the study analyzed an acre value 10 years before and during the study using descriptive statistics. As such, the chi-square test was applied to analyse the respondent perception on the value of an acre ten years back from the time this study was conducted, vs. the value of the same acre at the time this study was conducted. According to 84 percent of respondents, an acre was worth from TZS 10,000/= to 40,000/= and 16 percent reported that an acre was worth between TZS 40,000/= and TZS 80,000/= (Table 3).

Descriptive statistics show that one acre was worth between TZS 100,000 (USD 44.71) and 150,000 (USD 67.06) alluded to by 76.5% of surveyed households, 150,000 (67.01) and 200,000 (USD 89.41) disclosed by 13.6% respondents and above shillings 200,000 (USD 89.41) mentioned by 9.9% of surveyed households (Table 3). The rate of change is between TZS 9,000 (USD 4.03) and 15,000 (USD 6.71) per acre per annum revealed by 76.5% respondents and 13.6% of respondents and above TZS 20,000 (USD 8.94) per acre per annum mentioned by 9.9% of respondents in the studied villages. The chi-square test statistic yielded $P < 0.05$ implying a statistically significant change. The conceivability of the meaning of the value of land has changed from a communal to an individual perspective, whereby economic value was leading.

⁴ 1 USD = TZS 2236.80 in May, 2017

The economic value is deduced from economic activities generating economic gains. Thus, livestock keeping, agriculture and other economic activities are done on land represented the most important value. Spiritual value entails spiritual connections with land and its resources. For example, the MURTANGOS forest was reserved for use in spiritual (faith) matters. Ecological values were described in terms of biomes including wildlife and their habitats together with their mutual dependence. Issues of co-existence were described in terms of the ability to control nature from times immemorial. In this respect, ecological values were described in terms of their ability to transform to economic value through tourism. On the other hand, social values were described in terms of the creation of an environment whereby people would share social issues. However, most of those values were highly communal as opposed to economic values.

Changes in roles and responsibilities at the household level

Following changes in land stewardship, some roles and responsibilities at the family level in the pastoralist community have changed slightly. For example, sedentarisation has distanced livestock from women's milking because it was the women's responsibility, currently; they seldom do it. Diversification of consumption of food varieties has consequently increased uptake of carbohydrates as opposed to the entire dependence on livestock for food as it was a case before, a change that was embraced and so confirming Andrachuk and Armitage's (2015) submission before. For instance, involvement in agriculture has rendered to an increase in uptake of carbohydrates as their meals. Although the emergence of agriculture in pastoralist communities was described as relevant, it burdens more women than men. Moreover, reduction in the number of livestock due to drought and other factors has resulted in the rural-urban migration mainly by youth whereby they often engage in selling traditional medicine, weaving and security guarding mostly in urban areas.

Implications of land allotment on ecosystem integrity

Since formal systems of land use only recognize individual land ownership, it is hard to control destructive activities done by landowners. Areas with unique resources such as medicinal plants, salt licks, full-time water and nutritious biomass are not set for individuals through the traditional land use system. The traditional land use system recognizes wildlife habitats and their breeding zones. Maasai pastoralists do not want to disturb the ecology of their land. Areas used by wildlife for

breeding, particularly those used by wildebeest and antelopes contain infectious pathogens that can affect the livestock. In addition, the traditional land use system particularly by Maasai pastoralists does not split their *bomas*⁵ all over the area as a way to preserve pasture and confer smooth movement of livestock in accessing unevenly distributed land resources. On the contrary, formal land use systems subdivide land into small plots entitled to individuals unconcerned with other ecosystem management. Formal land use safeguarding and ecosystem protection mechanisms are done at the national level, which has little impact on the conservation of individually managed tracts of land. It is further fuelling clashes over land and other natural resource use patterns within pastoral areas as individuals try to control their pieces of land.

Discussion

Pastoralism as a mode of production has had an important bearing on the livelihoods of many people in arid and semi-arid environments. Thus, a better understanding of the dynamics of the contemporary pastoral livelihood system is needed to better place pastoralism in national and international policies, plans and programs (Secretariat of the Convention of the Biological Diversity CBD (2010)). The shift from customary to statutory policies of land management has indeed influenced the use of land resources utilisation (Ekaya 2005). Consistent with Leshan & Standslause (2013) and Ekaya (2005) among others, this study adds by showing how individualisation in land ownership can potentially affect natural resources management particularly when management institutions have no mandate to oversee land use in land parcels.

Table 1 shows that under the contemporary policies, land ownership at the community level is likely to be influenced by socioeconomic characteristics such as agriculture, male-headed households and resource use conflicts. This result adds to Leshan and Standslause (2013) as well as Tesfay and Tafere (2008) who mentioned population increase, state-enforced measures, environmental challenges and conflicts as the root causes for sedentarisation. Nonetheless, in addition to male-headed households, security to land ownership is will be attributed to climate change particularly ensuring that pastures available and accessible by the particular household. This is a surprising result as it could be expected that security of land could be among key factors to land ownership. However, to the extent that climate change is anticipated to shrink fodder and water availability in the same ecological zone, animals will require large

⁵ The Maasai homestead.

grazing areas. Nonetheless, findings show as well that resource use conflicts are likely to influence not only owning land but also influencing land security in ownership of land in agro-pastoralist communities

In the current form, land management is under the rival between customary and statutory policies with statutory policies being given great importance by decision makers (Lissu 2000). However, as the study shows, customary laws, which characterises the traditional system of land management is bottom-up oriented as local communities have a full mandate in managing land resources. Whereas pastoralists have sustainably managed natural resources from times immemorial using traditional system (Basupi et al. 2017), the adoption of statutory laws is seeming a paradigm shift in natural resources management perspective from outside the pastoral production system, a result of which is consistent with Kratli et al. (2013). This result points to the policy on the need to harmonize these two forms of policies.

Under statutory laws, land use planning is among approaches of ensuring that land and the associated resources are adequately managed and utilized (Reid et al. 2016) and land resource use conflicts are minimized or alleviated (Mwamfupe 2015). Land use planning can indeed reduce tensions and conflicts from land users as shown by Yanda and Mung'ong'o (2016) and Nelson (2012), however, in this study, there is generally lack of flexibility of these land use plans falls short of accommodating the increasing population in the respective villages. The lack of flexibility can potentially disrupt the existing land use plans, lose their logic and render unsustainable utilisation of natural resources. This result points to the policy on the need for regularly updating the village-based participatory land use plans.

While the management of pastoral land and natural resources was traditionally managed by customary laws (Scoones 2009, Leshan and Standslause 2013), the introduction of statutory policies has completely changed the manner through which land is contemporarily managed. Nonetheless, according to narratives in this study, customary laws enhanced sustainable management of natural resources indeed, using the well-defined traditional institutions. As statutory laws foster the creation of land parcels privatized to individuals, yet it cannot dictate land uses in such parcels done by individuals, a result of which is consistent with Haile (2017) and Leshan and Standslause (2013) among others. The lack of complementation between customary and statutory land management policies as this study shows puts land and natural resources contain a test. By showing the impossibility of complementation between customary and statutory land management policies, this study provides additional evidence of how the lack of harmonisation of modern and traditional methods of land management can create trade-offs in natural resource management and conservation.

Conclusion

In this paper, we explored the land stewardship transformation; focusing on two main issues; the influence of socio-economic characteristics on land ownership and the evaluation of contemporary land ownership and implications on the pastoral livelihood system. Results have demonstrated that factors such as crop production, climate change as well as male-headed household and resource use conflicts influence not only individualization in land ownership but also security of its tenure. Land management under customary laws fostered communal land ownership and guaranteed sustainability in natural resources management and utilisation by a holistic view of land resources, whereas statutory laws foster individualization in land ownership. Nonetheless, the statutory laws of land management and administration cannot guarantee sustainability in natural resources management in pastoral production systems because management institutions cannot dictate natural resources utilisation in individual land parcels. As customary laws are not considered in the current practice, the virtue of traditional systems of land management was taken for granted a likelihood. There is a need to harmonize traditional and contemporary statutory policies for a sustainable pastoral production system.

Acknowledgements The authors convey their heartfelt gratitude for significant contributions from those who, in one way or another, ensured an accomplishment of this task. Sincere thanks go to financial support from the project for Building Knowledge to Support Climate Change Adaptation for Pastoralist Communities in Eastern Africa Funded by Open Society Initiative for Eastern Africa (OSIEA). The project is implemented by the University of Dar es Salaam through the Centre for Climate Change Studies. We would like to acknowledge the contributions of all who were involved in data collection, including local government authorities for research clearance and logistical support. We send gratitude to Officers in Kiteto District Council, village leaders, and all respondents at large for their invaluable cooperation during field surveys. We recognize that the information they provided was instrumental in the successful completion of this work.

Compliance with Ethical Standards

Conflict of Interest The authors declare no competing interests.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

References

- Andrachuk M, Armitage D (2015) Understanding social-ecological change and transformation through community perceptions of system identity. *Ecol Soc* 20(4):26. <https://doi.org/10.5751/ES-07759-200426>.
- Anebo LN (2016) Assessing the efficacy of African Boundary Delineation Law and Policy: the Case of Ethio – Eritrea Boundary Dispute Settlement.

- Arsel Z (2017) Asking questions with reflexive focus: a tutorial on designing and conducting interviews. *J Consumer Res* <https://doi.org/10.1093/jcr/ucx096>.
- Basupi L, Quinn C, Dougill A (2017) Pastoralism and land tenure transformation in sub-saharan Africa: conflicting policies and priorities in Ngamiland, Botswana. *Land* 6(4):89. <https://doi.org/10.3390/land6040089>.
- Boyce C, Neale P (2006) Conducting in-depth interviews: a guide for designing and conducting in-depth interviews. *Evaluation* 2 (May):1–16. <https://doi.org/10.1080/14616730210154225>.
- Ekaya WN (2005) The shift from mobile pastoralism to sedentary crop-livestock farming in the drylands of eastern Africa: Some issues and challenges for research *Afr Crop Sci Conf Proc* 7 (September):1513–1519.
- Gaur MK, Squires VR (2017) Geographic extent and characteristics of the world's arid zones and their peoples. In *Climate Variability Impacts on Land Use and Livelihoods in Drylands* (pp. 3–20). https://doi.org/10.1007/978-3-319-56681-8_1.
- Gibbs A (1997) Focus Groups. *Social Research Update Issue* 19, Guilford. <http://sru.soc.surrey.ac.uk/SRU19.html>.
- Haile R (2017) Sedentarization and the creation of alternative livelihood among Saho Pastoralists in the Qohaito Plateau of Eritrea. *Senri Ethnological Stud* 95:293–318.
- Kipkeu ML, Mwangi SW, Njogu J (2014) Community participation in wildlife conservation in Amboseli Ecosystem. *Kenya IOSR J Environ Sci Ver II* 8(4):2319–2399. <https://www.iosrjournals.org>.
- Kiteto District Council (KDC) (2013) Kiteto District Council Strategic Plan 2013–2016. Kiteto.
- Kratli S, Huelsebusch C, Brooks S, Kaufmann B (2013) Pastoralism: a critical asset for food security under global climate change. *Anim Front* 3(1):42–50.
- Leshan MT, Standslause OEO (2013) Adaptation to the harsh conditions of the arid and semi-arid areas of Kenya: Is Pastoralism the best livelihood option? *Asian J Appl Sci* 2(4):22–29.
- Lind JSW, Kohnstamm R, Caravani S, Eid M, Nightingale AM, Oringa DC (2016) Changes in the drylands of Eastern Africa: implications for resilience-strengthening efforts [Data set]. Brighton: Institute of Development Studies.
- Lissu T (2000) Law, Social Justice & Global Development Policy and Legal Issues on Wildlife Management in Tanzania's Pastoral Lands: The Case Study of the Ngorongoro Conservation Area. *Law Social Justice and Global Development Journal*.
- Morgan DL (1996) Focus groups. *Annu Rev Sociol* 22(1):129–152.
- Mwamfupe D (2015) Persistence of farmer-herder conflicts in Tanzania. *Int J Sci Res Publ* 5(2):8.
- National Bureau of Statistics (NBS) (2013) A 2012 Population and housing census; Population Distribution by Administrative Areas. National Bureau of Statistics.
- Neely C, Bunning S (2008) Review of Evidence on Dryland Pastoral Systems and Climate Change: Implications and opportunities for mitigation and adaptation. FAO – NRL Working Paper. FAO: Rome.
- Nelson F (2012) Natural conservationists? Evaluating the impact of pastoralist land use practices on Tanzania's wildlife economy, 1–19.
- Ogotu JO, Piepho HP, Said MY, Kifugo SC (2014) Herbivore dynamics and range contraction in Kajiado County Kenya: climate and land use changes, population pressures, Governance, policy and human-wildlife conflicts *Open Ecol J* 7(1):9–31.
- Okello MM (2005) Land use changes and human-wildlife conflicts in the Amboseli area, Kenya. *Hum Dimens Wildl* 10(1):19–28. <https://doi.org/10.1080/10871200590904851>.
- Olungurumwa OPK (2010) The bill of rights in Tanzania. The best or the worst? Paper presented during the workshop prepared by the Tanzania Teachers 'Union.
- Platteau JP (1996) The Evolutionary Theory of Land Rights as Applied to Sub-Saharan Africa: A Critical Assessment. *Dev Change* 27:29–86.
- Redmond R, Curtis E (2009) Focus groups: principles and process. *Nurse Researcher* 16(3):57–69.
- Reid RS, Nkedianye D, Said MY, Kaelo D, Neselle M, Makui O, Clark WC (2016) Evolution of models to support community and policy action with science: Balancing pastoral livelihoods and wildlife conservation in savannas of East Africa. *Proc Natl Acad Sci* 113(17):4579–4584.
- Rwegasira A (2012) Land as a Human Right. A History of Land Law and Practice in Tanzania. Dar es Salaam: Nkuki na Nyota Publishers Ltd.
- Scoones I (2009) Livelihoods perspectives and rural development. *J Peasant Stud* 36(1):171–196.
- Secretariat of the Convention of the Biological Diversity CBD (2010) Pastoralism, Nature, Conservation and Development: A Good Practica Guide. Montreal.
- Tesfay Y, Tafere K (2008) Indigenous Rangeland resources and Conflict Management by the North Afar Pastoral Groups in Ethiopia. *Q J Int Agriculture* 31:191–216.
- Tynan CA, Drayton JL (1988) Conducting Focus Groups — a Guide for First-Time Users. *Mark Intell Plan* 6(1):5–9.
- United Republic of Tanzania (URT) (1997) The National Land Policy. Dar es Salaam: Ministry of Lands and Human Settlements Development.
- URT (2006) National Livestock Policy. Dar es Salaam, Government Publishing House.
- Yanda PZ, Mung'ong'o CG (2016) (Eds.) Pastoralism and Climate Change in East Africa. Dar es Salaam: Mkuki na Nyota Publishers Ltd.