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The evolving cultural values and their implications on the Maasai Pastoralists, Kajiado County, Kenya

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ABSTRACT

The Maasai pastoralists inhabiting Kajiado County have been known for their rich cultural values which have sustained their livelihoods. However, these cultural practices are evolving under the swift development context with the private holding of land becoming more prevalent. Before these disturbances, customary land was available for the Maasai pastoralists to carry out traditional production systems. The disturbance in their social-cultural ways following land fragmentation has rendered their traditional governance system untenable. Moreover, the Maasai pastoralists have been dispossessed from their customary land and social institutions which have shaped their customs. Thus, concerns have been raised over the sustenance of pastoralism considering that the required resources are either unavailable or not enough. To address this gap, there was the need to understand cultural adjustments and their impacts on the Maasai pastoralists' societal needs. The study employed a cross-sectional design which consisted of 195 Household survey questionnaires, 8 Focus Group Discussions and 18 Key Informant Interviews. The qualitative and quantitative data from the study were summarized and thematic perceptions generated. The results of this study revealed the uniqueness of the Maasai pastoralists' traditional social structures. Also highlighted by the study was the erosion of the traditional social relations exposing the Maasai pastoralists to increasing vulnerability. These findings support the need for external support to supplement the traditional coping strategies to balance the ecological, social and economic systems of the Maasai pastoralists.

1. Introduction

The Maasai have preserved their cultural heritage through generations while sustaining the status resource in attempts to sustain their livelihood system [35]. Cultural practices are for the common good and are rationally anchored on conscious choices which translate to sound environmental management [16]. O'Brien *et al.* [36] reported that the act of adherence to cultural practices inculcates discipline which is integral for the sustenance of natural resources. Similarly, Robinson and

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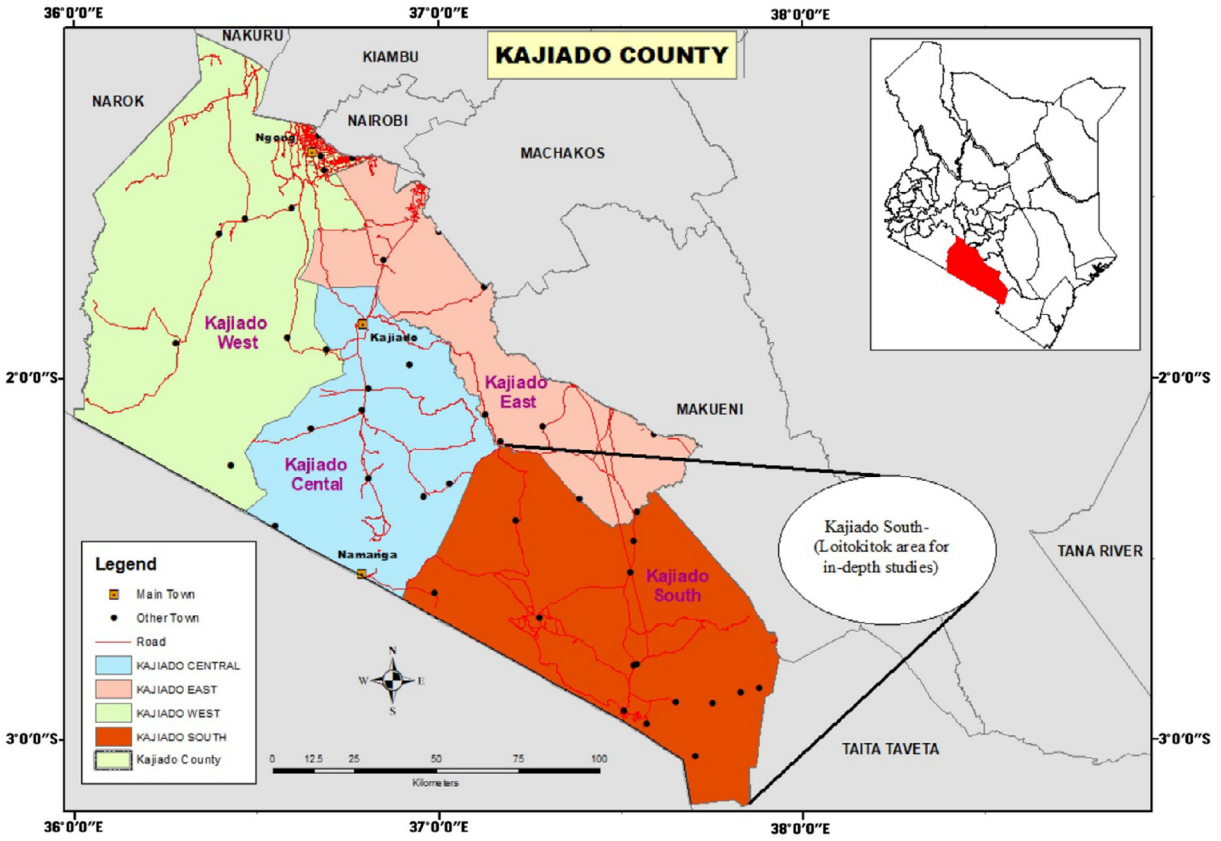

Fig. 1. Map of Kajiado County showing Loitokitok and major towns
The map of the study area (Figure 1**).
*International Livestock Research Institute
**The County's area is 21,900 km^2 and lies between latitudes 1° 0′ and 3° 0′ S and longitude 36° 5′ and 37° 5′ E (Fig. 1). The County's altitude ranges between 1580 and 2460 metres above sea level [20] and it is predominantly occupied by the Maasai pastoralists [28].
Source: Authors' from ILRI* shapefiles

Berkes [42] and Gunderson and Holling [18] supported cultural practices and recognized their integral roles in the pursuit of sustaining the pastoral Social-Ecological System (SES).

In another related study, Adams *et al.* [1] reported that traditional institutions and heritage are critical components for enhancing resilience in the pastoral Social-Ecological System. Similar sentiments were echoed by the IUCN[1] (2010) that advocate for local community participation. The adaptation model emphasises the preservation of natural systems and biodiversity under voluntary stewardship. The global environmental conservation guidelines advocates for the integration of native bio-cultural practices and their knowledge in the management of ecosystems. In the aforementioned report, as well as similar studies, bio-cultural perspectives have been useful in the understanding of ecological change. This is in line with Bavikatte and Bennett [3] who acknowledged the effectiveness of local communities in establishing customary laws to steward their land, water and natural resources with high regards to the environment.

The interaction between humans and the environment in a pastoral Social-Ecological System should be in such a way that both societal and ecosystem resilience improves [37]. Through this approach, resilience thinking becomes more explicit within sustainable livelihood. To this end, resilience in the ASALs (Arid and Semi-Arid Lands) should address among other factors the social networks [46,47]. This view is in agreement with Saidu and Omedo [45] and Samuels *et al.* [43] who noted that for there to be an enhanced resilience, indigenous knowledge and practices are integral when linking social and ecological resilience [2]. These indigenous practices have been passed to subsequent generations through channels such as; age groups, ethnic groups and wise men [29].

Pastoralism has served as the bedrock of livelihood and culture in the Maasai community [4]. However, in keeping with evolving cultural values, non-traditional-based production systems are emerging. This is in contradiction to the presumption that the rich Maasai cultural heritage could provide prudent pathways and linkages with greater potential for sustainability. Therefore, their herds are not as large as they were formerly attributed to the emerging land tenure system which is deci-

[1] International Union for the Conservation of Nature

mating the collective management of resources aligned to cultural heritage. These experiences are raising concerns over the future of pastoralisms as significant parts of their communal land have been converted into private landholdings. In keeping with these external influences, their social and cultural ways are adjusting [6,17,25]. Unfortunately, little is known about their ecological stewardship approaches and the few studies in the area have not systematically examined their societal needs [33].

It is in this regards that it was necessary to carry out the study to understand the limitations faced by the Maasai pastoralists as they access natural resources. Moreover, the problem of land fragmentation comes at a time when resources are increasingly becoming scarce across the entire Kajiado County. The objective of this study was to investigate the Maasai pastoralists' cultural adjustments and their impacts on societal needs. The research questions formulated to address the objective were:

a) How have cultural disruptions affected resource systems.
b) How has land-use change affected neighbourhood compatibility.
c) What are the possible future interventions to traditional production risks.

2. Methods and materials

2.1. The study area

Kajiado County is located in the southern region of Kenya bordering five counties, namely; Nairobi, Machakos, Makueni, Taita Taveta and Nakuru counties. The County also borders Tanzania where it shares a section of Mt. Kilimanjaro in the Loitokitok area. Despite its importance to the pastoral livelihood system, its proximity to Nairobi metropolitan is a recipe for increased demand for land for investment in housing, agriculture, commerce and education. However, the main economic activity is livestock rearing which is highly dependent on natural vegetation [41].

2.2. Field surveys to determine the Maasai Pastoralists' perceptions

The field surveys targeted respondents in Loitoktok area in Kajiado South based on the existence of coherent and significant Maasai pastoralists in this area. Moreover, the area had similar attributes, namely: biophysical features, socio-economic attributes and cultural values which created a common base of shared experiences and in-depth information.

The field surveys included household surveys, Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs). The questions were grouped to conform in the context of SES based on similar sub-themes. Thus, based on resource systems and field characteristics important indicators were investigated to understand the Maasai pastoralists and their evolving cultural practices in keeping with the study objective. The quantitative data generated from the household surveys were triangulated with the qualitative data from FGDs and KIIs.

2.2.1. Household surveys

a) Research team. This research was participatory hence local community engagement was mandatory, 8 research assistants, 8 village elders and the area chief formed the core research team. The identified people were familiar with the area. Thus, their participation in spearheading the implementation of the field surveys was critical. As a prerequisite, this team underwent a 3 days workshop where they were briefed on the study objective, the tools and the kind of data to be captured.

b) Survey validation. Survey validation was done to assess whether survey questions were dependable or not. Different people who are familiar with SES established that the questions were well captured. Thereafter, the questions were administered to 20 participants (10%) and the feedback was cleaned. Principal Component Analysis (PCA) and Cronbach's Alpha (CA) methodology were used to analyse and fortify the true dependable questions. The final step involved reframing the survey questions and aligning them in line with the study objective. According to Monette *et al.* [31], it is important to carry out a dummy survey where a few respondents are engaged before the actual administration on a sampled population to validate the process.

c) Field surveys. Field surveys were done with the knowledge of provincial administration (the area chief at the local level) following the consent given by the National Council of Science and Technology (NACOSTI). The study employed a stratified simple random sampling technique for the field survey administration. The consenting respondents from eight villages in Loitokitok area in Kajiado South were selected based on gender, education level and age. These household questionnaires consisted of closed-ended Likert-scale questions that addressed the Maasai pastoralists' perceptions [32]. These household questionnaires were administered through a drop and pick approach to ensure reliability and maximum response rate on the sampling frame of Kajiado County with a total population of 1,117,840 [23]. This method is supported by [30] who reported that a sample in a population is used to draw conclusions on the population. A total of 19 questions, with 8 and 9 questions in section A (resource systems) and section B (neighbourhood compatibility) respectively to investigate the experiences of the locals and how their evolving cultural values have influenced pastoral livelihoods.

The quantitative data collected from the household questionnaire were analysed using descriptive statistics and further triangulated by qualitative data obtained from 8 FGDs and 18 KIIs which are described in the next section. This is in line

with Denscombe [13] view of methodological triangulation which supported the use of alternative data collection methods to create a provision for making the comparison with findings from other methods. In this essence, the qualitative data from the FGDs and KIIs were cleaned, coded while seeking out common sub-themes and compared with the quantitative data that load onto the same factor as the household surveys.

Therefore, the sampling size was guided by the nature of villages, the number of villages, the size of the population and available time. To this end, this study adopted the formula suggested for social science research that has a large population [19], Cochran equation:-

$$\boldsymbol{n}_0 = \boldsymbol{Z}^2 \boldsymbol{p} \frac{(1-\boldsymbol{p})}{\boldsymbol{e}^2} \tag{1}$$

Where $\boldsymbol{n}_0$ = Sample size

$\boldsymbol{Z}$ = zValue (1.96 for 95% confidence level)
$\boldsymbol{p}$ =The estimated proportion of the population (assumed to be 50% or 0.5)
$\boldsymbol{e}$ = Margin of error (assumed to be 0.07)

$$\text{Therefore } n_0 = \frac{1.96 \times 1.96 \times 0.5(1-0.5)}{0.0049}$$

$\boldsymbol{n}_0 = 196$

$$\textbf{\textit{Adjusted Sample}}\ (\boldsymbol{S}) = \frac{\boldsymbol{n}_0}{1 + \left(\frac{\boldsymbol{n}_0 - 1}{\boldsymbol{P}}\right)} \tag{2}$$

Where: P is the population of Kajiado County given as 687, 312.

$$\textbf{\textit{Adjusted sample}}(\boldsymbol{S}) = \frac{196}{1 + \left(\frac{196-1}{687,312}\right)}$$

Therefore adjusted samples for effective results is 195.

The sample size was 195 as shown in Eq. 2, which is an acceptable sample size according to Cochran [11]. However, a total of 200 household questionnaires were administered within a duration of 3 months each of the eight villages in Loitoktok namely; Inkoisuk, Mabateni, Nasipa, Olng'osua, Isitet, Inshura, Kalesirua and Namerok being apportioned 25 questionnaires based on proportional allocation procedure to give each village an equal chance of being sampled in the overall outcome.

According to Boniface *et al.* [8] response rate is expressed as the fraction of the eligible survey participants who are contacted and interviewed. In this context, 200 questionnaires were distributed, 195 were filled and returned while 5 were returned blank leaving a total of 195 questionnaires whose feedback was found satisfactory. This feedback was equated to a response rate of 97.5%. This is in line with Saunders *et al.* [44] who asserted that a response rate of 52 and 100% is adequate for organizations.

2.2.2. Focus group discussions

The FGD respondents were selected from the local population. A total of eight FGDs meetings were held in social halls guided by a semi-structured guide aligned to the main components of the SES. This is in line with Krueger [24], who asserted the importance of having structured themes which guided the respondents as they narrated their experiences that were pertinent to the research. Each of the gender-based FGDs factored in gender, educational level and age of the discussants who comprised 9 to 11. This is in line with Dilshad and Latif [14], who recommended that FGDs participants should be within the range of 6 to 12. The sampling for FGDs employed a stratified simple random sampling technique with each of the eight villages in Loitokitok provided with an opportunity for fair distribution and balanced representation. The verbal consent was granted before recording the content in an audio recorder while at the same time taking notes of the discussions. The use of multiple gadgets for recordings made it easy to make a comparison later. FGDs sessions lasting between 1–2 h.

2.2.3. Key informant interviews

The interaction of the researcher with key informants is critical [38]. Similar sentiments are supported by Carter and Beaulieu [12] who reported that KIIs as a method of data collection makes it possible for one to acquire first-hand information from experts. In this context, an expert is a resource person with special knowledge in a particular field thus they play a critical role in data collection [7]. The sampling frame for KIIs was generated from a consolidated list of 40 institutions undertaking ecological-related programmes. Based on the stakeholder analysis, 18 institutions were identified and their experts engaged in interviews which went on concurrently as each of the 8 research assistants was apportioned a moderator's role guided the sessions. These face-to-face sessions lasted 1–2 h and were held in the respective expert offices. The KII guide focussed on gathering in-depth information resource systems and field characteristics just as in the other aforementioned survey tools. This approach borrowed heavily from Morgan's [27] assertion that shared experiences from diverse points of view enables integration of a wide world view which makes comparison possible especially when it comes to the key issues.

Table 1
Respondents Perceptions of Resource Systems.

S/N	Resource systems	Respondents				
		Very high(+2)	High(+1)	Neutral(0)	Low(-1)	Never(-2)
1	Water	26%	30%	19%	18%	7%
2	Pasture	30%	37 %	12%	13%	8%
3	Livestock	31%	35%	15%	10%	9%
4	Non-livestock	18%	20%	7%	21%	24%
5	Customary land	30%	29%	18%	11%	12%
6	Private holding	15%	11%	19%	29%	26%

Source: Authors' computations

Table 2
Respondents Perceptions on Neighbourhood Compatibility.

S/N	Field activities	Respondents				
		Very high(+2)	High(+1)	Neutral(0)	Low(-1)	Never(-2)
1	Transboundary	6%	15%	27%	24%	28%
2	Conservation	29%	27%	23%	13%	8%
3	Sedentarisation	6%	15%	27%	24%	28%
4	Alternativesactivities	30%	33%	11%	17%	9%
5	Partnerships	27%	29%	14%	16%	14%
6	Markets	26%	29%	23%	13%	9%

Source: Authors' computations

Table 3
Respondents Perceptions on Production Risks.

S/N	Production risks	Respondents				
		Very high(+2)	High(+1)	Neutral(0)	Low(-1)	Never(-2)
1	Diseases	27%	37%	23%	8%	5%
2	Weeds	31%	31%	9%	22%	7%
3	Seasons	27%	27%	24%	14%	8%
4	Population	29%	27%	23%	13%	8%

Source: Authors' computations

2.3. Analysis using frequencies and percentages

Responses were rated on a scale of 2 to -2 (where 2 = very high, 1 = high, 0 = neutral, -1 = low and -2 = never). The descriptive statistic was computed into frequencies and percentages which indicated the people's opinion. In this context, attributes were evaluated (Tables 1,2 and 3) based on an attitudinal scale [9,22].

2.4. Thematic analysis

Raw data from FGDs and KIIs in the form of audio files were transcribed and verification for each script was done by comparing field notes to the transcribed scripts generated. Thereafter, these were followed by data entry, cleaning and coding whereby emergent themes were identified. Using the content analysis method in NVivo version 10, the major sub-themes from all the transcripts were further coded into sub-themes which were then clustered together using comparable attributes.

3. Results

The study reported (Table 1) that in keeping with the delicate balance between sustaining the Maasai pastoralists' ecology and survival, social-ecological disintegration was inevitable. The weakening social relations observed in the study were attributed to the dwindling natural resource base. The study reported that regardless of the prominence given to livestock rearing to the non-livestock ventures, the numbers of stock were declining over the years. Besides, the responses from the FGDs and KIIs confirmed that natural resources were shrinking and as such traditional production systems were fast fading.

In the FGDs, the availability of water and pasture were identified as critical resources for the attainment of social-ecological cohesion. According to FGDs, the land parcels were getting fragmented disrupting the Maasai pastoralists' access to the diminishing resources and as such eroding the traditional social relations. It was also reported in the FGDs that the herders were trekking longer distances and spending more time away from their families in search of dwindling resources. According to FGDs, such adventures increase the Maasai pastoralists' frequencies of interaction with the non-natives and

thus creating a different set of a worldview that could result in the adjustments observed in their social-cultural ways. It was further stated in the FGDs that the Maasai pastoralists were opting for alternative investments including non-livestock ventures.

In the KIIs, it was reported that customary land was progressively being converted into private holding. A KII discussant reported that the expansion of private landholding was rendering the Maasai pastoralists landless. According to the KII discussant, the dispossession of their habitual communal land raises concerns over the future of pastoralism as the available natural resources are directly affected by the land use transformation in the area. It was also reported in the KIIs that pressure for land sub-division was taking a toll on the traditional coping strategies particularly herd seasonal mobility. According to a KII discussant, the field sizes were getting smaller since Maasai pastoralists sold substantial portions of their land to private landholders. It was further stated in the KIIs that the non-indigenes were taking advantage of the weak land tenure system to either acquire land from the locals or encroach into unclear territorial demarcations.

The study reported (Table 2) that the land-based transactions have limited the Maasai pastoralists' opportunities to access natural resources following compatibility hurdles among the various field activities. Although other forms of land use activities were slowly gaining acceptance in the area, it was clear that livestock rearing was still the main source of income. The responses from the FGDs and KIIs confirmed that there was alternative land uses converting the formerly vast open grazing space into land parcels that are too small for sustainable pastoralism and further aggravating the dire situation.

In the FGDs, it was reported that the frequencies of cross-border trade involving the Maasai pastoralists and their neighbouring communities had increased and as such as social-ecological adjustments were bound to happen. According to the FGDs, the Maasai pastoralists had taken into cognizance that there were beneficial aspects of such interactions. It was reported that the Maasai pastoralists were experiencing overlaps over the use of the transboundary resources. According to FGDs, before the expansion of alternative land uses in the area, the Maasai pastoralists had a high regard for environmental factors whereby there was a balanced interaction between nature and the exploiters. It was reported in the FGDs that cultural ways were evolving in keeping with the uptake of alternative economic activities in the Maasai pastoralists' pursuit for survival. It was further reported in the FGDs that to conform with the new arrangements, acreage per household has declined drastically. According to FGDs, these disturbances had been heightened by their proximity to the urban centres which is a recipe for increased demand for land yet the Maasai pastoralists are over-dependant on natural resources. According to the FGDs, the Maasai pastoralists are under the imminent threat of losing their primary source of livelihood.

In the KIIs, it was reported that the Maasai pastoralists bowed to the pressure of selling off their land for quick cash. According to the FGDs, the increase in land demand in the area has heightened their vulnerability as they have been slowly losing control in the management and utilisation of natural resources. It was also reported in the FGDs that there were growing numbers of landless Maasai pastoralists making already dire situations even worse. It was also stated in the KIIs that the Maasai pastoralists were either forced into small scale-business or migrate to urban areas in search of jobs. A KII discussant reported thereafter the Maasai pastoralists were faced with economic hardships as they are not able to rebuild their stock. It was further reported in the KIIs that sedentarisation had also contributed to the restricted access of the available natural resources. According to a KII discussant, fixed settlement locks out large the population from accessing social amenities thereby disenfranchising them from their traditional social relations especially undertaking traditional engagements. It was also reported in the KIIs that there were concerns over many instances where the Maasai pastoralists could seek external support especially food aid. It was further reported in the KIIs that the deaths of herds had made the Maasai pastoralists embrace partnerships and collaboration with supporting institutions such as veterinary services which were critical to livestock husbandry.

The study reported (Table 3) that there were rising production risks among the Maasai pastoralists. The study reported four main challenges namely: diseases, weeds, seasons and population. Livestock diseases had weakened the Maasai pastoralists' herds leading to their massive deaths. Besides, there was an upsurge in the invasive species suppressing the natural pastures in the fields. The study also identified unpredictable seasonal patterns as a factor curtailing the Maasai pastoralists' ability to uphold their cultural practices. Along with these hurdles, population explosion has heightened pressure for competition among the Maasai pastoralists who are over-dependent on the dwindling natural resources. The responses from the FGDs and KIIs confirmed the increase in production risks creating an enforcing loop, which eventually decimated the Maasai pastoralists' cultural practices.

In the FGDs, it was reported that palatable pasture was shrinking as such the herds were facing nutritional disorders as evident in their emaciated herds. According to FGDs, the upsurge of invasive species especially *Cincrass cilliaris and Prosopis juliflora* has contributed to habitat alteration. It was further stated in the FGDs that these weeds had covered significant areas and were inflicting a lot of suffering on livestock that depended on the natural pastures for their survival. It was also reported in the FGDs that the Maasai's herds were experiencing disease outbreaks. According to FGDs, the poor and marginalised Maasai pastoralists could not sustain the high cost of treatment and as such their herds had poor health status. It was further stated in the FGDs that the Maasai pastoralists were experiencing seasonal failures and weather uncertainties as the soothsayers who are entrusted with weather prediction matters were also getting confused.

In the KIIs, it was reported that the palatable species were dwindling at the expense of the invasive species. According to a KII discussant, there were increased incidences of livestock diseases such as East Coast fever, foot and mouth disease and anthrax which could wipe out the entire herds. A KII discussant reported that the high costs in managing livestock diseases had reduced the Maasai pastoralists' disposable income. It was further reported in the KIIs that there were increase incidences of other diseases such as trypanosomiasis and helminthiasis which were formerly uncommon in the area. According

to the KIIs, the existence of capacity gaps on veterinary services prompted the local women to formed part of community health workers. A KII discussant also reported that as a mitigating measure cattle, goats, sheep and camels were reared in one fold which did not only created an opportunity to optimize utilisation of the different ranges of resources as the grazers and browsers have different feeding habits but also prevented a situation where one disease wipes out the entire herds. Livestock mix also limits production risks as different species have a varying degree of tolerance to the shifting climate condition.

4. Discussion

The Maasai pastoralists have not been able to break even in the sustenance of the traditional production systems considering the fast-changing context as natural resources diminish in Kajiado County. In keeping with the high depletion levels, adjustment in their social-cultural ways was inevitable. In another related study Rankoana [39] reported that any change in the status of natural resources directly affects livelihood. The results indicated that emerging land tenure systems had rendered seasonal mobility untenable yet this strategy was critical in enabling the Maasai pastoralists to access natural resources far beyond their territory. The results also indicate that land fragmentation was increasing as the communal land is converted into private landholding. This land use transformation was evident in the study area despite its hindrance to flexibility, an important factor in the traditional production systems.

The results indicate that the genuine traditional production systems had been disrupted and that cultural practices were fading fast under the threat of private property rights. Land use exclusivity had been elevated in Kajiado County despite its restrictions which has increasingly rendered the Maasai pastoralists vulnerable. The sedentarised Maasai pastoralists had experienced a myriad of problems than their nomad counterparts. According to Marius [26], the Maasai migrate far and wide beyond their traditional territorial space to meet the pasture deficit. Therefore, actions that constrain mobility to limit access to critical resources and increases degradation as stated by Reid *et al.* [40] and Fitzgibbon [15]. The aforementioned opinions were in line with those of Benjamin [5] and Toulmin [48] who reported that sound environmental management was sustained where traditional systems were upheld.

The results also highlighted the uniqueness of the Maasai community and its social-ecological structures. A similar opinion was shared by Homewood and Rodgers [21] and Mutangah [34] who reported that the county is endowed with diverse species and unique landscapes where wild herbivores were exhibiting a high degree of spatial overlaps or co-existence with the Maasai' livestock. In another related study Burnsilver *et al.* [10] state that the Maasai pastoralists benefit from natural resources such as wildlife, albeit indirectly from tourism ventures as they reciprocate the Maasai pastoralists' conservation efforts by supporting education, health and other activities. It was also evidence of the growing number of partnerships between the Maasai pastoralists and their neighbours.

The results point out at diseases, weeds, seasons and population has the four main hurdles which are disrupting timelines in their calendar of activities denies them the opportunity to undertake traditional engagement. Along with these challenges, the results support the need for the Maasai pastoralists to adopt alternative economic activities which are less sensitive to natural resources and climate as a mitigating action against losing their livelihood.

Conclusions

The Maasai pastoralists harbour unique cultural and social structures. However, their cultural practices have evolved through experience. This is in keeping with diminishing natural resources directly affecting their traditional production system. In pursuit of survival, the Maasai pastoralists have made deliberate actions including lifestyle change. The study identified population explosion, land subdivision, seasonal failures, disease outbreaks and upsurge in invasive weeds as a major threat to their livelihood. To this end, apart from livestock rearing, the Maasai pastoralists have opted for alternative economic to sustain the increasingly dire situation. Indeed, the Maasai pastoralists have embraced realignments and cultural adjustments in their socio-cultural ways to enhance their coping ability.

Recommendation

Cultural heritage in rangeland management could be a useful pathway for land management decisions since it ensures cohesiveness and amicable consensus on the utilisation of natural resources. However, sustaining this will require a proactive involvement of the native and non-native in decisions by utilising the existing social structures. Based on results, traditional production systems will continue to lose their influence as the emerging land tenure systems render them obsolete. Thus, there is a need to supports supplementary measures beyond the traditional coping strategies to balance the Maasai pastoralists' ecological, social and economic systems.

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Data sources

This research was participatory hence eight local guides who are familiar with each of the eight villages in the study area were identified by the assistance of the area chief, with the consent of the County Commissioner's office, to oversee project implementation in each of the eight villages represented in the study. This team of participants, who were volunteers, were trained together with the eight village elders and the area chief. As a prerequisite, all the relevant permits and approvals were processed before the actual implementation of the study. Furthermore, the participants were briefed on the study objectives and the tools to guide them to capture the relevant data. The field surveys (Household surveys, Focus Group Discussions and Key Informant Interviews) were administered to consenting respondents from eight villages in Loitokitok area in Kajiado South which were purposely selected upon signing of the consent form.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

The authors declare no financial interests/personal relationships which may be considered as potential competing interests:

The authors declare that there is no potential conflict of interest in this submission.

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