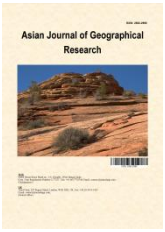

Asian Journal of Geographical Research

Volume 6, Issue 4, Page 17-31, 2023; Article no.AJGR.107552
ISSN: 2582-2985

Community Forest Associations Boundaries and Sustainable Forest Management in Loita Forest, Narok County, Kenya

Kiramba Lestan Kimiri [a*], Felix L. M. Ming'ate [a] and Eric M. Kioko [a]

[a] Department of Environmental Studies and Community Development, School of Agriculture and Environmental Sciences, Kenyatta University, P.O. Box 43844-00100, Nairobi, Kenya.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJGR/2023/v6i4200

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/107552

Original Research Article

Received: 06/08/2023
Accepted: 13/10/2023
Published: 20/10/2023

ABSTRACT

The Kenya Forest Act of 2005, subsequently revised in 2016, introduced the Kenya Forest Service and its mandate to engage in Participatory Forest Management (PFM) agreements with local communities adjoining state forests. This framework necessitated the establishment of Community Forest Associations (CFAs) nationwide, including the Loita Community Forest Association. However, a prevailing concern surrounding CFAs is the delineation and redefinition of boundaries, an issue that has gained prominence due to Kenya's decentralized forest governance system and the ambiguity surrounding the management of locally-held common resources. This study centers on investigating the process of establishing boundaries for the CFAs both in forest resources and the users within Loita Forest in Narok County, Kenya. Notably, Loita forest operates under a Traditional Participatory Forest arrangement, controlled by community elders, led by the revered

**Corresponding author: E-mail: lestankimiri1@gmail.com;*

Oloibon, who steers the resource utilization decisions. The vast expanse of Loita forest encompasses both lush woodlands and savanna landscapes. Employing purposive sampling, the study engaged 52 respondents from nine distinct Loita sub-locations. Key informants were interviewed individually, complemented with focus group discussions conducted with the use of semi-structured questions. Participant observation further enriched data collection, consolidating insights from key informants and group discussions. Collected data was meticulously tape-recorded and subjected to summative content analysis. The inquiry delved into the practicality of existing traditional resource-use boundaries, the adequacy of governmental regulations, policies, and institutions in elevating forest governance within Kenya, and the extent to which individual indigenous rights have been upheld in managing and using communal forest resources. Key findings of this study show that the Loita Maasai still values their traditional norms and have great respect for cultural institutions. Major decisions concerning the management of Loita forest are made by the council of elders led by the Chief Laibon. The study also found that there exists no CFA in Loita forest and that the presence of government institutions in the forest is minimal. This study's outcomes contribute to a nuanced understanding of the intricate interplay between indigenous wisdom, modern frameworks, and sustainable forest management. It underscores the indispensable role of tradition in shaping boundaries, governance, and ecological equilibrium within Loita forest and offers practical directives for future forest management endeavors.

Keywords: Community forest association; forest management; indigenous knowledge; loita; sustainability.

1. INTRODUCTION

Participatory Forest Management (PFM) represents an approach to forest governance that engages forest-adjacent communities and relevant stakeholders, directly or indirectly, in the management of forests [1]. This approach operates within a framework that contributes to the livelihoods of these communities [1]. For the success of community forestry, comprehensive stakeholder involvement is paramount, necessitating their participation in top-level decision-making [2]. Following Ostrom's [3] design principle for Common Pool Resources (CPRs), an initial step involves establishing precise boundaries for forests and other Common Pool Resources. This entails the need for a clear and, if feasible, legally defined and identified individuals who possess the right to partake in resource utilization activities, as well as the establishment of physical boundaries for resource units. Tenure rights are understood as having bundles of rights of access, withdrawal, management, exclusion and alienation [4]. The absence of certainty regarding the physical boundaries of the resource and the eligibility criteria for its usage leads to a situation where nobody knows what they are managing or for whom they are managing it. In most cases the indigenous communities, their allies, and individuals have always centered their struggles for resources and their rights on defining identity and territorial boundaries [5]. The overlap between communities and forest management bodies “rights” continue to affect the management of forest. As [6] note, the discussion about community participation in management of forests should not only involve partaking in forest management activities but also on different stages of decision making and policy making process that can help in defining forest boundaries.

Boundaries are viewed as a representation of social relationships that bring about distinctions among groups of people and that can establish the territorial or spatial grounds which helps these groups to claim that a piece of land “is mine”, “is ours and not theirs” or based on a social group’s terms, “this is us, not you”. Indigenous people tend to seek political solutions that involve frequent reinforcement and establishment of boundaries which are similar to the method used by government in the establishment of their policies. In the last few years, forestry governance advocates have insisted that the significance of forest governance policies is to ensure environmental protection of land which has been demarcated to certain indigenous people. However, within an indigenous community in Philippines, these “boundaries” are found to be less effective than “pathways” [5]. The same can be said about two community forests in Uganda (Ongo and Alimugonza) where the surrounding communities put enormous pressure on the forest for poles and firewood [7,8].

The absence of well-defined boundaries for CPRs and the criteria for governing their usage leads to uncertainty in CPRs management and potential user access [8]. Neglecting the delineation of these boundaries poses a risk to participating communities, as they risk losing benefits derived from resource protection, management, and conservation efforts to non-participating entities [9,10]. Notably, indigenous communities and their allies have emphasized the importance of defining and identifying territorial boundaries in their struggle for resource use rights [5,11]. However, the communities together with the Communal Land Association (CLA) continue to face challenges with the enforcement of forest rules due to the high cost of apprehending rule breakers [7].

In Kenya, registered Community Forest Associations (CFAs) collaborate with the Kenya Forest Service (KFS) to manage community forests [12,13]. This partnership extends to both county government-owned forests and state-owned gazetted forests. Local communities when seeking rights to manage and utilize forest resources must apply formally through CFAs, ensuring these rights align with forest conservation objectives [14]. The Loita Maasai community residing in the Loita ward along the Kenya-Tanzania border [15,11] benefits from an indigenous system which allows resource access within the Loita forest. The study area uses a traditional setting with most community resource decisions being made by elders led by the famous Oloibon. Loita is remote in terms of infrastructure, dry and covered with extensive forest and savanna land. The Loita residents use their forest for grazing, fuel wood harvesting, water extraction, religious and cultural purposes. These boundaries are regulated by customary laws, with herders and the Laibon having overlapping rights for grazing and cultural activities, contingent on the season. There are certain resource types and uses that are strictly controlled, while other resources are more freely accessible. This depends on several factors, which include resource type, resource use, resource users, nature and strength of rights and duties and seasons use [16].

This research aims to comprehend how the establishment of CFA boundaries to access of communal forest resource units for enhancing community livelihoods is done in Loita forest reserve [17]. Extant literature has established that well-defined boundaries for accessing community forest resources leads to sustainable resource use and improved livelihoods for forest-dependent communities [3,17,18]. This study examines Loita forest's traditional use and governance structures, focusing on how the local community has defined forest resource use and users' boundaries and governs forest resource units' utilization.

2. METHODOLOGY

2.1 Study Area

Loita Forest is an indigenous forest in southwestern Kenya, specifically in Narok South Sub County. It spans approximately 330 square kilometers and is situated between the Nguruman-Magadi escarpment and the Maasai Mara National Reserve, (Fig. 1). The forest is characterized by diverse ecosystems and is situated at an elevation of around 2300 meters above sea level [17]. The mean annual temperature of 17 °C and a rainfall range of 600–1,200 mm [19]. The geographical position of Loita is within 10 30IS, along the Kenyan Tanzanian Border and 350 30IE to 360 E [17]. The surrounding region is predominantly semi-arid, with grassland savanna extending west [20,21]. The population of Loita Ward, which encompasses the forest, is estimated to be approximately 22,873 people, according to the Narok County Village Units Delineation Bill of 2014. The forest area is part of the ancestral land of the Maasai community, situated along the Kenya-Tanzania border [22].

2.2 Research Design, Sample Size and Data Collection

This study is phenomenological and a sample size of 100 respondents was to be used but ultimately when saturation was reached the sample size was less [23]. However, only fifty-two respondents were interviewed which included three focused group discussions after the researcher found no new information in interviewing more respondents. They were composed of 40 households (8 households each from five sub-locations), three assistant chiefs, one KFS officer, one Narok County Forest officer, Loita ward administrator, one representative from SORALO and Maasai Bee Keeping Initiative NGOs. and three focused group discussions. Each focused group was composed of three men and three women. Table 1 summarizes the sample size of the respondents.

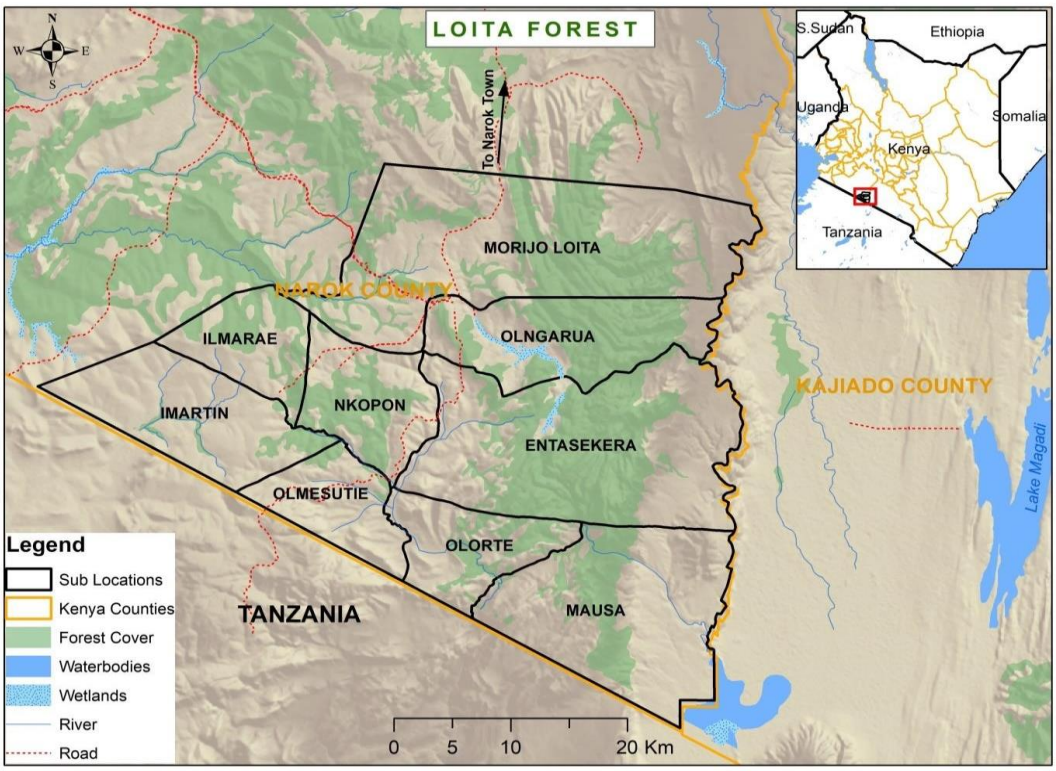

Fig. 1. Map of the Loita plains

Table 1. Sample size of the respondents

Category	Sample size	Percentage
Household Residents	40	82%
Forest Officers	2	4%
Oloibon	1	2%
Assistant Chiefs	3	6%
NGO Representatives	2	4%
Loita Ward Administrator	1	2%
Total	49	100%

Data was collected through semi-structured interviews, predominantly conducted within households adjacent to the Loita forest. The semi-structured interview format facilitated participants in exploring issues of personal significance. Open-ended questions were utilized to ensure participants could offer comprehensive opinions. This method allowed participant observation, tape recording, and interviews of key informants. This method provided participants with a chance to explore the issues they deemed more significant. A tight schedule was not kept by the interviewer but the interviewee was allowed to deeply explore the issues and from different angles as they please through use of open-ended questions [24].

2.3 Data Analysis and Presentation

Two distinct approaches were employed for data analysis: evaluation of demographic characteristics and content analysis. The evaluation of demographic characteristics aimed at capturing the participants' demographic profiles concisely. Content analysis is a qualitative approach, aimed at distilling critical themes or attitudes from participants' responses involved in the study [25]. Quantitative data was analyzed by using SPSS version 25, encompassing and presented in descriptive statistics where percentages were deduced and used to answer the study objectives. Also, all qualitative data was analyzed through coding,

grouping information into similar themes and then used them to answer the study objectives.

3. RESULTS AND DISCUSSION

The research's principal objective was to comprehensively evaluate how resource users associated with shared resource units can effectively establish well-defined CFAs boundaries. This evaluation sought to elucidate the role of forest-adjacent communities, whose livelihoods depend on the forest, in promoting sustainable forest management practices.

3.1 Demographic Characteristics of the Respondents

During the qualitative interviews, about 52.5% of the respondents in the households were found to be male, while 47.5% of them were female. The age distribution was found to have 45% of the respondents between the ages of 31-50, and only 5% were above 70 years as shown in Table 2. This indicated that a large percentage of the residents were young.

Age is a vital part of this research. Elders are the biggest custodians of Maasai culture and traditional norms. Therefore, it shows that the younger generation among the Loita Maasai understands their culture and has respect for traditional institutions considering the key findings of this study.

Most of the population was of the Maasai sub-tribe (90%). The only other community in the area is the Kipsigis, who mainly come for trading but have become part of the community, accounting for the remaining 10% (Table 3), with only one of the four Kipsigis traders staying less than five years with the community. This was a key factor as non – locals would have less knowledge and respect to the Loita Maasai cultural values and beliefs.

Moreover, only 17.5% of the respondents have a level of education beyond Primary, with 60% having No Education as shown in Table 4. This can be attributed to the historical marginalization of the region coupled with a traditional system that was predominantly based on Moranism and did not see value in formal education. Education was a key indicator as it was viewed that erodes the attachment people have to traditional norms and reduces respect for the key traditional institutions.

Table 2: Age distribution of respondents

Age					
		Frequency	**Percentage (%)**	**Valid Percentage (%)**	**Cumulative** Percentage (%)
Valid	Below 30	13	32.5	32.5	32.5
	31-50	18	45	45	77.5
	51-70	7	17.5	17.5	95
	Above 70	2	5	5	100
	Total	40	100	100	

Table 3: Ethnicity of respondents

Ethnicity					
		Frequency	**Percentage (%)**	**Actual Percentage (%)**	**Cumulative Percentage (%)**
Valid	Maasai	36	90	90	90
	Kipsigis	4	10	10	100
	Total	40	100	100	

Table 4: Education level of respondents

Level Education					
		Frequency	**Percent**	**Valid percent**	**Cumulative percent**
Valid	No Education	24.00	60.00	60.00	60.00
	Primary education	9.00	22.50	22.50	82.50
	Secondary education	5..00	12.50	12.50	95.00
	University education	2.00	5.00	5.00	100.00
	Total	40.00	100.00	100.00	

The findings in Table 5 show that only 17.5% of the households engage in trading activities, with 82.5% being involved mainly in tourism, Agriculture (including livestock and honey harvesting), and Forest Utilization activities. This shows that the Loita Maasai still engage mostly in their traditional grazing activities as the main income generating activity. Generally, the Maasai have a greater attachment to livestock and it forms part of their daily way of life.

3.2 Structure of Forest Governance in Loita

To further understand how the CFA boundaries concerning forest resources and resource users are defined in Loita Forest, the respondents were asked to explain the traditional governance structure for Loita Forest reserve and the role of the Chief Laibon. In the case of the roles of the Laibon the respondents identified the following roles:

"The Chief Laibon is a highly respected and feared leader among the Loita Maasai. He is believed to hold magical powers, which have helped instill discipline among forest users. Even people from far places that visit Loita forest always fear these magical powers of the Chief Laibon" (R28).

In terms of the structure under the Chief Laibon is the Council of Elders which has the overall mandate to help the Chief Laibon in making key governance decisions, and locational forest committees that act as the implementing bodies for the Council of Elders and Chief Laibon's decisions. Morijo, Entasekera and Olorte are the three locations in Loita ward. Each committee also has observers who may include government and NGO staff. The main task of the committees is to provide permits for people who need to cut trees for their own use (e.g., for construction or fencing) and to monitor that only the specified trees are cut [26,27]. They are also supposed to prevent charcoal burning, prevent tree-cutting near water courses and encourage people to use only dry wood for firewood as indicated by key informants. The hierarchical structure of Loita forest management is described as was found in the Fig. 2.

3.3 How to Establish Clear CFA Boundaries for Sustainable Forest Management

The study also set out to explore how to establish the forest boundaries within a traditional participatory arrangement like Loita forest. The responses from the informants showed that the use of the manual developed by the [28] for forming CFAs offers a comprehensive framework. This manual outlines five distinct stages that KFS uses in the formation of CFA forest resource use access boundaries across all public forests in Kenya. This includes:

1. **Identification and Negotiation Stage:** This stage involves thoroughly assessing the community setup and identifying entry points for engagement.
2. **Participatory Assessment:** Facilitators assess the activities of groups forming the CFA in alignment with the Forest Act, seeking to establish compatible activities.
3. **Establishment of CFA Rules and Regulations:** During this step, facilitators increase awareness of the Forests Act and environmental legislation, aid in constitution preparation and the development of relevant by-laws and regulations.
4. **Transparent Elections:** Organizing transparent elections for the CFA and fulfilling the Registrar of Societies and Kenya Forest Service requirements.
5. **Capacity Building:** Involves capacity enhancement for the CFA and Forest Committee and identifying areas necessitating additional capacity to fulfill the obligations for effective establishment of resource use and users' boundaries effectively.

Table 5. Source of income

Source of Income					
		Frequency	**Percentage (%)**	**Actual percentage (%)**	**Cumulative Percentage (%)**
Valid	Traders	7.00	17.50	17.50	17.50
	Tourism, Agriculture, and Forest Utilization	33.00	82.50	82.50	100.00
	Total	40.00	100.00	100.00	

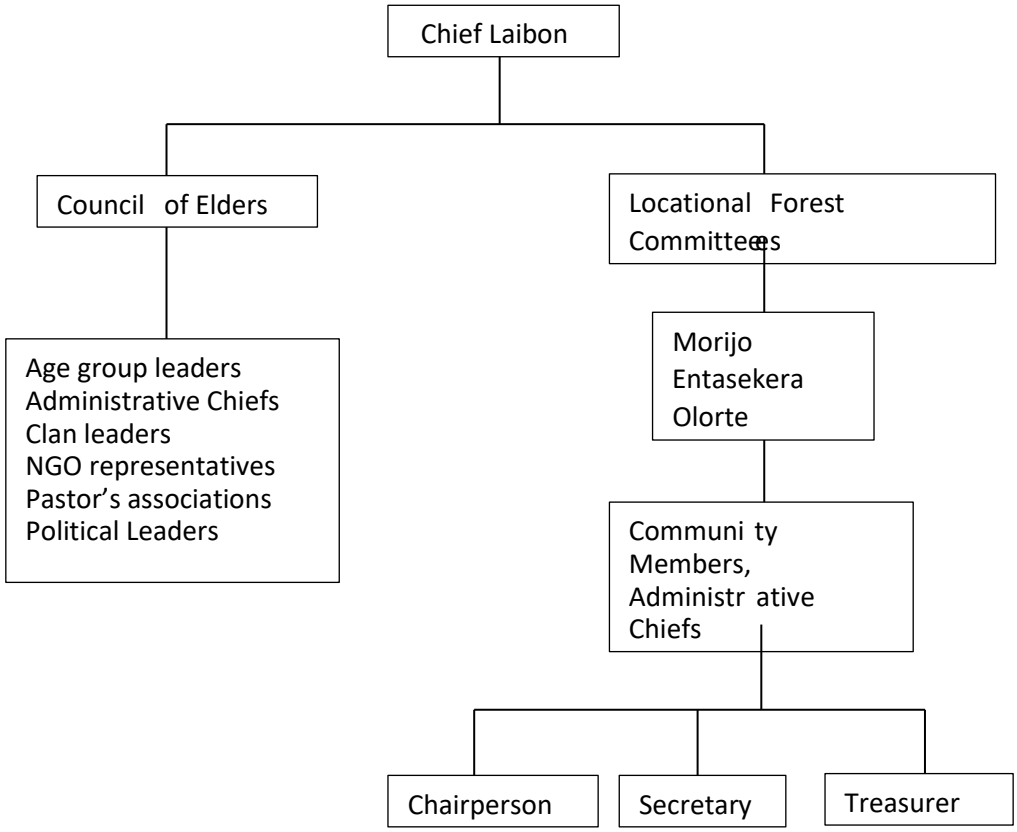

Fig. 2. Hierarchical structure of Loita forest management (Source, Author 2022)

To further unravel the mechanisms underpinning the establishment of boundaries for resource and resource users' boundaries traditional participatory arrangement frameworks could foster enduring and resilient boundaries, specifically as exemplified by the case of Loita Forest. Distinct from all other forest management paradigms in Kenya, the Community Forest Associations (CFAs) are necessitated registration by the registrar of societies prior to obtaining participation rights within forest management frameworks. However, it became clear that in Loita forest reserve, the traditional arrangements have historically governed its management. To date Loita forest reserve is communal and lacks titles for the entire forest land. The loita Maasai community espouses a clear comprehension of "*erishata,"* a term denoting division or separation that engenders a boundary. However, their perceived boundaries are akin to zones rather than discrete lines. A notable informant aptly encapsulated this concept as follows:

"Most families here do not have title deeds for their land. However, clans and families are separated by boundaries that most Maasai understand and do not cross. These boundaries were defined by Maasai ancestors, mostly great grandparents" (FO1).

As argued by [29], a significant portion of local communities and indigenous individuals inhabits land that lack legal titles. Further, while legal systems may recognize customary, aboriginal, or traditional rights stemming from prolonged residency and community affiliation, these rights often intersect with individual or state-held property rights. Customary laws governing land rights tends to encompass a pluralistic nature, characterized by inclusivity (encompassing multiple rights holders), ambiguity (with overlapping rights), and negotiability (established through communal processes). Further in most cases customary land tenure lacks the definitive certainty provided by formal land registration.

By exploring the intricacies of boundary establishment, the study delves into the intricate interplay between traditional approaches to communal land management and the formal regulations stipulated by CFAs. This synthesis of

perspectives enables a more nuanced understanding of how boundaries are conceptualized and maintained within the dynamic context of Loita Forest.

When the community grants rights to people and families, they come together and interact as they collectively utilize the land. Access to the land is determined through negotiation and may occasionally lead to conflicts, as put in the words of a key informant:

"Families that live within a particular zone allow members to use land and its resources. However, to avoid conflict on who should and should not use the land and its resources, some rules govern access to the land by members" (LWA).

For the Loita Maasai, their customs and laws have existed since immemorial. Respondents could not clearly explain how these customs were formulated, who formulated them, and if in meetings or consultations took place. As put by the respondents:

"There are no formal meetings to formulate these rules. Only the locational forest committees in consultation with the Laibon stipulate any new rules and communicate them in chief's barazas" (R19). "No specific community meetings are organized" (AC2).

Even though there is no CFA involved in the Loita Forest, management is done through traditional participatory forest arrangements (R21). Further, even though there was an attempt to form a CFA at a location called Entasekera, this was firmly rejected by the entire community members and the County Government of Narok. The informant was captured saying:

“I explained the importance of a CFA to Maasai leaders, including the Laibon. I also attended a meeting where leaders and Maasai members were present. When I tried to pitch my suggestion, the community strongly rejected it. The county Government of Narok *was also against it. Some members cited the reason for rejection as politics” (FO2).*

All community members were aware of and understood the benefits that can be extracted from Loita Forest in one way or another. As explained by the respondents, the following are the benefits:

"Loita forest is very beneficial to us. We get our honey from the forest, our cattle graze in the forest" (RH35). "We get firewood and timber from the forest. Besides, Loita acts as a water catchment area and thus provides water for our community" (R4).

Only about 5.8% (3 CFA officials) of the participants knew about the concession or management agreement between CFA and KFS, indicating limited knowledge of the concession between CFA and KFS. For management purposes, a CFA can be given a Management Agreement by KFS to manage the forest for a duration of specified time. The following words from critical informants and household interviews captured this finding:

"I do not know any concession or management agreement between a CFA and KFS" (R5). "I do not think there is a concession agreement because there is no CFA in Loita forest" (R16).

It was revealed by most respondents, about 80%, that they needed to gain knowledge of the inclusion and exclusion rules. Inclusion and exclusion rules define who can access forest resources and those who are not. It also states the group of people who should participate in forest management decision-making. The following statements from the respondents capture these results:

"We have been living as a community for a long time, and we share Forest resources. I do not know if there are any rules that govern access to these resources" (R25). "I do not know any inclusion and exclusion rules about Loita Forest" (R7).

However, the minority who explained that they knew the inclusion and exclusion rules stated that some people feared invading the forest resources. These two households commented that:

“They were allowed to access the resources” (R34). “Others fear accessing Forest resources because they might be punished” (R14).

Other than the customary rules that were used in the utilization of forest resources in Loita Forest, fines are administered to violators of these rules, with a cow being the mandatory fine, as put in words by the respondent:

"If anyone breaks the rules set by the Local leaders and forest officers concerning the use of

forest resources, fines are always administered. Because cattle are one of the main income sources in the region, a cow is a mandatory fine" (R7).

The Chief Laibon, Council of Elders, Locational Forest Committees, NGOs, and Narok County Government were identified as responsible for implementing the rules and monitoring Loita Forest. The responses from key informants and household interviews captured these findings:

"During meetings, rules about management and use of the forest are normally set and revised. These meetings are mostly attended by Chief Laibon, Chiefs and assistant chiefs and pastors" (AC2). "I am part of those who set rules on the management of Loita forest. I represent SORALO NGO group. The Narok County Government representatives are also part of the rule-making committee" (NGO2).

The research revealed that pivotal decision-making responsibilities regarding resource utilization within Loita Forest rested with several vital entities. These entities include the Chief Laibon, Council of Elders and Locational Forest Committees. The role of Non-Governmental Organizations (NGOs), and the Narok County Government in decision making is very minimal. Their roles encompassed determining resource allocation, usage protocols, and overall forest management strategies. The collaborative involvement of these diverse stakeholders underscores the intricate web of governance structures shaping the management of resources in the Loita Forest context.

3.4 How the CFA Forest Resources and Resources User's Boundaries Have Helped Indigenous People Assert their Rights in the Use of the Forest Resources

The research also underscored the importance of the governance system in Loita forest in helping the indigenous Loita Maasai to assert their rights in the access and management of the forest. The benefits drawn by the Loita Maasai from the Loita forest include grazing, building materials, herbal medicine, water catchment, ecotourism, fuel harvesting, cultural values, honey harvesting and farming to a limited extent. The responses from key informants captured these findings:

"As stipulated by rules set by Chief Laibon, KWS and Narok County government, forest resources should be well used. Members of the community are allowed to access resources such as grazing land in the forest, firewood and water" (LWA).

The forest acts were seen as a very important drought and dry-season safety net. Even for the community members living close to the forest, the desire to have the animals graze in the forest where the pastures are good all year-round is resisted. They graze their livestock based on the traditional wet and dry season grazing areas. R24 explained that:

"Although the forest is almost always green, during the rainy season, members only graze their livestock in their land. We only graze our cattle in the forest during semi-dry or dry seasons" (R24).

Residents are also allowed to individualize and fence small portions of grassland next to their homesteads known as lookeri (The lookeri are well recognized and respected among all Maasai communities) for use as enclosed grazing fields for calves and weakened livestock as put in words by the respondent:

"We divide our pieces of land around our homesteads into portions that are used to graze mostly calves and other cattle during wet season. When one land become short of grass, we move the cattle into the next portion of fenced land" (R27).

Only the Laibons are allowed to use certain sacred resources such as the Oltukai (*Phoenix reclinata*) which is used for cultural ceremonies such traditional rituals carried out within the forest, and require the use of limestone, which is found in very few parts of the forest. Conducting these ceremonies are carried out deep within the forest, for instance Enkitainoto Olorrip Olasar lolporror - the chosen spiritual leader of the new age group. It is only these age-group spiritual leaders who know where this special limestone is located within the forest, and the actual site where these ceremonies are conducted. The Loita Maasai community understands and respects their spiritual leaders, and the whole ceremony is greatly revered by all:

"The reason why cattle are not allowed to graze deep inside the forest is because they are used for conducting spiritual ceremonies. Only a few selected people are allowed to visit these places"

(R2). "Some of the key tools like limestone that are used to carry out rituals are located in the forest and few chosen leaders know its location" (R28).

The Loita Maasai also have a right to use the forest resources for construction and fencing. Most of the indigenous peoples' structures that may require the use of forest resources are often simple in nature and make use of mostly dry wood and twigs. In the context of the Loita Maasai the major structures are the traditional houses and the livestock enclosure fences and traditionally, it is the women who build the houses. A Maasai traditional house is a simple structure made up of entirely of wooden poles, and interwoven twigs or branches and smeared or cemented with cow dung. Specific species are preferred for the different parts of the building. The fence around the homestead and animal enclosure also uses branches of particular thorny bushes, but rarely tree trunks. The traditional way of fencing is done by piling up branches of thorny acacias and oleleshua (*Tarchonanthus camphoratus*) or, where thorny material is limited as in *Ilkerin*, by sticking oleleshua and olmisigiyioi (*Rhus natalensis*) into the ground. Other species used for dead fences include *Maytenus heterophylla* (olaimurunyai) and *Mystroxylon aethiopicum* (olodonganayioi).

Wood for such constructions is freely sourced from any part of the forest without having to obtain permission from official entities. Extraction of large quantities, especially of specific species, is however under strict control of the elders. Chief Laibon plays a key role in decision making regarding the extraction of large quantities [30].

Community members are also allowed to sustainably harvest herbal medicine within the forest. The community understands the diseases and illnesses that these herbal medicines treat with some used to flavor meat soup. Orkonyil (*Rhamnus prinoides*), Oleparmunyo (*Toddalia asiatica*), Olkiloriti (*Acacia nilotica*), Olamuriaki (*Carissa edulis*), Olngonguenyi (*Acacia kirkii*), Olmisigiyioi (*Rhus natalensis*), Olperelengo, Oloirien (*Olea europaea*), and Osokonoi (*Warburgia salutaris*) were identified as the most salient plants, with some reported to have more than one medicinal use. To continue having this access rights the results revealed the existence of three primary traditional conservation strategies used in the study area to protect medicinal plants. Sustainable harvesting is a technique used to harvest these plants without damaging them to ensure their availability in the future [31]. Secondly, the monitoring of these plants is seen as the collective responsibility of all the members of the community, meaning that everyone is responsible for protecting them:

"We value trees because they provide us with herbal medicine to treat almost all types of diseases that attack our people. Therefore, we watch out how we harvest these trees to allow for continuous growth. For example, only stems and not main roots are harvested" (R11). "We harvest herbal medicine from the plants and trees such as Orkonyil, Oloirien, Olkiloriti, Olmisigiyioi, Oleparmunyo and Osokonoi" (R19).

The customary rules associated with the use of the resources in the Loita Forest with regards to herbs are no cutting off of the main roots allowed, no one is allowed to remove the bark all-round the stem to allow for continuous growth and no one is allowed to cut down trees near water catchment area. In terms of building structures, the households are only allowed at the periphery to avoid collateral cutting down of trees with logging for commercial use being prohibited. The responses from household interviews captured these findings:

"There are traditional trees that are mostly used to extract herbs and medicine from. We are not allowed to cut the roots of these trees. Only stems are taken out to allow continuous growth" (R29). "We get building materials from the forest. However, our leaders understand that there is logging that can take place and therefore, cutting of trees is regulated" (R4).

One of the respondents elaborated those trees of cultural value e.g., the fig tree, locally known as *oreteti,* is preserved as it is used when blessing barren women. The respondent expounded that the olive tree, locally known as *oloirien,* is also preserved for use during the *orkiteng' loo lbaa* which is an initiation ceremony for first born sons as put in words by the respondent:

"We have specific trees used for specific functions in our community. Oreteti is used when blessing barren women while Oloirien is used during orkiteng' loo Ibaa. Therefore, no one is supposed to cut down these trees" (R16).

Ecotourism is another activity that happens within Loita Forest with customary rules dictating that any investor who wishes to establish a campsite or a visitor who wishes to visit the forest has to inform and agree with residents of that particular locality:

Table 6. Role of stakeholders in Loita Forest

NGO	Role
SORALO (This stands for the South Rift Association of Land Owners)	They work with the local community to monitor forest use.
Maasai Bee-Keeping Initiative	Promote sustainable bee-keeping within the community.
Friends of Loita Forest	Work with the local community to conserve the forest and help enforce the forest rules.
Walking with the Maasai	They help the Loita Maasai in promoting their traditional governance systems.
Kenya Wildlife Service (KWS)	They have their offices at Ewaso Nyiro town but occasionally conduct patrols at Loita forest.
County Government of Narok	They hold the forest in trust on behalf of the people of Loita.
The Kenya Water Towers Agency (KWTA)	The agency has fenced off several water sources in the forest to avoid destruction.
Kenya Forest Service (KFS)	Their role is limited in the management of Loita forest given that the forest is under the County Government of Narok and that nobody has an agreement with KFS to manage the forest, contrary to claims by some groups in Loita forest.

Table 7. Summary of sufficiency of laws and policies in Kenya that are applicable in the management and governance of Loita forest

Kenyan Law	How it has assisted in the management of Loita forest	Weaknesses	Strengths
Kenya Forest Act of 2005 (revised in 2016)	-It has prevented illegal logging. -Ensured water catchment areas are protected. -Regulation of land use and other resources including firewood and timber.	-Forest officers have less power to give fines and punishments to wrong doers -There have been unsuccessful attempts to establish CFAs	-Instilled fear on potential violators of forest rules
Environment Management and Coordination (Amendment) Act, 2015	-The County government, through Loita Ward Administration, participates in yearly meetings with the local community leaders and NGOs to discuss challenges faced in ensuring proper management of Loita Forest.	Enforcement is minimal as government agencies presence at Loita forest is limited	-It offers a framework for smooth investigation of crime cases that are committed. -It ensures responsibility from Forest Officers, Ward Administration community leaders and members in management of the forest.
Community Land Act, 2016	-The County government of Narok teams up with community leaders and members to ensure proper use of the Community land as classified by the Act	-Land not yet converted from trust land to community land as per the law by the time of research	-Strengthens community ownership of land -Controls land use and ensures proper governance structures for community resources
The Water Act, 2002	-There are no regional service boards to license water service providers in	-The Act is not sufficient since there are no water	-Supports community involvement -The Act supports the

Kenyan Law	How it has assisted in the management of Loita forest	Weaknesses	Strengths
	the area and thus the Act is not sufficient in management of the Forest	service providers in Loita	user-pay principle as proposed in the Forests Act -The Water Act encourages collaboration between local communities and water service providers to conserve and protect water catchment areas.
The Fisheries Act, Cap 378	-The Act is not applicable in Loita Forest since the data collected reported no fishing activities	N/A	N/A

"It is not a common thing but we sometimes receive requests from tourists that want to camp in the forest. For this to happen, they must receive approval from us residents" (R3). "Trees in the forest are a good source of herbal medicine and my grandmother gets most of them in the forest. We also get honey from the forest" (R31). "The forest offers some cultural benefits. For example rituals such as circumcision are done in the forest. Our leaders also go to the forest to offer sacrifices to our ancestors" (R18).

3.5 Role of Various Stakeholders in Establishing Resource Use and Users' Boundaries

The Kenya Forest Service has specifically delineated pertinent community forest association formation stakeholders. Notably, the Loita Maasai community has embraced their traditional rules to govern forest management. Their collaboration extends beyond traditional governance, encompassing cooperative efforts with governmental and non-governmental agencies. Table 6 provides the roles of stakeholders in establishing resource use and users' boundaries.

3.6 Laws and Policies in Kenya that are Applicable in the Management and Governance of Loita Forest

The study also tried to investigate and draw inferences from the laws, policies and instruments that are applicable in the management of Loita forest. The findings are provided in Table 7.

4. CONCLUSION

The findings of this study illuminate the proactive utilization of indigenous knowledge and traditional governance systems by the Loita Maasai and other communities within the Loita forest. These communities have astutely employed their age-old practices to establish and maintain a discipline system for the forest offenders. These practices, especially in areas like river sources that play a pivotal role in maintaining the forest ecosystem, have enabled the delineation of boundaries crucial for sustainable forest management. The incorporation of traditional approaches has not only contributed to boundary definition but has also fostered the preservation of the forest's ecological integrity. However, despite the involvement of the Narok County Government in portions of Loita forest management, the absence of well-defined and identifiable county-constructed boundaries remains to be noticed. Consequently, the onus of safeguarding critical regions, such as water catchment areas, largely falls upon community leaders. These leaders take it upon themselves to protect and preserve these vital areas within the Loita forest.

5. RECOMMENDATIONS

Drawing from the insights garnered through this study, several recommendations emerge that hold significant implications for the promotion of sustainable forest management:

1. *Physical Boundary Demarcation*: To preempt potential future encroachments, it is recommended to demarcate physical forest boundaries through beacons and cut lines. Such measures serve as visible markers, delineating the limits of the forest and warding off unwarranted encroachments.

2. *Protection of Water Sources and Wetlands*: Given the vital role of water and wetlands in sustaining the forest ecosystem, the study underscores the importance of erecting protective fences around these areas. Safeguarding these sensitive zones can significantly preserve the forest's ecological balance.
3. *Implement the Community Land Act of 2016:* This will protect community lands in Kenya including community living adjacent forests. This would mean the issuance of community land title deeds to safeguard the ownership of those lands.
4. *Consideration of Traditional participatory Forest Management Approaches:* Courts to take into consideration cultural and traditional attachments to forests when mediating disputes and forest conflicts.
5. *Water Accessibility Initiative:* Environmental organizations should initiate a project to install boreholes in the Loita area. The growing population has led to increased demand for water in the community, and Loita Forest serves as the sole water source. By providing accessible and affordable alternative water sources through boreholes, the pressure on the forest's water catchment areas can be relieved, thereby safeguarding the forest ecosystem.
6. *Documentation and Preservation of Indigenous Knowledge*: It is imperative to embark on a concerted effort to meticulously document and preserve the rich local knowledge of the Loita Maasai and other forest communities in Kenya. By safeguarding these insights, future generations can benefit from the wisdom derived from time-honored practices.
7. *Cultural Sensitization Campaigns*: Initiating comprehensive sensitization campaigns becomes crucial in educating local communities about the imperative of preserving their cultural heritage. These campaigns should also emphasize transmitting these cultural values to succeeding generations, fostering a harmonious blend of tradition and modernity.
8. *Recognition of Traditional Governance Systems:* Acknowledging the importance of traditional governance systems within the hierarchical framework of community forest management is pivotal. Integrating these systems into management strategies can ensure a holistic approach that values indigenous wisdom and contemporary practices.
9. *Enhanced Government Involvement:* The Narok County government should play a more active role in enforcing forest resource regulations outlined in relevant Acts and policies. This involves deploying additional forest officers and establishing a dedicated forest officers' camp for continuous forest monitoring. This proactive approach will aid in curbing illegal activities such as logging and charcoal production within the forest.

CONSENT AND ETHICAL APPROVAL

The study was conducted under the Graduate School of Agriculture and Environmental Sciences. The Confidentiality of the participants was adhered to when participants signed the consent form after being explained the nature and purpose of the study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. KFS. Participatory Forest Management Guidelines. Nairobi: KFS; 2015a.
2. FAO. State of the world's forests: Forests and Agriculture-Land Use Challenges and Opportunities. Rome; 2016.
3. Ostrom E. Governing the Commons: The Evolution of Institutions for Collective Action. Cambridge University Press, Cambridge, UK; 1990.
4. Bose P, Dijk VH. Dryland forests management and social diversity in Africa and Asia. Springer; 2016.
5. McDermott, M. H. (2000). Boundaries and pathways: Indigenous identity, ancestral domain, and forest use in Palawan, the Philippines. University of California, Berkeley.
6. Friedman RS, Rhodes JR, Dean AJ, Law EA, Santika T, Budiharta S, et al. Analyzing procedural equity in government-led community-based forest management. Ecology and Society. 2020; 25(3).
7. Mawa C, Babweteera F, Tabuti JRS, Tumusiime DM. Changes in vegetation

characteristics following a decade of community forest management in mid-western Uganda. International Forestry Review. 2020;22(3):323-338.
8. Rotich B, Makindi S, Esilaba M. Communities attitudes and perceptions towards the status, use and management of Kapolet Forest Reserve in Kenya. International Journal of Biodiversity and Conservation. 2020;12(4):363-374.
9. McGinnis M, Ostrom E. Linking Local and Global Commons, Harvard Center for International Affairs, Cambridge, Massachusetts; April 23-25, 1992.
10. Nyagwalla Otieno J, Bellotto V, Esho LS, Van den Broeck P. Conserving the Sacred: Socially Innovative Efforts in the Loita Enaimina Enkiyio Forest in Kenya. Land. 2023;12(9):1706.
11. Ming'ate FLM, Bollig M. Local rules and their enforcement in the Arabuko-Sokoke Forest Reserve co-management arrangement in Kenya. Journal of East African Natural History. 2016;105(1): 1-19.
12. Government of Kenya. The Forest Act of 2005. Nairobi: The Government Printer; 2005.
13. Musyoki JK, Ming'ate FLM, Muriithi JK. Factors Determining Household Membership to Community Forest Association for Participation in Management of Upper Imenti Forest, Meru County, Kenya. Open Access Library Journal. 2022;9(10):1-18.
14. Mogoi J, Obonyo E, Ongugo P, Oeba V, Mwangi E. Communities, Property Rights and Forest Decentralization in Kenya – Early Lessons from Participatory Forest Management. Conserv. Soc. 2012; 10:182–294.
15. Ongugo RA, Osumba PA, Tuzo PM. Traditional Forest Use and Institutional Change: Case Study of Loita Community Forest, Narok South District, Kenya. Paper presented at the 13th Biennial Conference of the International Association for the Study of the Commons (IASC) in Hyderabad, India; 2011.
16. Toulmin C, Quan J. (Eds.) Evolving Land Rights, Policy and Tenure in Africa, DFID/IIED/NRI, London 2000.
17. Mbuvi MTE, Kungu JB. A transforming traditional community-based forest management: The case of Loita community forest, Kenya. Heliyon. 2021; 7(6).
18. Ming'ate FLM, Rennie HG, Memon A. NGOs Come and Go, but Business Continues: Lessons from Co-management Institutional Arrangements for Governance of the Arabuko-Sokoke Forest Reserve in Kenya, International Journal of Sustainable Development & World Ecology; 2014.
DOI: 10.1080/13504509.2014.968237
19. Kariuki PM, Njoka JT, Saitabau CL, Saitabau HS. Forest governance, livelihoods and resilience: the case of Loita forest (Entime e Naimina enkiyio), Narok County, Kenya. Dryland Forests: Management and Social Diversity in Africa and Asia. 2016;117-138.
20. Riamit SK. Indigenous people and the Naimina Enkiyio forest in Southern Kenya: A case study, W.V. Alangui, G. Subido, R. Tinda (Eds.), Indigenous Peoples, Forests and REDD Plus: Sustaining and Enhancing Forests through Traditional Resources, Tebtebba Foundation. 2010;1-58.
21. Obare, L Obare. Forest User Needs, Gender and Geographic Information Systems: an Integrative Approach to Managing the forest of the Lost Child. Master's Thesis, McGill University. 2003; 137,
Accessed on 23rd November 2012.
22. Lesorogol C. Land Privatization and Pastoralist Well-being in Kenya. Development and Change. 2008;39(2): 309-31.
23. Lester S. An introduction to phenomenological research. Stan Lester Developments, Taunton; 1999.
Available:http://www.sld.demon.co.uk/resmethy.pdf
24. Longurst R. Interviews: In-Depth, Semi-Structured. International Encyclopedia of Human Geography; 2009.
25. Bernard HR. Social Research Methods: Qualitative and Quantitative Approaches (1st ed.). New York: Sage; 2012.
26. Mbuvi MT, Musyoki JK, Ongugo PO. Equity Mechanisms in traditional forest management Systems: A case study of Loita forest in Kenya. Journal of Sustainable Forestry. 2015;34(4):380-405.
27. García AK. Exploring the 'layeredness' of recurring natural resource conflicts: The role of Loita Maasai leadership in the Naimina Enkiyio Forest conflicts in Kenya. Land Use Policy. 2017; 65:66-77.

28. KFS. Forest Law Enforcement and Governance in Kenya. A paper prepared for the East African Community-led regional process in the framework of the Ministerial Declaration, Yaoundé, Cameroon, October 16, 2003, on the Africa Forest Law Enforcement and Governance (AFLEG); 2007.
29. Blackman A, Corral L, Lima ES, Asner GP. Titling indigenous communities protects forests in the Peruvian Amazon. Proceedings of the National Academy of Sciences. 2017;114(16):4123-4128.
30. Maundu P, Berger D, Ole Saitabau C, Nasieku J, Kipelian M, Mathenge S, Höft R. Ethnobotany of the Loita Maasai. People and plants working paper. 2001;8.
31. Nankaya J, Nampushi J, Petenya S, Balslev H. Ethnomedicinal plants of the Loita Maasai of Kenya. Environment, Development and Sustainability. 2020; 22:2569-2589

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/107552