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SUSTAINABLE APPROACHES FOR COMMUNITY INVOLVEMENT IN THE CONSERVATION AND MANAGEMENT OF DRYLAND FOREST AND THEIR BIODIVERSITY, A CASE OF KIJEGE FOREST, THARAKA NITHI COUNTY, KENYA

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ABSTRACT

Community involvement is central in management and conservation of forests. Adjacent communities depend on these forests for livelihood and cultural values. Dryland forests are among the vital ecosystems in the environment and they face degradation due to undervaluation by surrounding communities even though they supply a range of important resources. This study aimed at determining sustainable approaches for community involvement in management and conservation of Kijege forest and its biodiversity. Specifically, the study determined the importance and values of Kijege forest to community, the role of community involvement in management, and sustainable approaches for community involvement in conservation and management of Kijege forests and its biodiversity. Interviews were conducted with the KFS officials, village elders, local community and other relevant leaders. The results revealed that, although 90% of the respondents depended on the forest for their livelihoods, especially for supply of wood fuel, and pasture during dry seasons, only 6.7% have ever, or are being involved in management of the forest. From the findings, it is clear that the level of involvement of community members is very low, hence the study outlines three key recommendations to improve community involvement including: formation of Community Forest Association, capacity building of the community members, and formulation of a Forest management plan to foresee the sustainable involvement of the formed CFAs for better conservation and management of Kijege Forest and its biodiversity.

Keywords: Sustainable approaches, Dryland forest, Conservation, Management, Communities, Involvement.

1. INTRODUCTION

Dryland forest resources are key contributors to development and wellbeing of rural communities as they provide both direct and indirect services, and constitute a rich biodiversity, many of which are highly adapted to dryland ecology. Almost a billion poor people rely on forest resources as their main source of livelihood. As in Latin America, Asia, and Africa, where forest resources and biodiversity products contribute significantly to livelihoods of rural households (Paul, 2014; Davies, et al, 2012).

Drylands constitute 41 percent of the global land area and support more than half of the world's livestock and host 27 percent of the world's forests and woodlands with some of the most fragile and threatened ecosystems on the planet, including over one quarter of global biodiversity hotspots and many threatened and endemic species. They also support 35 percent of global hotspot areas and world heritage sites (FAO, 2020; FAO, 2019a; World bank, 2019a.). Dryland

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forests occupy up to 11 percent of the global forests area with nearly two billion people globally, most of whom are from low-income countries, depending on the forests and pastures for their food and livelihoods (Koutroulis,2019; van der Esch, 2017).

In Africa dryland forests covers up to 43% of the continent and about 320 million people inhabit and depend on these areas for their needs. These forests are important for rural and urban peoples' livelihood diversification, food security and fodder for livestock and human health care. (FAO, 2021)

Most benefits from dryland forests are not easy to price hence are taken for granted making these forests face degradation from various natural and anthropogenic causes, weak governance. Agricultural and urban expansion, unsustainable agriculture and grazing practices, fires and unsustainable tree felling and harvest of forest products also pose a threat to the forest resources and its biodiversity. (Atmadja et al, 2019)

Strict forest management interventions may interfere with traditional forest uses like grazing, fodder collection and firewood harvest. Larger scale and industrial interventions may lead to even more serious competition for land. Therefore, the need to formulate sustainable approaches in involving the community in conservation and management of these forests and their biodiversity to help improve efficiency in the management of the resources by the users themselves. With the aim of improving the management of natural forests by devolving some authorities held under state ownership to local community, this is essential for addressing environmental, economic and social goals in the rural communities. Since local communities are more comparatively advantaged over government regarding conservation cost, monitoring and familiarity with local conditions and situations (Tabot, et.al, 2020).

The study therefore aimed at establishing sustainable approaches for community involvement in management and conservation of Kijege forest and its biodiversity. This is despite the existence of forest guards, there has been a surge in unsustainable exploitation and consequent destruction of the forest from local community activities.

2. METHODOLOGY

2.1 The Study Area

The study was carried out in Kijege forest in Tharaka Nithi County. A hilly dryland forest on the southern part of the county. Located between a Latitude of 0.27º Sand Longitude of 37.9º W. The forest is boarded by three main sub-locations, that is; Chiakariga, Kamanyaki and Gituma. Simple random sampling was applied to select the respondents from each sub-location. A total of 60 local community members and an addition of 8 key informant formed the respondents. The study involved establishing sustainable involvement approaches using feedback from the local communities, other stakeholders, guidedobservations and documented literature. The main indicators that were tested in this study were; importance of the forests, level of community involvement in forest management and opportunities for community involvement.

3.RESULTS

3.1 Importance and values of Kijege forest.

The major benefits and uses of the forest included; livestock grazing (54.2%), Fuelwood for cooking, heating and sale (37.3%), water (5.1%), fruits and honey fourth (1.7%).

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The study also found out that most of the community members depended on the forest for their livelihood, 90% agreed that they depend on the forest, while 10% did not directly depend on the forest. Of the 90%; 1.7% depended on the forest for wood, firewood and fruits; 1.7% for firewood, timber and pasture; 1.7% for timber and water; 3.3% for timber and firewood, 3.3% for water only, 3.3 for pasture only; 5.0% depended on the forest solely for firewood; 5.0% pasture and timber; 6.7% depended on the forest for timber, firewood and water, another 6.7% for pasture and water. Up to 16.7% depended on Kijege for water and firewood, 16.7% for firewood, water and pasture, and 18.3% depended on the forest solely for firewood and pasture.

Table 1: Forest resources obtained Kijege forest

Forest Resource	Frequency	Percent
Firewood	3	5.0
Pasture	2	3.3
Water	2	3.3
Firewood and Pasture	11	18.3
Pasture and Water	4	6.7
Pasture and Timber	3	5.0
Water and Firewood	10	16.7
Water and Timber	1	1.7
Timber and Firewood	2	3.3
Timber, Firewood and Water	4	6.7
Firewood, Water and Pasture	10	16.7
Firewood, Timber and Pasture	1	1.7
Wood curving, Firewood and Fruits	1	1.7
Total	**54**	**90.0**

According to the study, most of the resources were harvested during the dry season or when needed; 80% grazed within the forest during dry seasons, while 5% at any time. 1.7% made hay when needed, 1.7% at any time, while 8.3% only during the dry seasons. 68.3% of the respondents collected woodduring dry season, 15.0% when needed and 5.0% at any time. 35% harvested herbs whenever needed, 1.7%during rainy seasons, while 8.3% harvested herbs any time. Fruits were obtained from the forest by 35% of the respondents when needed, 6.7% at any time, and 1.7% during harvesting. 41.7% accessed hives only during harvesting.

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Table 2: Period of forest access for resources

	Anytime	Dry Season	Rainy Season	When Needed	Harvesting
Grazing	5%	80%	-	-	-
Hay Making	1.7%	8.3%	-	1.7%	-
Fuelwood Collection	5%	68.3%	15%	-	-
Medicinal plants	8.3%	-	1.7%	35%	-
Collection of fruits	6.7%	-	-	35%	1.7%
Bee keeping	-	-	-	-	41.7%
Other uses (water)	5%	-	-	6.7%	-

3.2 Community involvement in forest management and conservation.

The study found out that only 6.3% of the respondents have ever taken part in any decision-making process involving the forest, while the remaining 93.7% have never been part of any decision-making process.

Though the level of involvement differed with locations. In Gituma, as pointed out by the forest department, level of engagement had been above average, because despite the absence of the forest guards, the community has been reporting on fires, and other destructive uses in the forest. This was supported by the members of Karithi Self Help Group (SHG), who were involved in forest protection. The case was different for Chiakariga and Kamanyaki, informants from these locations had no involvement in the forest conservation, and it was pointed out by the forest department that mobilization had been difficult, and getting to organize the community into committees proved fruitless. Though one informant from Kamanyaki was in the process of registering a community forest association with the aim of conserving the forest while maximizing its benefits to the community.

Key informants' interviews pointed out that in the locations where the community was being involved, the involvement was through patrols and guarding the forest, and maintenance of the forest boundary which was key in protection, reporting damage and unauthorized activities in the forest.

3.3 Opportunities for community involvement.

The study assessed the community views on the need for conserving the forest, almost all the respondents were of the idea that the forest needs to be conserved, with 98.3% saying yes, and only 1.7% being of the opinion that the forest does not need any conservation. The respondents' willingness to be involved in planning, management and conservation of the forest indicated that majority (88.3%) of the respondents were very willing to be involved, with only 11.7% not being opting for future involvement. The respondents wanted to involved through the following ways; be allowed to harvest trees and wood products from the forest, farm within the forest boundaries, offer village patrols and security within the forest to prevent and report unpermitted entry, be trained in conservation of the forest; be involved and consulted in decision-making processes

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concerning the forest, take part in tree planting and in conservation of the water catchment areas within the forest.

Table 3: Proposed ways for involvement in forest use and management

Ways of Involvement	Frequency	Percentage
Forest Products Harvesting (Timber, deadwood, medicine)	14	23.3%
Patrols and security within the forest	22	36.7%
Consultation and decision making	12	20.0%
Tree planting and forest conservation	2	3.3%
Farming in the forest boundaries	8	13.3%
Training on importance of forest conservation	10	16.7%
Conservation of water catchment areas	2	3.3%
Allowed to graze in the forest	3	5.0%

The community was also of the opinion that with their involvement there would be an improvement in the state and condition of the forest, with 90% saying their involvement will improve the forest state, and 10% saying involving the community will destroy the forest. Majority of respondents cited proximity to the forest as the main reason that will enhance conservation through enhanced security and reporting; promotion of ownership, regulated access, adherence to laws and regulations; appreciation of local indigenous knowledge and improvement of the forest condition for tourism activities as reasons for improvement of the forest condition with involvement of community. Those of the contrary opinion cited destruction of the forest by community members due to unsustainable extraction and different personal interest as the main reasons for non-improvement of the forest condition. The study also assessed the social capital in the community, and only 17 respondents (28.3%) were members of common interest groups, while the remaining 43 (71.7%) were not members of any group. Only two of the eight groups listed had an objective geared towards conservation and management of the forest and its resources, with only 9 members within the sampled respondents.

4. DISCUSSION

Kijege forest, like many other dryland forests is key in supplying important resources for livelihood sustainability among community members(Demel, 2020). Kijege forest proved to be very essential as a grazing land, source of firewood, a water catchment area, wildlife habitat, climate modifier and a supplier various resources including fuelwood (both deadwood, and charcoal), fruits (like *Tamarindus indica*, and baobab fruits), timber, and grass for thatching. Especially during the dry seasons, when conditions are not very favorable for both livestock and the communities. It was also pointed out the catchment area within the forest is key for water supplythroughout the seasons, but very essential during dry season.

Appreciating the trade-off between demand and supply of dryland forest resources by local communities, and understanding the difference in spatial and temporal context of these services is key in informing sustainable development and management decision in drylands.Yongping, et. al (2020) and Duo (2021). These importance inform how much effort the community is willing

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to put in management and conservation the forest and its biodiversity. The respondents have shown more than above average need to conserve the forest and willingness to be involved in the management and conservation.

The level of community involvement in decision making, planning and management of Kijege forest was very low. More than half of the respondents felt that the community was not being adequately involved in management. It was only in Gituma location, where the community with support from the forest management, had interest groups involved with conservation of the forest, but were only engaged in patrols and reports on destructive forest use. Indicating that despite the existence of the group, their role in management is still very low and only play a little part in conservation.

The level of community involvement in forest management and decision making has a positive significant relationship with the performance of forest management (Paulo, 2014). The low involvement in Kijege forest has resulted to lack of incorporation of local indigenous knowledge and manpower in forest protection, as the community does not feel the sense of ownership and consequently an increase in illegal access, lack of cooperation from the communities, destruction and unsustainable exploitation of forest resources by the few who patrol the forest, lack of proper communication channels making it difficult to monitor the conservation activities, and varying interest groups resulting to lack of harmony in forest conservation goals.

The community members were ready and very willing to be involved, and they outlined various ways for their involvement. Indicating the various identified opportunities for potential involvement opportunities key in livelihood improvement and also conservation of the forest.

Through these various involvement opportunities, community participation in forest management will improve the forest state (Mugambi, et.al 2020). The community appreciated the fact that they were closer to the forest which will allow them offer effective surveillance and first-hand monitoring of the forest activities, through patrols and surveillance there will be regulated access and utilization of the forest. Involvement and participation will enhance community sense of ownership to the forest and increase appreciation and conservation effortsamong the communities. Training and awareness creation will enhance participation, understanding and adherence to set laws and regulations for management and conservation of the forest. The community also pointed out that they have inhabited Kijege hills for a longer period and were very conversant with the forest,and they would contribute a lot with local knowledge to enhance conservation. Involvement would also improve the forest condition for amenity use (CIFOR, 2014., Matti, 2015).

To enhance community involvement, as pointed out by key informants; education and training of community on importance of conservation; multisector and stakeholder involvement in forest conservation; donations and grants to fund conservation activities; formation of community forest association and preparation of a forest management plan for Kijege forest, will be key in ensuring capacity and outlined engagement plan for sustainable involvement of the community in management and conservation of the forest.

5. CONCLUSION

Kijege community depend on the forest for majority of goods and services and because of this most of the community members are for conservation of the forest and are willing to take part in

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the planning and management of the forest and its biodiversity at large. But from the study, the level of involvement of the community is very low, and very few community members are involved in management and conservation of the forest, though most are aware of the various strategies that can be put in place to enhance their involvement and improve the state of the forest. Therefore, to ensure sustainable involvement of the community in conservation and management of Kijege forest and its biodiversity, theirs is need to formation and registration of a Community Forest Association, training and capacity building community members on conservation and management, and preparation of a forest management plan for Kijege forest.

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