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The Role of Forest Resource and Resource Users' Boundaries in Improving the Livelihoods of Communities Adjacent to Arabuko-Sokoke Forest Reserve, Kenya

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Abstract: The role of forest resource and resource users' boundaries in improving the livelihood of forest adjacent communities has been of great concern in current literature. Studies have shown that there is likelihood that forest adjacent communities can draw significant benefits from the forest resource use and users' boundaries. But is not clear the extent to which this can happen. Thus this study focuses on examining the role of forest resource and resource users' boundaries in improving the livelihood of forest adjacent communities in Kenya using the Arabuko-Sokoke Forest Reserve as a case study. To fill this gap the study used a sample size of 220 households, including 100 households participating in the Arabuko-Sokoke forest management arrangement, 90 non-participating households in the Arabuko-Sokoke forest management arrangement and 30 key informants. It then used both primary and secondary sources of data. Primary data collection involved administering semi-structured questionnaires to the participating and non-participating forest management households and key informants, while the secondary data involved a review of relevant and reliable materials on forest resource management, browsing from both internet sources as well as from books, daily newspapers, and published articles. Data analysis was done through coding responses from the different interview categories namely the participating and non-participating households and key informants and grouping them into similar themes in order to answer the study objectives. It is concluded in the study that successful governance of Common Pool Resources requires well established forest resource use and users' boundaries, and that well established boundaries for resource use and resource users' can improve community livelihood. It is recommended that, governments should develop forest resource use and users' boundaries to enhance forest conservation and improved livelihoods of forest dependent households.

Keywords: Forest Resource and Resource Users', Boundaries, Livelihood, Forest Adjacent Communities, Arabuko-Sokoke Forest Reserve, Kenya

1. Introduction

Forest resources are considered to be important in enhancing the livelihood of forest dependent communities, and even may influence the decision of forest dependent households to join a Community Forest Association (CFA) due to the benefits that are expected to be reaped on the basis of being a member [17, 18]. Ostrom's first design principles for successful Common Pool Resource (CPR) management, states that boundaries of the resource and community or resource users' have to be clearly defined to ensure sustained CPR use [20]. Also forest resource and resource users' boundaries are important in increasing tourism due to initiatives such as eco-tourism in order to stem encroachment and forest destruction, which have attracted private investors and local communities for alternative use of the forests [18]. For instance growth of restaurants and hotels, which have promoted the development and creation of employment for the forest adjacent communities [23, 22].

In addition, several other scholars have supported these finding that, instead of communities adjacent to the forest being blamed for destroying forests through logging, charcoal burning and illegal cultivation, with the establishment of the forest resource and forest users' boundaries, they benefit through employment opportunities and other benefits that are related to the forest activities [10, 23].

Also forest resource use boundaries have supported training activities for community forest scouts [10]. The boundaries on some forest management initiatives including beekeeping, sale of non-wood products e.g. mushrooms and the production of seedlings, among others, have clearly shown that forests resource use boundaries are very crucial for enhancing the livelihoods of the forest dependent community members [12, 13].

Moreover, the successful management of forest resource use boundaries are beneficial to the community through the provision of food, rainfall attraction and medicine [19, 7]. Forest resource use boundaries make the vulnerable and marginalized groups dependent on the forests to access honey, fruits, medicinal plants, firewood and charcoal for income generation and survival [2]. The forest resource use boundaries are also beneficial to the community as well as the government as they reduce human-animal conflict [5, 14, 15], and minimize human activities such as degradation within the forests [3, 21]. Forest resources and resource users' boundaries promote partnerships and coordination between communities and forest landowners and foster forest stewardship and economic development [15].

The protection of the forests resources and users boundaries stimulates the areas for water catchment and thus promotes the existence of rivers thus improving fishing activities which provide households with food, employment and income which spurs the growth of other economic activities in the areas, such as the growth of market centers and eventually improving the forest adjacent communities living [11, 16]. Also a study conducted in Ethiopia established that forest resource use boundaries help to increase the ecological services of the forest, water resource management, biodiversity conservation, carbon stock, greenery enhancement and air quality management [6].

As argued from above, forest resource and resource users' boundaries play an important role in the improvement of the forest adjacent communities livelihoods, but there is need to understand the extent to which the livelihood of the forest dependent communities in ASFR have improved as a result of the forest and resource users' boundaries. Thus the aim of this paper is to understand if clearly defined boundaries of forest resources and resource users' can lead to improved livelihoods of the forest adjacent communities using the ASFR as a case study.

2. Methodology

Study Area

The study area Arabuko-Sokoke Forest reserve is a 420 km^2 forest in Kenya; the largest and most intact coastal forest in East Africa [8, 13]. More precisely, Arabuko-Sokoke Forest Reserve is in Kilifi County about 110 km North of Mombasa at latitude of 3° 20' S and a longitude of 39° 50' E [1, 8]. The forest is a lowland dry forest in the Kenyan former Coast Province, starting at sea level with the mangroves at the Mida Creek with 54 villages surrounding the forest reserve [12] (Figure 1).

The case study used a qualitative approach to address its objective by using a descriptive approach in presenting its empirical data [9, 4]. The respondents in the study included participating communities in participatory forest management (PFM) and non-participating communities in participatory forest management (NPFM) including the key informants from, Kenya Forest Service, Kenya Wildlife Service, National Museum of Kenya, village elders, chiefs and leaders from the business community. On the other hand, those who were not taking part in the management of the forest resources were categorized as non-participating in forest management (NPFM). A sample size of 220 respondents was used for this study. This included 100 households participating in the Arabuko-Sokoke Forest Reserve PFM, 90 non-PFM households in PFM and 30 key informants which included; 5 Kenya Forest Service officials, 8 Kenya Wildlife Service officials, 3 officials from National Museums of Kenya, 5 officials from KEFRI, 4 Village elders, 1 Chief and 4 leaders from business community.

This study utilized both primary and secondary data collection procedures. Primary data collection involved administering semi-structured questionnaires to the participating and non-participating forest management households and key informants [4]. Secondary data collection involved a review of relevant and reliable materials on forest resource management, browsing from both internet sources as well as from books, daily newspapers, and published articles.

Data analysis was done through coding respondents from the different interview categories namely the participating and non-participating households and key informants. For instance, households living adjacent to the Arabuko-Sokoke Forest Reserve were coded as PH 01…PH100, Households not participating were coded as HPH…90, the KFS was codes as KFS 1…KFS5, and Kenya Wildlife Service officials were coded as KWS1…KWS8. Officials from the National Museums of Kenya were coded as NMK1….NMK3. Moreover, Kenya Forestry Research Institute was coded as KEFRI1….KEFRI5. Furthermore, village elders were coded as VE. The rangers were coded between VE….VE4. Further, the chief was coded as CF1 since only one was interviewed. Lastly, leaders from the business community were coded as LBC1…4.

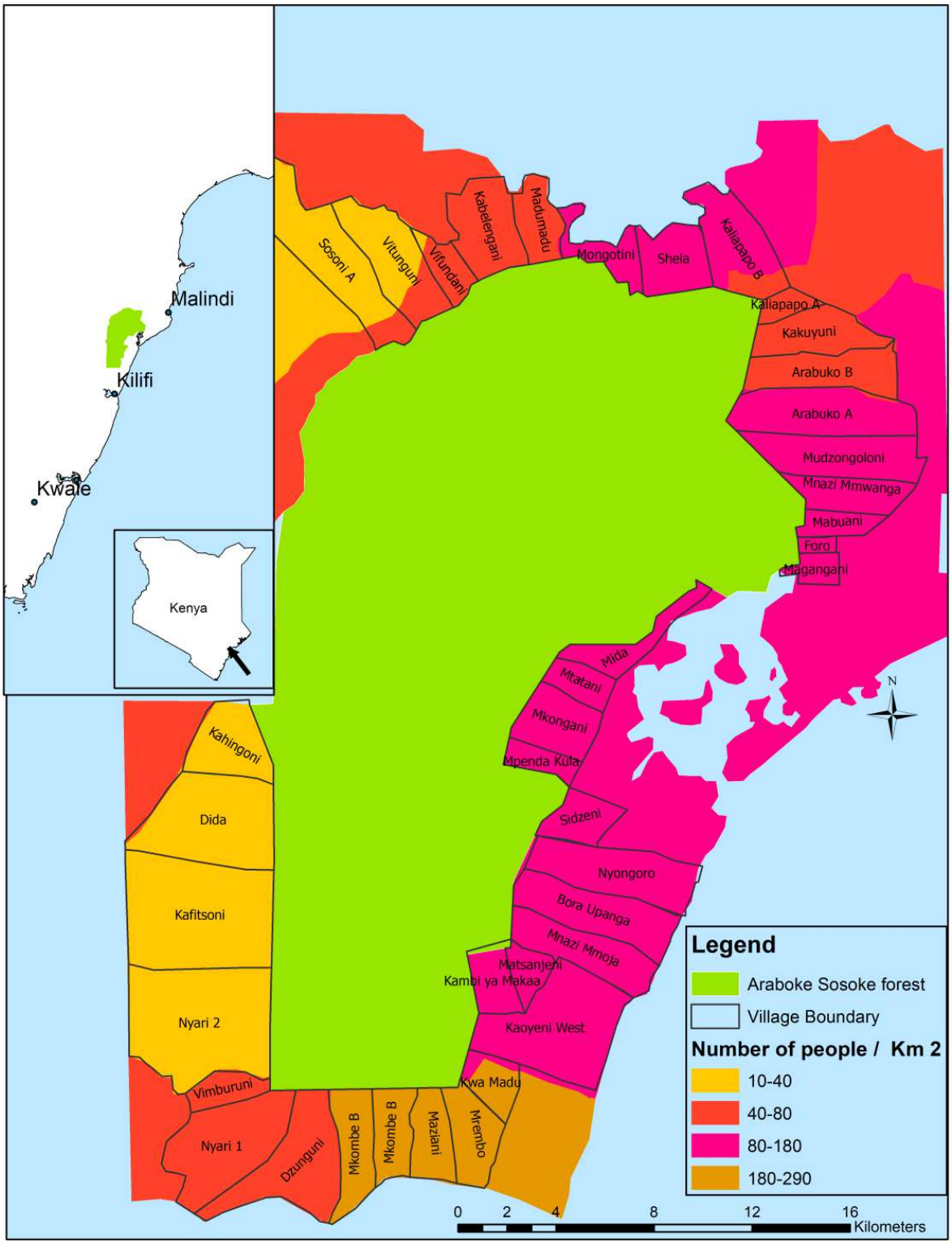

Figure 1. *Study area location and surrounding villages Source.*

3. Results and Discussion

The extent to which the livelihoods of the forest adjacent communities have improved as a result of the forest resources use and resources users' boundaries.

The objective of this paper was to assess the role of forest resource and users' boundaries in improving the livelihood of forest adjacent communities in Arabuko-Sokoke Forest Reserve in Kenya. As argued by some scholars clearly defined boundaries of forest resource and resource users' boundaries may improve livelihoods of forest adjacent communities [14, 20]. The study found that forest adjacent communities' livelihoods are supported by the forest

resource use and users' boundaries. For instance the boundaries for beekeeping, collection of the firewood and herbs have been clearly spelt out for the communities e.g. where to collect those resources, who should collect and what quantities (PH3).

The boundaries have also attracted the development of tourism in ASFR given the fact that tourists come to view the rich biodiversity (VE3), thus leading to the growth of restaurants and hotels where the tourist and the tourist guides take lunch and other meals thus enhancing forest adjacent community's livelihood (PH 17). Moreover, members collect cassava from the forest and also harvest grass to feed their livestock (LBC 1).

Another form of livelihood from the forest is that community members are allowed to keep snakes for tourist attraction and cut building poles from the forest (PH37), and keep butterflies in the forest which they take to the Kenya National Museum for sale to overseas. This enables the community members to have some source of income thus providing them with sources of livelihood (PH73).

Even though the non-participating households in PFM complained that their livelihoods was not as good as that of the households involved in forest governance, resource use and resource users boundaries were found to have improved their livelihoods to some extent (NPH3 and NPH 38). The Study confirmed that the non-PFM Communities do farming of pepper and cassava on their farms due to the fact that the resource use and users boundaries have led to falling of rainfall in their area that supports community farming (NPH13, NPH 38 and NPH 69).

Also, it became apparent from both participating and non-participating communities, that conservation of the forest had been enhanced due to the forest resource use and users' boundaries (LBC, PH37, VE, PH 14, PH11, CF, VE and LBC1).

When both the participating and non-participating household were asked to explain if their livelihoods had improved due to the resource use and users' boundaries. The households participating in PFM reported the way their livelihoods had improved as follows:

1. Life has changed tremendously after participating in the management of the forest (PH1).
2. Members have been empowered to participate in numerous activities to generate income, such as beekeeping and collecting of butterflies as a result of participation in the forest management (PH5).
3. Most of the community members were very poor and used to survive on taking porridge in most cases, but that has drastically changed after the establishment of the boundaries (PH1).
4. The establishment of the boundaries has enabled people to access resources without fear (PH74).
5. The chief also confirmed this finding: members had nothing in the past, but after being engaged in forest management, they have access to numerous forest resources (CF).
6. The poverty level has gone down by 35% as a result of the establishment of the boundaries (PH51).
7. The village elders reported that: people used to steal the resources from the forest and they were heavily punished when found in the forest (VE 4).
8. The local business community explained: most community members used to go to work for others for their survival, however, now they have income that has enhanced their livelihood positively (LBC 1).
9. In the case of the non-participating households, they also confirmed that: boundaries have promoted sufficient rainfall in the area and now the community can plant crops such as cassava and pepper and these have sustained their livelihood (NPH4 and NPH9) [19].
10. These findings were also confirmed by the key informants:
    a. Since the boundaries were established, the locals are able to plough and harvest without fear (NMK 2).
    b. Most of the community members living near the forest relied on the forest for firewood, timber among other things though they harvested unsustainably (KEFRI 1).
    c. The poor depended mostly in poaching both trees and wild animals which was uncoordinated system of living before introducing the user groups (KFS 3).
    d. They [households] did not benefit from the resources like firewood collection initially and there was a very serious conflict between community and the forest conservators from the government side (KEFRI 3) [12, 13].

The vulnerable and marginalized groups rely on the forests for honey, fruits, medicinal plants, firewood and charcoal for income generation and survival [2]. Also, forest resource users' boundaries are beneficial to the community as well as the government [5]. The study also notes that the development of boundaries between forests and human habitation areas is significant in reducing human-animal conflict [5]. In addition, the development of forest resource use boundaries is critical in minimizing human activities such as degradation within the forests [3].

4. Conclusions and Recommendations

The objective of this paper was to understand the roles of resource and users' boundaries in improving the livelihood of forest adjacent communities in ASFR. It can be concluded that successful governance of common pool resources requires well established forest resource use and users' boundaries. Also it can be concluded that well established boundaries of resource use and resource users' can improve forest adjacent community livelihoods. It is recommended that, governments should develop forest resource use and users boundaries to enhance forest conservation and improved livelihoods of forest adjacent households.

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