Community-Led Participatory Forest Monitoring for the Restoration of Kibale National Park (KNP) in Western Uganda

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Authors' contributions

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

Original Research Article

ABSTRACT

This paper presents findings from a study on Participatory Forest Monitoring (PFM) and Natural Forest Restoration (NFR) in Uganda, a case of communities bordering Kibale National Park (KNP), Uganda was conducted among 394 respondents from June to August 2024. The study adopted a cross-sectional research design to determine participatory Forest Monitoring Activities and Practices. A questionnaire was designed and distributed to collect responses and data was analysed using MS Excel. Findings reveal that more males (55.58%) participated in PFM compared

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to 44.42 females, most females were involved in raising seedlings for restoration of KNP. The majority (83.76%) of them were farmers. Over 46.09% of the households were employed by the Uganda Wildlife Authority Forests Absorbing Carbon Emission (UWA-FACE) project and living within 1 kilometre of the park boundary. Tree planting through reforestation of degraded and reclaimed areas was the main PFM activity at 51%. Participation in PFM was through signing a Memorandum of Understanding. Only 24% of the households signed an MOU with UWA-FACE to participate in PFM programmes. Of the 394 respondents surveyed, 79.2% strongly agreed that they engaged in selecting tree species to raise for restoration activities to improve the management of Kibale National Park (M=1.88, SD = 1.97). Almost half (54.4%) of the communities bordering Kibale National Park (KNP) work with UWA rangers during forest monitoring patrols in restored areas (M=2.25, SD = 1.95). PFM can restore natural forests. There is a need to increase support for community projects by UWA-FACE.

1. INTRODUCTION

Participatory Forest monitoring is a key strategy for natural resource conservation and management that has been adopted in many countries. It recognizes the need to address social and environmental concerns collectively, as one affects the other. Theoretically, the participatory approach would lead to a "win-win" result: environmental sustainability and social development. However, its on-site implementation encounters constraints and yields unsuccessful outcomes [1]. Providing benefits and incentives for local communities is also problematic and calls for improvement [2].

Worldwide forest governance has adopted participatory approaches in the belief that this strategy would lead to environmental sustainability while also accounting for social concerns [2]. Previous studies concluded that long-standing strict and exclusionary conservation caused pressure on local communities such as displacement and restrictions on the use of resources. Meanwhile, participatory management, a more people-centred approach, would, in theory, produce "win-win" results: a strategy for resource protection and conservation and for delivering benefits to local communities [3].

Local communities, as the cornerstone of the participatory approach, play a vital role in the success of this management strategy, hence strengthening their participation is highly important. However, local people's participation is contingent on the incentives and benefits they will receive [2]. In contrast, receiving no benefits means the social objective of participatory forest management is neglected, consequently

discouraging local people from participating. The studies of Cao et al. [4] stressed that sudden and untimely discontinuation of benefits could cause local people to revert to their former unsustainable practices in forest resource utilization. However, it is important to understand that a perpetual supply of benefits for people is irrational and inefficient. The outcome of participation should function as a means to improve people's capabilities to achieve self-reliance and self-governance and thus, realize sustainability.

The same situation can be observed in the Philippines, where a community-based approach serves as the main strategy for managing forests [5]. Hence, this study was designed to contribute to improving natural resource management through strengthening local people's participation. This study examined social capital as an incentive and impact of people's participation in mangrove restoration projects and its implications for their livelihoods, while most studies consider social capital as an enabling condition for participation in collective actions for common pool resources [6].

For this study, the research problems were framed based on two propositions. First, there is a cause-and-effect relationship between the environmental and social components, therefore resource management strategies should cover both environmental and social aspects to achieve sustainability. Second, the benefits for local people who participate in resource management motivate them to continue engaging in participatory management. In particular, two research questions were addressed in this study. First, what are the effects of people's participation on social capital? Second, what are

the implications of changes in social capital to people's livelihoods? Building social capital may have a greater impact compared to other tangible incentives, in terms of improving people's overall well-being, as its development also enhances the accumulation of other forms of capital [7]. From the perspective of the poor, increased access to and ownership of assets provides better means and more alternatives to get resources for meeting people's needs and supporting subsistence. These conditions are favourable for environmental protection, as they diminish people's dependency on natural resources, which has been identified as a major driver of deforestation and forest degradation [8].

Participatory monitoring for natural forest restoration ensures that forests are restored for higher carbon intake as the forest develops into high conservation ecosystems (PMMP-Participatory Monitoring and Management Partnership, 2015). Participatory monitoring and forest restoration have been implemented since 1994 around Kibale National Park [9]. About 4,195 hectares since 1995 (170 hectares during this monitoring period) of Kibale Forest, the restored areas have developed into a closed canopy forest, providing a habitat for important forest species which include 13 primate species and several ungulates [10]. Most of the restoration efforts are taking place in the Mainaro sector which was established as part of the wider Kibale National Park landscape that holds a High Conservation Value Forest. The number of tree species in the planted forests and the regeneration of climax species have both increased with increased monitoring efforts that involve communities. Reed et al. [11] observe that participatory processes that engage multiple stakeholders are more likely to lead to success than top-down approaches.

This study utilizes tenets of the planned, multifunctional, and multi-stakeholder theory as applied by Chazdon et al. [12] to enhance forest-landscape restoration (FLR) to restore forests and create awareness about the value of natural forest regeneration to enhance the many goods and services forests provide to people [12]. The purpose of this study was to document community-led participatory forest monitoring activities and practices for the restoration of Kibale National Park (KNP) in Western Uganda.

2. METHODS AND MATERIALS

The study was conducted in 15 parishes surrounding Kibale National Park, Uganda, focusing on participatory forest monitoring (PFM) and natural forest restoration (NFR). A cross-sectional design with both qualitative and quantitative methods was employed, utilizing household questionnaires, interviews, and photography to gather data. A sample of 400 households was randomly selected from a population of 5,731 households using Slovin's formula, and interviews were conducted with 394 households. Data were collected through a mixed-methods approach, with questionnaires capturing both closed and open-ended responses, and analyzed using descriptive and correlational analysis with SPSS software. Photography and observation complemented data collection. Reliability and validity were ensured by pre-testing the questionnaire and conducting semi-structured interviews. Ethical considerations included informed consent, confidentiality, and anonymity of participants. Data were coded, cleaned, and processed using Excel and SPSS, with findings presented in graphical and descriptive forms. The study was guided by ethical protocols, including approvals from relevant authorities and safeguarding research materials.

3. RESULTS

3.1 Participatory Forest Monitoring Activities and Practices by Local Communities for Forest Restoration around KNP

Of those households with members that have ever been employed by the UWA-Face project, the majority were from households living nearer to the park as shown in Fig. 1. This shows that the UWA-Face project gives priority to the immediate park neighbours while giving jobs.
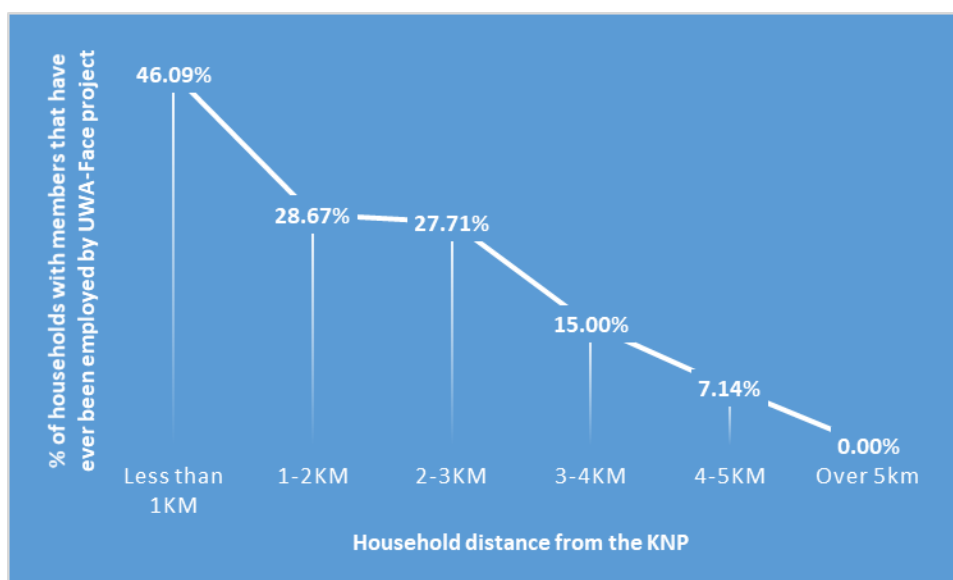
Fig. 1. Households employed by UWA-FACE per distance range from Kibale National Park

3.2 Participatory Forest Monitoring Activities Communities are Employed around KNP

Among the activities for which different household members were/are employed by the UWA-FACE Program, planting and tendering tree seedlings in the reforestation area in KNP ranked most with 51% while patrolling as fire patrolmen/women ranked least with 10% as shown in Fig. 2. The 12% who said had been employed for "Other" activities other than those listed mentioned activities like; Opening trails, coordinating community groups, primate monitoring, cooking, working as headman and ranger, building and being porter.

It should be noted that the UWA-FACE project also purchases and distributes seedlings of indigenous tree species which are distributed among community members to plant their woodlots. For instance, in 2019, eight thousand (8,000) were distributed to community members in Bigodi, Kamwenge District, the survival rate was 60%, and some seedlings were lost to challenges such as aggressive weeds. From observations made, after the management of weeds, the height of the tree has currently reached a height of 1.5 metres in height, in the same year ten thousand (10,000) tree seedlings of Prunus africana were distributed to a member of the community in Kanyante Village, Kasenda Kabarole District, the tree seedling survival rate was at 75% and the trees are beyond 3 metres in height average.

As postulated by Valenzuela et al. (2020) participatory forest management (PFM) is a practical and effective strategy for sustainable forest management, though Valenzuela emphasizes PFM in situations where land tenure is not securely settled, for Kibale National Park (KNP), the PFM efforts were focused on restoring a natural forest previously degraded by communities while working with communities, indeed, the restoration efforts in KNP have yielded results and garnered support from international certification organisations such as the Forest Stewardship Council and Soil Association. For effective forest restoration, local communities, as the cornerstone of participatory management, should be provided with incentives to facilitate their participation and active role. Incentivizing communities in nursery establishment and management (Plate 1) with seedlings bought by UWA to restore degraded forest patches is critical to successful PFM.

3.3 Community Engagement Activities under PFM

Conservation awareness was the most pronounced topic with 44% followed by problem animal management/HWC resolution/HWC compensation regulation with 33% as shown in Fig. 2. The other activities/topics included; livelihoods, personal safety, species management, tree planting, and guiding. Participation in PFM is by households signing a memorandum of understanding with UWA-FACE.

Plate 1. A community-managed Indigenous tree seedlings nursery, Kamwenge District, (Source: Author, 2024)

Plate 2. Uganda Green Heart Tree *(Warbugia Ugandensis)* planted by a PFM member in the Mainaro Sector of KNP
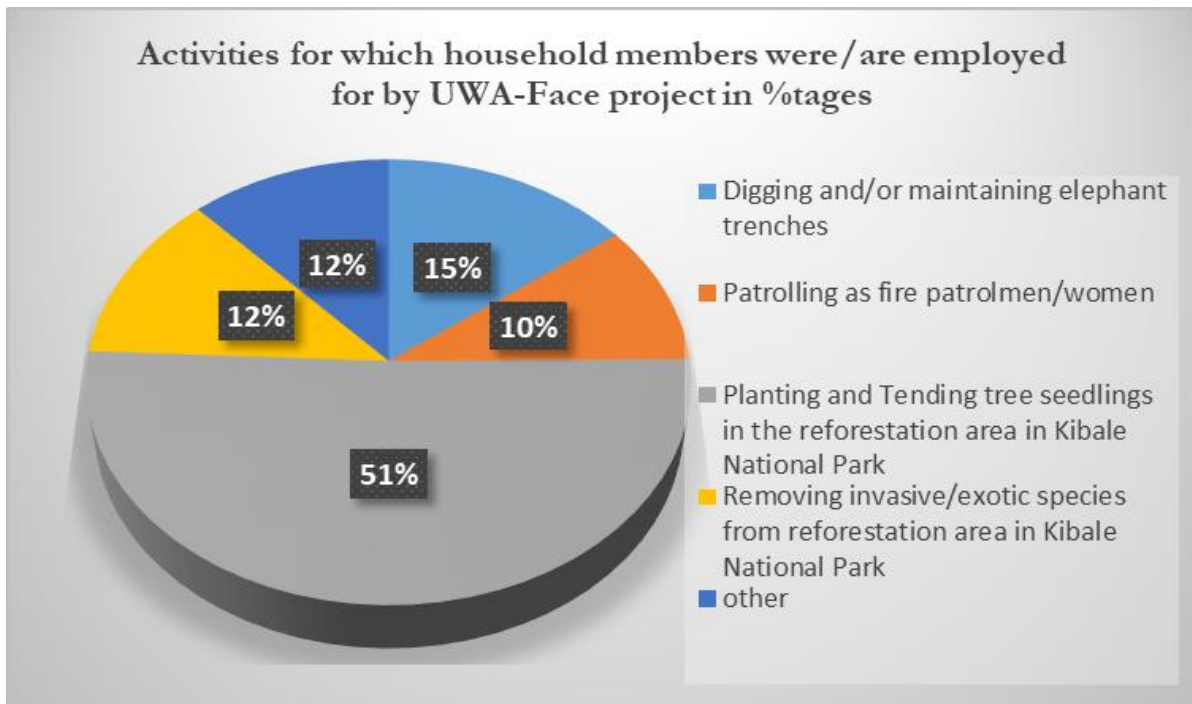
Fig. 2. Activities for which household members were/are employed by UWA-FACE

Plate 3. A fully restored natural forest, Bujongobe Parish, Mainaro Sector KNP

Plate 4. An area cleared by communities of invasive species in preparation for tree planting
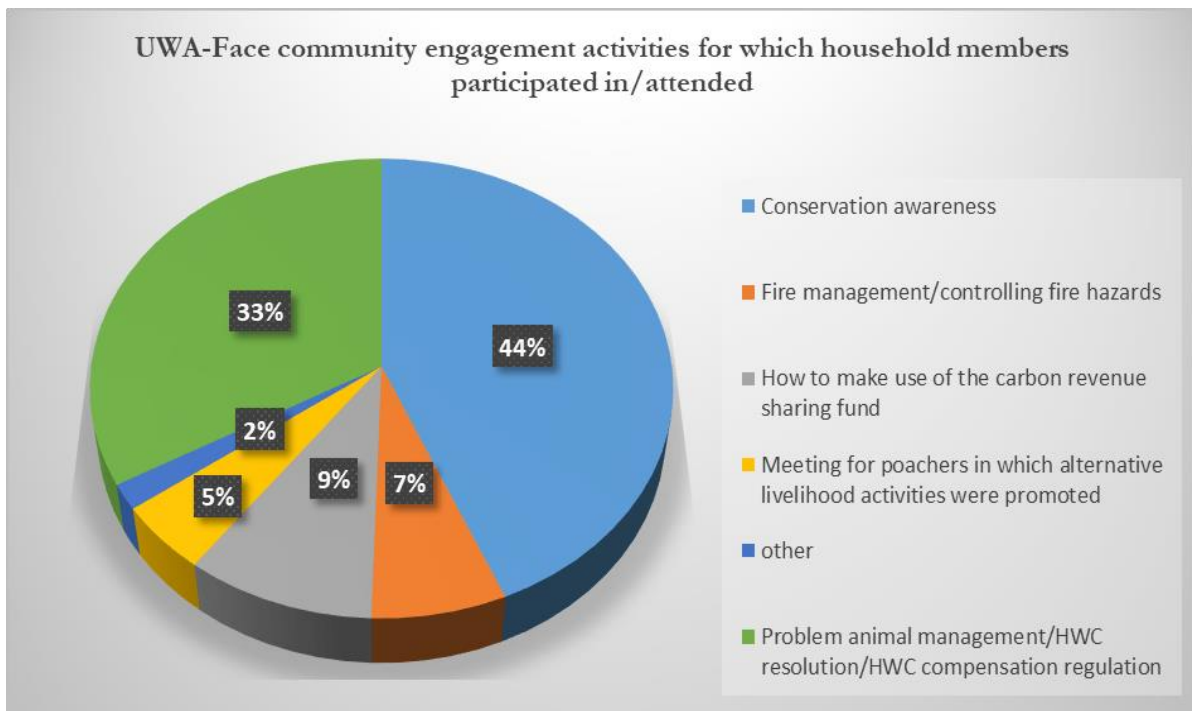

Fig. 3. Activities for community engagement under PFM

Plate 5. An agroforestry farm with a mixture of coffee and Terminalia superba (Umbrella Tree in Kyabakwerere Parish, Kamwenge District

3.4 Specific PFM Project Activities Implemented around KNP

According to the survey, most (37.8%) of respondents were supported in livelihood projects such as tree nursery management as shown in Table 1. Supporting tree planting and reforestation efforts accounted for 11.75%. Other activities mentioned were trail maintenance, carbon credit training, health services, scholarships, supporting communities during funerals, beekeeping, skilling locals, fire management, working closely with communities, agroforestry, promoting tourism, and revenue sharing.

Plate 6. A community-managed Indigenous tree nursery of Brideria Micrantha – The Coastal Golden Plant (Bujongobe Ward, Bigodi Kamwenge District

Table 1. Specific PFM Activities around Kibale National Park

Specific PFM Project Activities	%
Supporting livelihoods	37.80%
Tree planting/Reforestation efforts	11.75%
Resource Access	8.60%
Protecting wildlife/Ranger patrols	7.30%
Employing local community members	7.10%
Conservation awareness	3.90%
Constructing community infrastructure	3.70%
Others	19.9%

4. DISCUSSION

A portion of the tropical rainforest in Kibale National Park became encroached and thus degenerated in the 1970s due to increased human pressure and weak government policies. Face the Future has been working with the Uganda Wildlife Authority (UWA) on restoring the degenerated part of Kibale forest since 1994. Since then, more than 5 million indigenous trees have been planted, restoring 6,700 hectares of forest. In addition, FACE the Future has embarked on implementing carbon trading which is a market-based system aimed at reducing greenhouse gases that contribute to climate change. Besides UWA-Face has been addressing any potential negative environmental and socio-economic impacts of the restored area and partly the park, while channelling the benefits from carbon credits to help communities neighbouring the park mainly through supporting income-generating activities, mitigating human-wildlife conflicts, particularly crop-raiding, supporting needy and vulnerable community groups, and skilling local community members through training. Further, PFM activities have provided over 300 part-time and full-time jobs.

Participatory Forest Management (PFM) has played a critical role in the management of Kibale National Park (KNP), as it actively involves local communities in conservation efforts aimed at reversing forest degradation. Since 1993, initiatives led by the Uganda Wildlife Authority (UWA), in partnership with organizations such as Climate Impact Partners (CIP) and Face the Future Foundation (FACE), have aimed to restore 10,000 hectares of degraded land within the park by planting indigenous trees and supporting natural regeneration efforts [13]. These initiatives have fostered PFM practices to engage local communities in forest management, improving biodiversity conservation while offering social and economic benefits.

Communities neighbouring Kibale National Park, especially from the districts of Kamwenge, Kyenjojo, Bunyangabu, and Kabarole, are integral to the monitoring and restoration of the park's forest ecosystems. One of the primary PFM activities is tree planting, where local households and organized community groups participate in reforestation programs by planting indigenous tree species such as mahogany, Prunus Africana, and Albizia species. These efforts focus on enhancing carbon sequestration, mitigating climate change, and providing economic incentives for communities through programs that generate carbon credits [14].

Another key practice is forest patrol and monitoring. Trained local community members, referred to as "Community Resource Persons" (CRPs), collaborate with UWA staff to monitor illegal activities such as logging, poaching, and encroachment into protected areas. These patrols have significantly reduced illegal deforestation in areas adjacent to the park, as CRPs act as the first line of defence and maintain vigilance through regular forest visits [15]. Involving locals in monitoring also fosters a sense of ownership, enhancing compliance with conservation regulations and reducing conflicts between park authorities and communities.

Sustainable agricultural practices are also promoted as part of participatory restoration. Agroforestry, which integrates tree planting with farming, helps reduce community pressure on forest resources. By adopting agroforestry, local farmers gain alternative sources of income and food, reducing their reliance on forest products such as firewood and timber [16]. This practice contributes to forest regeneration while enhancing community livelihoods, aligning with the principles of sustainable forest management (SFM).

Community-based monitoring of forest regeneration is another crucial aspect of PFM. Local communities are trained to track and report on the growth and survival rates of planted trees, assess biodiversity levels, and identify areas that require further restoration interventions. These monitoring activities help maintain transparency and accountability in the implementation of forest restoration projects and ensure the sustainability of conservation initiatives [17].

In addition, environmental education and awareness campaigns have been a cornerstone of PFM activities. UWA and partner organizations, such as FACE, have conducted

educational programs in local schools and communities to raise awareness about the importance of forest conservation. These campaigns emphasize the ecological and economic benefits of forest restoration, motivating communities to actively engage in protecting Kibale National Park's biodiversity [13].

In summary, participatory forest monitoring in Kibale National Park has enhanced natural forest restoration through collaborative tree planting, forest patrols, sustainable agriculture, community-based monitoring, and environmental education. These initiatives, supported by partnerships between UWA, local communities, and international organizations, have contributed to the regeneration of degraded forest areas, while also offering social and economic benefits to the communities involved. As forest restoration efforts continue, it is crucial to maintain community engagement and address challenges such as illegal activities, land-use conflicts, and limited resources to ensure the long-term success of these initiatives.

5. CONCLUSION AND POLICY IMPLICATIONS

Most of the communities involved in PFM around Kibale National are located within 1 kilometre from the park boundary. PFM activities are supported by the UWA-FACE programme. Communities are participating in PFM activities such as planting indigenous trees, patrolling of restored areas and agroforestry initiatives. Livelihood projects are also supported under PFM after signing a Memorandum of Understanding. PFM activities, practices and projects can improve income at the household level through employment, supporting community projects and investing in community projects for PFM recipients. Income from PFM activities, projects, programmes and related initiatives helps to directly address household needs such as school fees and food.

CONSENT

As per international standards or university standards, participants' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standards or university standards written ethical approval has been collected and preserved by the author(s).

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during the writing or editing of this manuscript.

COMPETING INTERESTS

The authors have declared that no competing interests exist.

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