Community Involvement in Participatory Forest Monitoring around Kibale National Park of Western Uganda

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Original Research Article

ABSTRACT

A study on Participatory Forest Monitoring (PFM) and Natural Forest Restoration (NFR) was carried out in the communities residing around the Kibale National Park (KNP), Uganda. The research was conducted from June to August 2024 among 394 respondents, adopting a cross-sectional research design to explore mechanisms for scaling up Participatory Forest Monitoring. The results revealed that participation in PFM improved income at the household level directly addressing household needs especially income for school fees and other needs by 79.9% (r=0.799, P<0.05). Enhancing

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PFM activities and practices, the Uganda Wildlife Authority Forest Absorbing Carbon Emission (UWA-FACE) project is encouraged to consider electric fencing as an addition to existing PFM benefits (23.40%), increase the remuneration of a daily wage for PFM recipients (28.6%) and PFM could consider compensating farmers who lose livelihoods (29.9%). The findings indicated that PFM can effectively restore natural forests in the study area and enhance income and community livelihoods. There is a need to invest more funds in PFM activities.

1. INTRODUCTION

Participatory Forest Monitoring is an approach that involves local communities in the oversight and management of forest resources [1]. PFM empowers local stakeholders to play an active role in monitoring forest health, managing resources sustainably, and enforcing conservation laws. Community involvement is critical in scaling PFM [2]. PFM relies on the active involvement of local communities who often have the most intimate knowledge of the forest environment. By including them in monitoring activities, the approach leverages local knowledge and encourages greater accountability [3]. Notably, PFM leads to more effective forest management. For instance, the involvement of local communities in monitoring activities has been associated with reduced illegal logging and improved forest conditions (Nguyen et al., 2020). Despite its benefits, PFM faces challenges such as inadequate funding, lack of technical skills among local communities, and conflicts of interest between conservation goals and local livelihoods as highlighted by Gasheye, D. [4]. Loss of forest ecosystems affects livelihoods Kusuro et al., [5], and PFM enhances livelihoods [6].

Participatory forest monitoring leads to natural forest restoration (NFR) which involves the process of restoring degraded or deforested lands to their natural state [6]. This approach focuses on enabling natural processes to regenerate forests rather than relying solely on reforestation or afforestation techniques [7]. NFR aims to enhance biodiversity, improve ecosystem services, and restore ecological balance. For example, restoring native forests can improve soil fertility, water retention, and habitat connectivity [7]. Similar to PFM, NFR also benefits from local community engagement. Communities often participate in activities such as planting trees, managing invasive species, and protecting restoration sites [8]. Uganda has seen some success with NFR projects. Initiatives like the National Forestry Authority's (NFA) forest restoration programs have demonstrated positive outcomes in terms of both ecological recovery and community benefits (Kagume et al., 2022).

Integrating PFM and NFR can enhance the effectiveness of forest conservation strategies [9]. By combining community engagement with ecological restoration efforts, Uganda can improve forest management outcomes and ensure sustainable use of forest resources. Effective policy frameworks and institutional support are crucial for the success of both PFM and NFR. Policies that support community involvement and provide adequate resources can significantly enhance these initiatives [10]. Ongoing research and the adoption of innovative techniques can help address the challenges faced in PFM and NFR. For instance, incorporating technology such as remote sensing and GIS can improve monitoring and management practices [11].

A study executed by Muluneh [6] reported that PFM enhances the forest cover, plantation volumes, number of trees, and forest regeneration capacity. PFM increases seedling and sapling populations and improves forest ecosystem services which are beneficial to man. PFM has a positive and progressive contribution to forest resource management, income diversification, and poverty alleviation where it is practised. The only challenge with PFM could be unequal benefit sharing, a weak institutional capacity and support, and a lack of strong coordination which can affect community participation in forest monitoring [6].

1.1 Participatory Forest Monitoring Practices

Participatory Forest Monitoring serves as the major approach towards the reconciliation of biodiversity conservation and community livelihood needs. Gradually, one-third of the world's forests are now under Participatory Forest Monitoring (PFM), with 35 African countries having such approaches [12]. It is

increasingly recognized as a potentially effective way of maintaining forests, especially in the Global South [13]. PFM is regarded as having the capacity to transform degraded forests into regulated and productive resources while lessening the load on the state and rural poverty. It as a result has drawn significant financing from international organisations and national governments [14].

Some studies show success in forest maintenance and livelihood improvement, suggesting the approach is sustainable [12]. Seeing its development, several countries have attempted to coin and label it using various names, such as community-based forest conservation (CBFC), community-based natural forest resource management (CBNFRM), community-based forest management (CBFM), social forestry/forest management (SFM), sustainable forest management (SFM), collective/joint forest management (CFM), community forestry (CF), as well as participatory forest management [13]. Participation is the central element in all of them and a complex issue and the interplay of various actors and factors are involved in ensuring its application

properly. It implies people participating, sharing, or acting [15]. The purpose of this study was to explore strategies for scaling community involvement in participatory forest monitoring around Kibale National Park in western Uganda.

1.2 Conceptual Framework on Participatory Forest Monitoring and Natural Forest Restoration in Uganda

Participatory Forest Monitoring (PFM) is a critical component in the management and preservation of Uganda's forest ecosystems. Both approaches seek to involve local communities in the stewardship of forest resources, aiming to enhance biodiversity, combat deforestation, and improve livelihoods. Participatory forest monitoring enhances natural forest restoration [16]. This framework suggests that participatory forest monitoring leads to natural forest restoration and enhances income at the household level. However, this is possible with enabling policies and guidelines (Fig. 1). PFM reduces illegal activities and promotes support for conservation programmes [17].
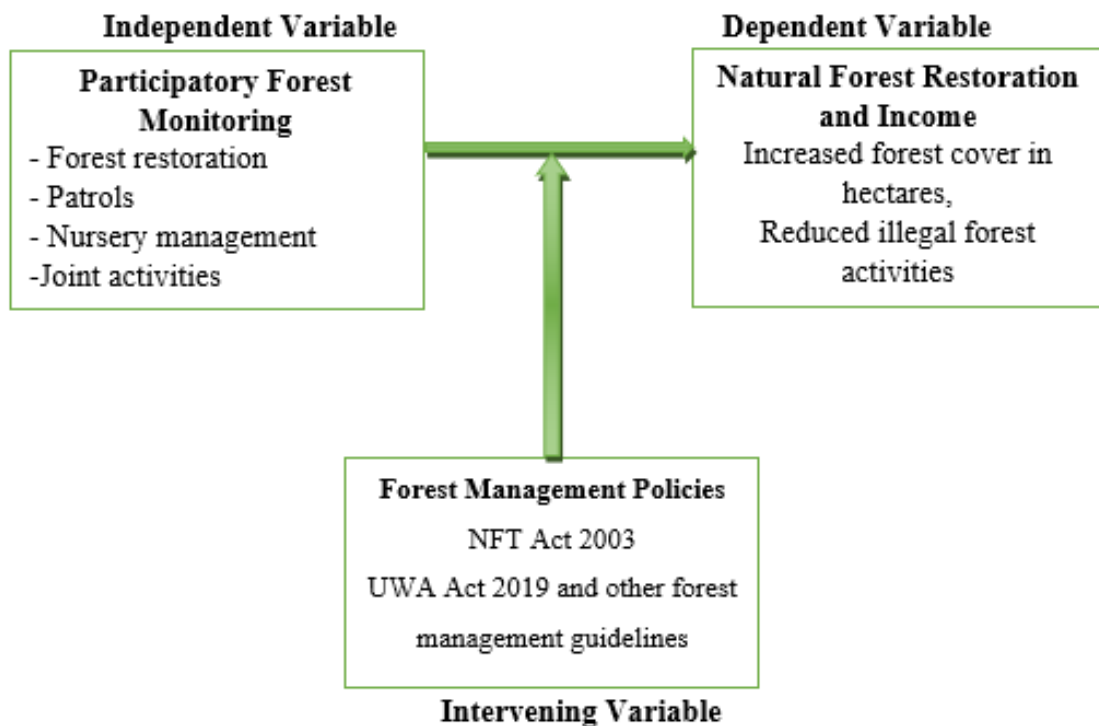

Fig. 1. Participatory Forest Monitoring and Natural Forest Restoration in Uganda
(Source: Author)

2. MATERIALS AND METHODS

The study was conducted across 15 parishes surrounding Kibale National Park in Uganda, focusing on Participatory Forest Monitoring (PFM) and Natural Forest Restoration (NFR). A cross-sectional design employing both qualitative and quantitative methods was utilized. Data were collected through household questionnaires, interviews, and informal communication.

A random sample of 400 households was selected from a population of 5,731, using Slovin's formula, and interviews were successfully conducted with 394 households. The semi-structured questionnaire involved both closed and open-ended questions in the questionnaires. Data analysis was carried out using descriptive and correlational techniques with SPSS software, while photography and observation provided additional insights.

The reliability and validity of the data were ensured by pre-testing the questionnaire and conducting semi-structured interviews. Ethical considerations were rigorously adhered to, including obtaining informed consent, maintaining confidentiality, and ensuring the anonymity of participants. Data were coded, cleaned, and processed using the spreadsheet (MS EXCEL) and SPSS, with findings presented in graphical and descriptive forms. The study followed strict ethical protocols, including obtaining approvals from relevant authorities and securing research materials.

3. RESULTS

3.1 Mechanisms for Scaling up Participatory Forest Monitoring Around KNP

3.1.1 Creating more awareness about PFM benefits

The results showed that PFM households receive higher income levels in comparison with other households, in addition, the study finds that the participation in community forest management by households may reduce poverty by improving income at 79.9% (r=0.799, P<0.05). Communities around Kibale National Park were actively involved in PFM activities, projects and programmes. This resulted in an improvement of income at the household level among 394 respondents directly addressing household needs especially income for school fees and other needs by 79.9% (r=0.799, P<0.05) as

illustrated in Table 3. Creating awareness about PFM could bring more households on board and help further restoration efforts.

3.2 Overall Performance of PFM around Kibale National Park in Uganda

During the study, PFM recipients were asked to rate overall, the performance of PFM programmes, projects and activities were rated "Good" with 40% as shown in Fig. 2.

3.3 Participatory Forest Monitoring (PFM) Activities, Projects and Programmes for Enhancement

Participatory forest monitoring reduces Human-Wildlife Conflicts (HWC). An increase in PFM activities could reduce HWC though, it remains the most pressing and urgent issue amongst communities neighbouring KNP. Future projects should include more robust HWC mitigation interventions. Notably, 10.7% stated none, meaning those households were satisfied with all the activities of the Uganda Wildlife Authority Forests Absorbing Carbon Emissions (UWA-FACE) project. The 17.9% others include; agroforestry, quality of machines distributed, following up with ex-poachers, maintaining fire lines, making immediate park neighbours a priority, resource access, revenue sharing, following up with interventions, extending projects to other villagers, equality for services, and tree planting (Table 1).

3.4 Suggested Additional Activities for the Uganda Wildlife Authority-FACE Programme

Besides supporting livelihood projects, installing an electric fence around the Kibale Forest National Park (KNP) was the most suggested to be added to the UWA-Face program with 23.4% and this could only communicate still the urgency with which HWC/crop raiding needs to be addressed and a big concern among majority households around KNP. Construction of health centres, strengthening HWC mitigation measures and compensation were also pronounced in the suggestions as shown in Table 2. Other activities that were suggested include; constructing a vocational training institute, promoting community-based tourism, poultry farming, marketing for local products, integrating conservation education in schools, and conservation awareness. Notably, 29.9% of the respondents suggested an increase in compensation fees for crops lost to be added to the UWA-FACE program Table 2.

Table 1. Proposed Areas for Improvement Regarding Participatory Forest Management

Project activities that need to be improved	Percentage (%)
HWC monitoring in restored areas	37.90%
Compensation for time spent planting	28.6%
Supporting livelihoods	6.20%
Protecting wildlife/Ranger patrols	4.50%
Conservation awareness	3.80%
Employing local community members	3.80%
Elephant trench maintenance	3.30%
Working closely with communities	2.90%
Constructing community infrastructure	2.60%
Others	6.20%
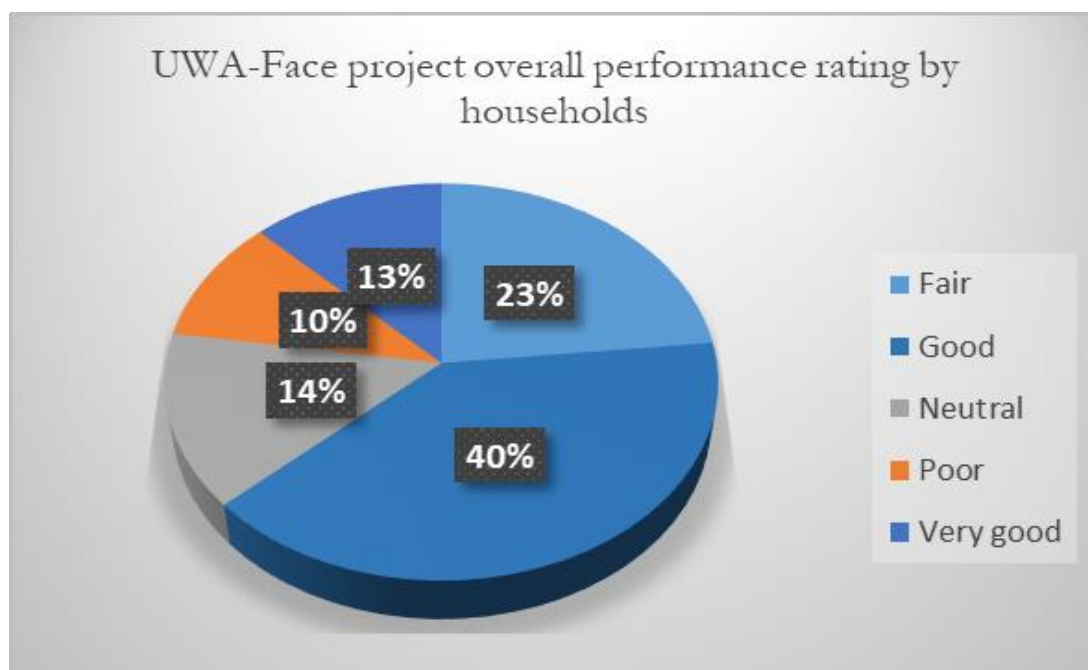
Fig. 2. Rating of UWA-Face project, programmes and activities

Table 2. Suggested activities to be added to the UWA-Face programme

Activities suggested for addition to the UWA-Face program.	%
Electric fence	23.4%
Construct health centers	8.4%
Compensation for livelihoods lost due to crop foraging	29.9%
Strengthen HWC mitigation measures	6.5%
Employing more local community members in conservation	5.6%
Road maintenance/Construction	4.4%
Scholarships for school-going children	4.4%
Water supply	4.0%
Protecting wildlife/Ranger patrols	3.8%
Revenue sharing	2.7%
Tree planting in communities	2.5%
Work closely with communities	2.5%
Construct schools	2.1%

Table 3. Correlational statistics on PFM Engagement and Household Income at the household level

		Are you involved in PFM activities?	Does PFM address your household needs (income)?
Are you involved in PFM activities?	Correlation Coefficient	1.000	.799**
	Sig. (2-tailed)	.000	.000
	N	394	394
Does PFM address your household needs (income)?	Correlation Coefficient	.799**	1.000
	Sig. (2-tailed)	.000	.000
	N	394	394

Source: Primary Survey 2024

4. DISCUSSION

4.1 Scaling Community Involvement in Participatory Forest Monitoring Around Kibale National Park, Western Uganda

Participatory Forest Monitoring (PFM) offers a framework to involve these communities in forest management, aiming to enhance conservation outcomes while addressing local needs. The Importance of community involvement is critical as local communities possess extensive knowledge about their environment, which is invaluable for effective forest management. Integrating this knowledge into PFM can enhance monitoring accuracy and foster community commitment to conservation [18]. Community involvement also helps build trust between park authorities and local populations, which is crucial for the success of conservation initiatives (Mugisha et al., 2017).

Community-based approaches can provide sustainable livelihoods through activities such as eco-tourism and sustainable agriculture. This reduces reliance on illegal activities like poaching and logging, which are significant threats to forest health [6]. Furthermore, when communities benefit economically from conservation efforts, their support for protecting the forest is strengthened [19]. Effective PFM requires equipping local communities with the skills and knowledge needed for forest monitoring. Training programs should cover forest ecology, monitoring techniques, and data management. By building local capacity, communities can actively participate in and benefit from conservation efforts [9]. Establishing CFM groups can facilitate collaboration between local communities and conservation agencies. These groups can serve as platforms for dialogue, decision-making, and joint management of forest resources (Blomley et al., 2018). Successful examples include the CFM groups around Kibale National Park, which have played a role in monitoring and protecting forest resources [9].

Using available technological tools such as Geographical Information Systems and Remote Sensing can enhance the monitoring capabilities of local communities. These tools can provide real-time data on forest cover changes, detect illegal activities, and help in planning conservation strategies [11]. Training communities to use these technologies can further strengthen their involvement in PFM. PFM can focus on ecotourism and agroforestry as alternative livelihoods can reduce pressure on forest resources. Programs that promote eco-tourism and sustainable agriculture offer economic benefits while supporting conservation goals [20]. Such initiatives help align community interests with forest conservation efforts, creating a win-win situation.

Scaling community involvement in PFM requires supportive policies and institutional frameworks. Legal recognition of community rights and involvement in forest management can enhance the effectiveness of PFM initiatives [2]. Policies that provide financial and technical support for community-led monitoring efforts are essential for sustainability. Balancing conservation goals with local livelihoods can be challenging. Conflicts may arise between conservation objectives and community needs, such as access to resources for subsistence. Addressing these conflicts through participatory processes and negotiated agreements is crucial for successful PFM (Roe et al., 2017).

Securing adequate funding for PFM initiatives is essential for their success. Financial resources are needed for training, technology, and community support programs. Partnerships with NGOs, government agencies, and international donors can help address funding gaps [4]. Understanding and addressing social dynamics within communities is crucial. Ensuring equitable participation and avoiding power imbalances can enhance the effectiveness of PFM programs. Engaging all segments of the community, including marginalized groups, is important for achieving inclusive conservation outcomes [21,22].

5. CONCLUSION

Scaling community involvement in Participatory Forest Monitoring (PFM) around Kibale National Park of Uganda is essential for the sustainable management and conservation of this vital ecosystem. The integration of local communities into forest monitoring efforts not only harnesses their extensive knowledge and deep connection to the land but also fosters a sense of ownership and responsibility that is crucial for long-term conservation success. Key strategies for scaling up community involvement include building local capacity through targeted training programs, establishing collaborative structures such as Community Forest Management (CFM) groups,

and leveraging technology to enhance monitoring capabilities. Providing alternative livelihoods and ensuring supportive policies further align community interests with conservation goals, reducing reliance on harmful practices and promoting sustainable development. Despite these promising strategies, several challenges must be addressed, including balancing conservation objectives with local livelihood needs, securing adequate funding, and navigating complex social dynamics within communities. Addressing these challenges through inclusive, participatory processes and adaptive management can enhance the effectiveness of PFM efforts.

There should be a demonstration of the potential for community involvement to achieve positive ecological and socio-economic outcomes. By scaling these approaches and addressing the identified challenges, Uganda can improve forest management around Kibale National Park, ensuring the preservation of its rich biodiversity and supporting the well-being of local communities. Ultimately, a collaborative approach that empowers local communities and integrates their insights into forest management strategies will be key to achieving sustainable conservation and fostering a harmonious relationship between people and the environment.

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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