

Livelihood impacts of participatory forest management in Maharaka village land forest reserve, Mvomero District, Tanzania

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Abstract

This study examines the livelihood impacts of Participatory Forest Management (PFM) on communities surrounding the Maharaka VLFR. Guided by the Sustainable Livelihoods Framework, the study focuses on the influence of PFM on natural and financial capital among forest-adjacent communities. Data were collected from 60 respondents residing in two sub-villages located at different distances from the forest reserve. A mixed-methods approach was employed, combining Individual surveys, Focus Group Discussions, and Key Informant Interviews. In addition, six focus group discussions and six key informant interviews were conducted to complement the quantitative data. Quantitative data were analyzed using the Statistical Package for Social Sciences while qualitative information was analyzed through content analysis. The findings indicate that a majority of respondents perceived that PFM has positively contributed to their livelihoods, while a considerable proportion reported no noticeable improvements. These results suggest that although PFM has generated livelihood benefits for some community members, the outcomes are not uniformly distributed across households. The variation in perceptions among respondents reflects the differentiated nature of livelihood outcomes associated with PFM implementation. The study also revealed a slight increase in wage labour opportunities related to forest-based activities since the introduction of PFM. Although the improvement was modest, it indicates that forest governance initiatives can create employment opportunities through activities such as forest patrols, tree planting, beekeeping, and other conservation-related tasks. Overall, the findings highlight the uneven livelihood impacts of PFM and underscore the need for more inclusive benefit-sharing mechanisms to ensure broader community participation and equitable distribution of benefits.

Keywords: Participatory Forest Management; Livelihoods; Impacts; Natural Capital; Financial Capital; Community-Based Forest Management

1. Introduction

Community involvement in forest management has been evolving since the early 1950s, with the concept gaining momentum in the 1980s due to a shift in rural development thinking and practices, which also emphasized improving livelihoods through sustainable forest resource use [1, 2]. The concept has been gaining wider acceptance by developing country governments as well as donors in the developing world as a prerequisite for rural livelihoods improvement, sustainable conservation and management of the forest resources (3 and 4). Given this continued popularity, still the evidence for the approach in improving rural livelihood has been found to be weak with mixed livelihoods impacts [3–5]. The community involvement in Forest resources management has been evolving and taking different forms from country to country due to differences in actors/stakeholders that are involved and the country political context in which the concept is implemented [6]. Among these forms of community involvements in Forest Management include Community Forest Management (CFM), Collaborative Forest Management (CoFM), Participatory Forest Management (PFM), and Co-management [7]. In Tanzania the term Participatory Forest Management was adopted in 1990s following

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policies reforms in forest management practices, whereby pilot PFM initiatives started in Babati, Manyara Region and Mgori in Singida region [8–10]. In Tanzania Participatory Forest Management consists of two forms; Joint Forest Management (JFM) and Community Based Forest Management (CBFM), both forms aim at improving forest governance, condition and rural livelihoods [11]. However, since the approach was introduced, the evidence for the approach in improving rural livelihood is limited and therefore it is important to understand how far PFM has gone towards improving the livelihoods of participating communities. Reviewing a range of cases [7, 12], we found that implementation of PFM excluded women and poorest individuals in access, use, and control of valued forest resources, suggesting serious shortcomings in rural livelihoods improvement [7] while [13] found that access to natural capital in PFM differ from one form of PFM to another hence compromise the achievement of rural livelihood improvement in PFM. Therefore, we used the case of PFM specifically CBFM in Tanzania to assess the PFM current rural livelihoods impacts by comparing observed outcomes to the sustainable livelihoods framework, developed by Department for International Development [14]. This framework covers 5 Livelihoods capital but, in this study, we covered only 2 livelihoods capital (natural and financial). We purposively selected the case study from a wider sample of forests (CBFM) under PFM in Tanzania because of its history of donor support. Therefore, the selected case study might be expected to represent a “best-case” scenario of PFM communities in Tanzania. A notable weakness of previous PFM livelihoods impact studies that we aim to address here is the focus of surveys at the household level. Both household and individual surveys aim to generalise the study findings to a wider study population, however the use of household surveys in the assessment may lead to an unrepresentative sample, particularly in terms of gender as most of the household heads (study respondents) are normally men. In order to assess PFM rural livelihoods impacts, we need studies that ensure all the different socioeconomic characteristics of a heterogeneous community which may influence respondent’s access and use of PFM benefits are well considered in the assessment. This study aims to achieve this by employing an individual-level survey other than household survey to evaluate how far communities managing Maharaka VLFR have gone towards accessing natural and financial capitals.

1.1. Measuring Livelihoods

The Sustainable Livelihoods Framework (SLF) provides an important analytical approach for understanding how development interventions influence the well-being of rural communities. Livelihoods are commonly defined as the means, capabilities, assets, and activities required for a means of living, reflecting how individuals and households combine available resources to sustain their lives and improve their welfare [15, 16]. In natural resource including forest resources dependent communities, livelihoods are closely linked to access to environmental resources, institutional arrangements, and socio-economic opportunities that shape how people generate income and secure their well-being [17]. Because Participatory Forest Management (PFM) aims to improve both forest governance, condition and rural livelihoods, the Department for International Development (DFID) Sustainable Livelihoods Framework provides a useful conceptual lens for evaluating its impacts [18, 19]. The framework highlights how development interventions influence livelihood outcomes by shaping people’s access to assets, opportunities, and institutional support systems [20]. In the context of Community Based Forest Management, this framework helps assess how policies and management approaches contribute to improvements in human well-being, income generation, and environmental sustainability [21].

The Sustainable Livelihoods Framework identifies five key forms of capital that determine livelihood opportunities and outcomes. These include human capital (knowledge, education, health, and skills), social or political capital (networks, relationships, and institutions), financial capital (income, savings, and access to credit), physical capital (infrastructure and productive assets), and natural capital (land, forests, water, and biodiversity resources) [17, 19]. These capitals interact and complement one another, shaping the ability of households to pursue sustainable livelihood strategies. Because households face diverse and complex livelihood challenges, no single form of capital is sufficient to meet all livelihood needs. Instead, households rely on a combination of different capitals to achieve improved livelihood outcomes [20, 22].

Within this framework, households continuously mobilize and combine these different assets to pursue livelihood strategies that enable them to secure food, income, and resilience. These strategies are influenced not only by the availability of assets but also by external factors such as demographic changes, resource trends, environmental shocks (e.g., droughts or floods), and seasonal variations in employment and prices [17, 23]. Such vulnerability contexts often shape how rural communities depend on natural resources such as forests for survival and livelihood diversification.

In addition, the structures and processes, including policies, institutions, governance systems, and cultural norms, determine how people access and utilize different forms of capital [24, 25]. These institutional arrangements influence who benefits from natural resources, how resources are managed, and the extent to which communities can participate

in decision-making processes. Consequently, livelihood outcomes are shaped by the interaction between vulnerability contexts, institutional structures, and access to different forms of capital.

Participatory forest governance approaches, such as Participatory Forest Management and co-management, can enhance livelihood opportunities by enabling communities to legally access and sustainably manage forest resources. Through such arrangements, communities may gain rights to harvest forest products, engage in forest-based enterprises, and participate in conservation initiatives that generate economic benefits [17, 25]. Access to forests also serves as an important safety net during times of crisis, such as crop failures, economic shocks, or climate-related stresses, thereby reducing vulnerability among rural households [23].

Furthermore, livelihood studies often use a range of indicators to evaluate how community-based forest management initiatives influence livelihood assets, opportunities, and welfare outcomes. These indicators help to assess the extent to which forest governance systems contribute to improved incomes, resource access, social empowerment, and environmental sustainability among forest-dependent communities [22, 26] (Table 1).

Table 1 Participatory Forest Management Indicators for Livelihood Assets

Livelihoods capitals	Indicators of PFM opportunities and capabilities
Natural	Improved availability of and access to forest resources: (e.g., timber, charcoal and firewood trees,
Financial	Increased livelihoods and income sources Increased income levels Access to loans Employment Ability to accumulate savings

Because livelihood assets are interconnected and can be transformed into one another, improvements in natural capital may also enhance financial well-being and overall household livelihoods [16]. A livelihood is considered sustainable when it can cope with and recover from shocks while maintaining or enhancing its asset base without degrading natural resources [23]. Consequently, households often combine different livelihood assets and strategies to reduce vulnerability and strengthen resilience [27, 28]. Given these interconnections, assessing the overall impact of PFM requires examining not only changes in individual livelihood capitals but also local community perceptions regarding the program's overall influence on their livelihoods.

2. Material and methods

The study was undertaken Maharaka Village Land Forest reserve (VLFR) in the Mvomero district. Maharaka Village Land Forest reserve was established and gazetted since 2018 for the purpose of conservation and sustainable charcoal and timber production. The Forest has the size of 5283ha and is managed by Maharaka village. The village is located 117 kilometers from Mvomero district head quarter. The village has seven sub villages which are Mabwe, Kitopeni, Ndugile, Kibaoni, Zonwe and kibarawembe. The main economic activity is agriculture and people of Maharaka belong to waruguru tribe.

The study village was purposively selected. Key informants helped to identify which sub villages are far and which ones are closer to the forest. Then in each stratum one sub village was randomly selected. 30 respondents from each sub village were random selected from the lists of all adults (aged 18 or over) that were obtained from key informants for each sub village. A total 60 individuals were surveyed. In cases where selected residents were absent or unwilling to participate in the study, the next resident on the list was chosen, resulting in 4 unavailable respondents and no one declined to participate in individual survey. Respondents were asked to rate the program's overall impact on their livelihoods (i.e., whether they were benefiting or not) and how they viewed changes in the natural and financial livelihood capitals before and after PFM started

Key informant interviews were conducted with 6 Key informants, including village leaders, Village Environmental Committee leaders, Village Environmental Committee members and District Forest Officer. Key informant interviews were conducted to gain deeper insights and to cross-check the information gathered from the Individual survey, ensuring a more comprehensive understanding of the livelihoods impacts of PFM. Following the individual

questionnaire survey and then 6 Focus Group Discussions were conducted separately with marginalized groups (women and the poorest) in each study sub village, with 7 individuals per group. Focus Group Discussions used relatively unstructured questions, but were guided to get common perception and also address issues raised by the questionnaire survey and key informant interviews.

2.1. Socioeconomic and Livelihoods Questionnaire.

The questionnaire first gathered the socioeconomic characteristics of the respondents, including age, education, location, income source, and wealth indicator. Respondents were asked to indicate their perceived changes in the different livelihood capitals before and after the programme was initiated and the programme's current overall impact on their livelihoods (i.e., whether they were benefiting or not). Quantitative data were analysed using SPSS software while the qualitative data was subjected to thematic analysis using Nvivo 10 software. Overall, we compared the results of the various data assessments to the Sustainable Livelihoods Framework developed by [14], which is based on the two livelihoods capitals (natural and financial capitals), as well as the stated policy objectives.

3. Results and Discussion

3.1. Perceived Participatory Forest Management Impacts

Participatory Forest Management (PFM) in Tanzania was introduced as a governance strategy aimed at improving forest conservation while simultaneously enhancing the livelihoods of communities living adjacent to forest resources. National policy frameworks including the National Forest Policy, the Forest Act, and subsequent forest management programmes emphasize that communities participating in forest management should derive tangible socio-economic benefits from forest resources [9–11]. These policies are aligned with broader global approaches to community-based natural resource management, which recognize local participation as a critical mechanism for achieving both conservation and livelihood objectives [29, 30].

The findings of this study indicate that 56.7% of respondents perceived that PFM has had positive impacts on their livelihoods, while 43.3% perceived no livelihood improvements (Figure 1). These results suggest that although PFM has contributed to livelihood improvements for a portion of the community, the benefits are not uniformly experienced. Similar findings have been reported in several empirical studies examining PFM outcomes in Tanzania and other developing countries. For example, [31] found that while participatory forest governance improved institutional capacity and forest protection, its direct contribution to household income and material welfare remained limited in the short term. Likewise, [32] argue that although PFM has contributed to improved forest conditions, the economic benefits for forest-adjacent communities have often been modest and unevenly distributed.

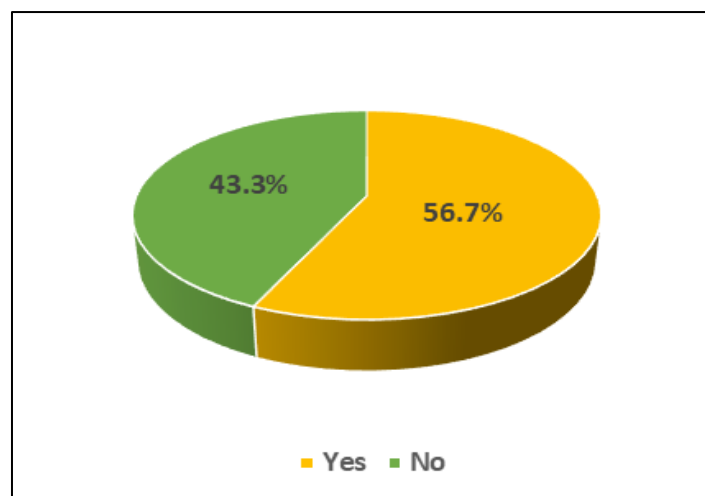


Figure 1 Perception of respondents on whether PFM had positive impact on their livelihoods

The variation in perception levels observed in this study where 11.7% strongly agree and 54% agree that PFM has improved livelihoods, while 15% strongly disagree and 28.3% disagree (Figure 2), reflects the differentiated nature of livelihood outcomes among households. This supports the finding in [7] who highlighted that majority of residents involved in PFM perceived the benefits sharing is unfair and the approach has become dominated by a very restricted

“elite within an elite”, comprising only forest committee leaders and close associates. These findings also reflect the differentiated nature of livelihood outcomes among households. From the perspective of the Sustainable Livelihoods Framework, livelihood outcomes depend on the interaction between available livelihood assets, institutional arrangements, and access to natural resources [16]. In the context of PFM, households with greater access to forest-based opportunities such as beekeeping, non-timber forest product harvesting, or participation in forest governance institutions are more likely to perceive livelihood benefits than those with limited access to these opportunities.

Several studies have also emphasized that PFM tends to generate stronger ecological and governance outcomes than economic ones. For instance, [5] demonstrated that community-managed forests in Tanzania often show improved forest conditions compared to state-managed forests. However, improved forest condition does not automatically translate into increased household income unless effective benefit-sharing mechanisms and market opportunities are established [4]. In many cases, conservation regulations introduced under PFM restrict certain traditional forest uses such as charcoal production, timber harvesting, or grazing, which may reduce immediate livelihood benefits for some households.

Furthermore, studies have highlighted the role of institutional and governance challenges in shaping the livelihood impacts of PFM. Issues such as limited financial incentives, weak market linkages for forest products, and unequal participation in village decision-making processes can influence how communities perceive the benefits of forest management initiatives [33, 34]. In some cases, benefits from forest management programs may be captured disproportionately by local elites or individuals with greater social capital, thereby limiting the broader livelihood impacts across the community.

Recent literature also suggests that integrating PFM with complementary initiatives such as REDD+ programs, community forest enterprises, and payments for ecosystem services can enhance livelihood outcomes. For example, [34] and [35] argue that combining community forest governance with financial incentives and livelihood diversification strategies increases the likelihood that conservation initiatives will generate meaningful socio-economic benefits.

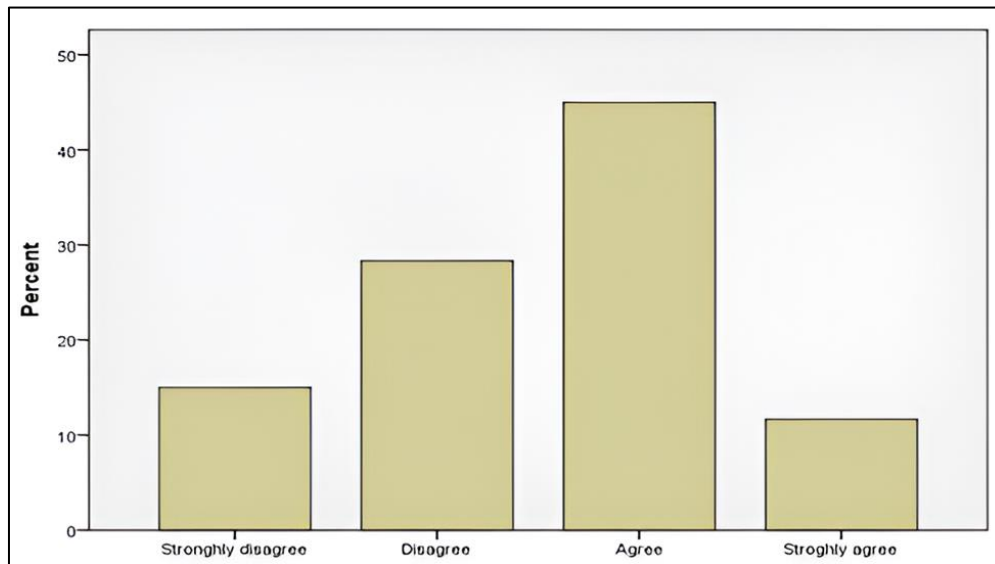


Figure 2 Level of agreement on whether CBFM has positive impact on local communities Livelihoods

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3.2. Impacts of PFM on the natural capital availability and access to local communities

The findings indicate that all respondents (100%) perceived an increase in the availability and accessibility of timber following the implementation of Participatory Forest Management (PFM). However, the intensity of this perception varied among respondents. About 56.7% of respondents reported a clear increase in timber availability compared to the period before PFM, while 43.3% perceived that timber availability had increased but only in small amounts (Table 2). The relatively moderate perception of increased timber availability may be attributed to the limited harvestable stock in many forest reserves, which reflects the long-term degradation of forest resources prior to the introduction of participatory management approaches. Moreover, forest ecosystems typically require considerable time to respond to improved management interventions, and therefore the duration of PFM implementation in the study area may not yet have been sufficient to allow substantial regeneration of harvestable timber stocks [31, 32].

Similarly, all respondents (100%) perceived that the availability and accessibility of charcoal and firewood had increased since the implementation of PFM, although perceptions again differed in magnitude. While 21% of respondents indicated that charcoal and firewood are now more available and accessible than before PFM, 39% believed that availability had remained the same (Table 2). This improvement is likely linked to the introduction of sustainable harvesting practices, where harvesting is regulated through designated plots (e.g., 50 × 50 m annually) and supported by local bylaws governing forest product extraction. Such management arrangements are designed to balance forest utilization with regeneration, thereby improving forest conditions over time.

Community members also reported that the Forest Conservation Group introduced initiatives such as sustainable charcoal production and controlled timber harvesting for village use and income generation, which enhanced both access to forest products and community awareness of sustainable resource management. As a result, respondents perceived gradual improvements in forest conditions, including the regeneration of previously threatened species. These observations are consistent with studies showing that participatory forest management can improve forest condition, strengthen local governance, and increase the availability of certain forest products when harvesting is effectively regulated [5, 33].

Recent literature further supports these findings by emphasizing that community-based forest management systems often improve access to forest products while promoting sustainable harvesting practices. Studies conducted in Tanzania and other developing countries have demonstrated that participatory forest governance can enhance the availability of forest products such as fuelwood, timber, and non-timber forest products by improving forest stewardship and reducing illegal exploitation [34, 38]. In addition, participatory approaches can promote livelihood opportunities through regulated forest-based enterprises, including charcoal production, beekeeping, and timber harvesting for local markets [35, 37].

The findings of this study are also consistent with earlier studies by [39] and [40], which reported improved availability of construction materials such as poles and timber following the implementation of participatory forest management initiatives. Similarly, respondents in the present study noted that other non-timber forest products (NTFPs) have become more available after PFM implementation, highlighting the broader ecological and livelihood benefits associated with participatory forest governance.

Overall, these findings suggest that PFM contributes positively to the availability and accessibility of both timber and non-timber forest products, although the magnitude of these improvements depends on factors such as the duration of PFM implementation, the condition of forest resources before management interventions, and the effectiveness of local governance mechanisms regulating forest use.

Table 2 Perceived livelihoods status before and after PFM in Maharaka VLFR

Livelihood capitals	Indicators	Response	Before PFM	After PFM
Natural capital	Better availability and access to charcoal	Highly available	0(0)	21(35)
		Available	0(0)	39(65)
		Available in small amount	60(100)	0(0)
		Not available	0(0)	0(0)
Natural capital	Better availability and access to Timber	Highly available	0(0)	0(0)
		Available	0(0)	34(56.7)
		Available in small amount	59(98.3)	24(43.3)
		Not available	1(1.7)	0(0)
Natural capital	Better availability and access to Firewood	Highly available	7(11.7)	10(16.7)
		Available	53(88.3)	50(83.3)
		Available in small amount	0(0)	0(0)
		Not available	0(0)	0(0)
Financial capital	access to forest-based income generating activities	Highly available	0(0)	7(11.7)
		Available	0(0)	88.3)
		Available in small amount	3(5)	0(0)
		Not available	57(95)	0(0)
Financial capital	Access to wage labour associated with forest activities	Highly available	0(0)	0(0)
		Available	0(0)	0(0)
		Available in small amount	0(0)	30(50)
		Not available	60(100)	30(50)
Financial capital	accessed loans saving	Highly available	0(0)	0(0)
		Available	0(0)	40(66.7)
		Available in small amount	0(0)	1(1.7)
		Not available	60(100)	19(31.7)

3.3. Impacts of PFM on the financial capital availability and access to local communities

The findings indicate that Participatory Forest Management (PFM) has played a significant role in enhancing the financial capital of households in communities surrounding the forest reserve. Approximately 100% of respondents reported that the programme has enabled them to access new income sources, mainly through forest-based income-generating activities such as timber harvesting, charcoal production, firewood sales, and beekeeping. These activities were largely unavailable to local communities before the implementation of PFM, suggesting that the programme has created new livelihood opportunities by granting communities regulated access to forest resources and encouraging sustainable forest-based enterprises. Similar outcomes have been reported in recent studies showing that Community-

Based Forest Management arrangements can diversify rural livelihoods and increase household income through sustainable forest utilization [41, 42]

The study further revealed that 50% of respondents perceived a slight improvement in wage labour opportunities associated with forest-related activities since the introduction of PFM. Although the increase was reported as relatively small, it suggests that forest governance initiatives can create additional employment opportunities, particularly through forest patrols, tree planting, beekeeping activities, and other conservation-related tasks. Previous studies also demonstrate that participatory forest governance contributes to rural employment generation, though the magnitude of benefits often varies depending on institutional arrangements, market access, and the level of community participation [43, 44].

In addition to income diversification, the findings show that 100% of respondents perceived an increase in access to savings and credit services since the introduction of PFM. Access to loans was facilitated through institutions and programmes such as SEDA, TASAF, FINCA, REGROW, TANAPA, TFCG, and MJUMITA. This suggests that PFM initiatives often attract complementary development interventions that strengthen local financial systems and support community-based enterprises. Improved access to credit enables households to invest in forest-based enterprises, expand small businesses, and strengthen resilience to livelihood shocks. Recent literature also indicates that forest governance programmes often enhance community financial capital by linking conservation initiatives with microfinance institutions and rural development programmes [41].

Despite these positive outcomes, a small proportion of respondents reported that PFM contributed only marginally to their household financial capital, mainly through charcoal and timber-related businesses. This finding suggests that the financial benefits of PFM may not be evenly distributed among community members. Variations in benefit sharing may be influenced by factors such as access to forest resources, capital constraints, local governance structures, and market opportunities. Several recent studies highlight that while participatory forest management can improve livelihoods, unequal benefit distribution and limited market access can constrain the extent of financial gains for some households [42, 45].

Overall, the findings suggest that PFM has contributed positively to strengthening financial capital among local communities, primarily by creating forest-based income opportunities, expanding access to microfinance services, and generating limited employment opportunities. However, the relatively small proportion of households reporting significant financial benefits indicates the need for improved benefit-sharing mechanisms, enhanced market linkages, and stronger institutional support to ensure that the economic gains from Participatory Forest Management are more equitably distributed among community members.

4. Conclusion

We have assessed the livelihoods impacts of Participatory Forest Management, specifically focused on natural and financial capitals in a case study that has been relatively well-supported. We found that implementation of PFM achieved at least some of the stated policy objectives for improving availability and accesses to natural capitals (e.g. charcoal, timber and Firewood). Likewise, the approach has improved access and availability to financial capitals to some extent. Participatory Forest Management (PFM) has not yet fully improved access and availability of financial capital to all community members, but achieving a 50% improvement is a significant milestone toward meaningful livelihood enhancement. Considering that the Maharaka VLFR has only been under this management approach for few years, it is reasonable to expect that more time is needed to realize its full potential. The findings of this study also suggest that forest PFM can potentially improve individual livelihoods by introducing adequate and profitable income generating activities that could contribute to enhancing their financial capital. Likewise, livelihood improvements from PFM are gradual and depend on the sustainable utilization of forest resources, capacity-building efforts to community members involved, and community adaptation to the approach. With continued commitment and time, PFM has the potential to bring even greater positive impacts to the communities involved hence improve forest condition.

Compliance with ethical standards

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Disclosure of conflict of interest

The Authors declare that they have no conflict of interests regarding the publication of this paper

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