

Participatory Forest Management



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List of abbreviations

CBO - Community-Based Organization

CFA - Community Forest Association

CSR - Corporate Social Responsibility

DBH - Diameter at Breast Height

FGD - Focus Group Discussion

FUG - Forest User Group

KII - Key Informant Interview

PELIS- Plantation Establishment at Livelihood Improvement Scheme

PFM - Participatory Forest Management

PFMP - Participatory Forest Management Plan

PPP - Public Private Partnerships

TCS - Total Carbon Stock

TH - Total Height

Abstract

Amidst growing global environmental consciousness, the imperative for innovative strategies in forest management is increasingly recognized. Participatory Forest Management has emerged as a prominent approach within the conservation sector, prioritising inclusivity and democratic decision-making involving local communities. In Kenya, the implementation of PFM, facilitated by the Forest Act (2005), aimed to foster sustainable resource management among forest-adjacent communities. Our study conducted in Njukiri Forest addresses the effectiveness and impact of PFM in this complex ecosystem. The research investigates governance structures, legal frameworks, biophysical impacts, livelihood changes, and community participation within the CFA. Through CFA initiatives, such as livelihood improvement programs and an ecotourism venture, participatory management of forest resources is perceived as essential for long-term sustainability and climate resilience. However, governance challenges persist, particularly concerning transparency and accountability within the CFA. Centralization of power has resulted in an opaque benefits-sharing mechanism, limiting understanding and access to benefits for both CFA and non-CFA members. Addressing these governance issues is crucial for achieving the objectives of PFM, necessitating a transparent, equitable, and inclusive governance model.

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1. Introduction

As global environmental consciousness rises, the calls for increased protection of existing forests and the planting of new forests across the world have increased the need for the exploration of innovative strategies for forest management.

One trend within the conservation and forest management sector is that of Participatory Forest Management (PFM). This shift coincides with an increased emphasis on participation more broadly, and entails approaching forest management more inclusively and democratically where local populations are involved in decision-making and management of local forested areas (Frank *et al.*, 2017). However, in order for these processes to be both meaningful and effective for local communities, they must ensure a broad presentation of the different groups within communities, particularly those already marginalised such as women, young people, ethnic minorities, people with disabilities as well as the poorest members of the communities who have less access to resources and influence (Chomba *et al.*, 2015). There are many stakeholders, factors and internal power-dynamics involved in PFM processes and thus attention must be paid to ensuring that processes remain inclusive and just.

Acknowledging the pivotal role of communities living adjacent to forests in curbing forest destruction and degradation, the Kenyan government introduced PFM in 2005. This initiative was initially established through the enactment of the Forest Act (2005) followed by the subsequent National Forest Act (2016). Within the framework of PFM in Kenya, ownership of the forest remains with the government, while forest-adjacent communities, organised in Community Forest Associations (CFAs), are granted user rights. Local communities have the opportunity to apply for specific rights regarding the utilisation and management of forest resources through the CFAs, provided that these rights do not contradict forest conservation objectives. Within the Act, CFAs are acknowledged as key partners in forest management and are composed of multiple Community-Based Organizations (CBOs) or Forest User Groups (FUGs). To complement these efforts, commercial plantations are also available for lease agreements. In exchange, communities are granted various user rights, including the collection of firewood, grass for thatching roofs, grazing animals, gathering herbal medicine, accessing timber, engaging in scientific and educational activities, and participating in recreational activities.

The underlying principle behind promoting local participation in resource management is grounded on the belief that effective management of resources can be achieved when local

stakeholders derive benefits from them and are granted either exclusive or shared decision-making rights in resource management. However, there are several examples of social and environmental challenges relating to these CFAs with issues around representation, distribution of rights and benefits cited in several studies (Chomba, Treue and Sinclair, 2015; Frank *et al.*, 2017). As research indicates, CFAs are actively engaged in a variety of management tasks related to forest protection, monitoring, and administration, the ultimate authority however over decision-making, revenue distribution, and overall control of resources remains with the Kenya Forest Service (KFS). To ensure sustained commitment to the PFM process, it is imperative to share revenue streams generated from forest resources with communities, thereby balancing their incentives with the responsibilities they undertake (Mogoi *et al.*, 2012).

2. Research question

PFM is especially significant in areas such as Njukiri Forest, where the interaction between natural ecosystems and human communities is complex and highly intertwined. However, the implementation of PFM in Njukiri Forest has raised several questions about the effectiveness and impact of this governance model. This study endeavours to better understand the impact on the local PFM, including the overall effectiveness of the protection efforts, the livelihoods of the local communities and the overall dynamics in the local CFA, leading to the following research questions:

How is the Njukiri Forest governed and what is the impact of this governance on the forest and the local communities?

- What are the legal frameworks governing the PFM in Njukiri Forest and how are they perceived by the community?
- Have there been direct negative or positive biophysical impacts of the PFM in the Njukiri Forest? What are they, and what is the extent of them?
- How has the PFM project and the partnership impacted the livelihoods of local communities living in proximity to the forest?
- What is the inclusion, participation and representation like in the CFA at this time, and how are these processes perceived by the community?

3. Literature review

In Kenya, the establishment of CFAs through the introduction of PFM has significantly enhanced forest management and conservation endeavours (Larson and Dahal, 2012; Mogoi *et al.*, 2012). These entities actively engage in forest protection, monitoring, and governance, contributing to sustainable forest management practices. Comparatively, studies indicate that community involvement in forest management, as facilitated by CFAs, yields better outcomes than state-managed forests (Kairu *et al.*, 2021). However, research also suggests that the advantages of forest conservation may diminish over time, particularly after the initial stages of access restrictions, leading to potential forest degradation (Robinson and Lokina, 2011). There's a risk that the degraded areas may be relocated to compensate for the reduction in forest-based product availability, highlighting the complexities and challenges in achieving sustainable forest management goals.

An even more significant link to forest conservation, when it comes to participatory natural resource management, is that of poverty alleviation and the importance of reduced dependence on forests in achieving better conservation outcomes. According to Gikonyo and Kiura (2014), there is a positive influence of CFAs on both sustainable forest management practices and livelihood enhancement, particularly in communities that have diversified their income sources, thereby reducing their reliance on forests. Similarly, Sunderlin *et al.* (2005) illuminate the complex dynamics surrounding forest-dependent communities' economic strategies and their implications for successful forest conservation initiatives. In addressing the multifaceted relationship between poverty alleviation and conservation, Agrawal and Redford (2009) emphasise the importance of considering socioeconomic factors to avoid exacerbating poverty through conservation projects. Furthermore, Chhatre and Agrawal (2008) explored the role of community-based approaches and local governance structures in fostering sustainable resource management practices, aligning with the broader argument that diversified livelihoods and reduced dependence on forests are conducive to achieving more successful forest conservation outcomes.

The interconnection between livelihoods and the attainment of conservation objectives is evident, as PFM entails the collaborative efforts of CFAs to conserve forests while simultaneously enhancing livelihoods. Studies show that PFM can contribute to improved livelihoods by providing new income opportunities for forest-adjacent communities, such as seedling

production and beekeeping (Mutune *et al.*, 2017). Despite communities recognizing the socioeconomic significance of the forest, there remains a notable absence of a sense of personal responsibility among them for its conservation efforts (Nzau *et al.*, 2020). While PFM can lead to higher total and forest-related incomes for community members, governance often remains largely under the control of the KFS. This suggests that the current forest governance approaches in Kenya may not fully support meaningful participation in practice, potentially limiting the benefits for local communities (Mutune and Lund, 2016). Notwithstanding the participatory approach, the control over important forest resources and decision-making largely remains with governmental bodies. For instance, PFM has not granted the CFAs genuine decision-making power over important forest resources such as timber and firewood. This limits the capacity of CFAs to influence forest management practices and access associated benefits (Mutune *et al.*, 2017).

For the proliferation of benefits, and to help enhance sustainable management and address the emerging development challenges faced by natural forests, Kenya's government has developed policies and established institutions to enhance the implementation of Public-Private Partnerships (PPPs). PPPs indicate a fairly stable condition for building trust among private partners involved in the governance of public natural forests (Chisika and Yeom, 2021).

PPPs add to the complexity of the PFM framework, which faces challenges related to governance, benefit sharing, and internal conflicts. Internal conflicts, such as power struggles and leadership issues, pose threats to the viability of a CFA (Mogoi *et al.*, 2012). These conflicts underline the necessity for negotiation support to address conflicting interests and bolster governance structures. This is where capacity building, especially for the successful implementation of complex frameworks, can contribute to the sustainable management of forest resources by fostering greater involvement of local communities in decision-making processes (Girma *et al.*, 2023). Factors influencing the success of collective management of forest resources include household participation in CFA activities, institutional quality, group size, and the education level of the CFA chairperson. These factors underline the importance of fostering an environment that encourages active and equitable participation among community members (Okumu and Muchapondwa, 2020).

For livelihood benefits to be secured there is a need to ensure co-management quality criteria like resource access clarity, benefit distribution, collective decision-making, effective monitoring,

and conflict resolution. Instead, PFM frameworks are challenged with hierarchical frameworks hindering stakeholder interaction, limited community decision-making power, lack of shared objectives understanding, corruption in resource access, donor dependency, and inadequate property rights (Ming'ate, Rennie and Memon, 2014). Issues arise from the CFA's representation of forest communities and its limited downward accountability. The participatory process is therefore criticised for deficiencies in engagement and inclusivity. In addition, inadequate access to updated information about management practices and legal rights limits effectiveness. These findings point to the need for better communication and information dissemination (Himberg *et al.*, 2009).

Moreover, the complexity of the framework structure and the subsequent lack of transparency allow for a bias in CFA representation towards small, already influential local elites, which undermines the inclusivity of CFA initiatives (Chomba *et al.*, 2015). It may be that the integration of participatory management within existing socioeconomic frameworks can have profound implications for rural vulnerability, but simultaneously the socioeconomic disparities ingrained in the historical political economy of land and forest allocation, alienation, and dispossession are reflected in the framework. Paradoxically, instead of mitigating vulnerability, such frameworks can exacerbate the plight of marginalised groups through two primary mechanisms: Firstly, by imposing fees for access to forest products crucial for livelihoods by state agencies. Secondly, through elite control of local institutions that mediate forest access, meaning influential individuals or groups within communities disproportionately benefiting from PFM initiatives, thereby excluding or marginalising vulnerable community members (Frank *et al.*, 2017). Addressing vulnerability requires reducing fees for forest activities like firewood collection and grazing, ensuring equitable representation in local forest institutions, and alleviating structural inequalities in land and forest access (Chomba *et al.*, 2015).

The efficacy of community forestry initiatives in empowering local communities remains a subject of ongoing debate. National forest policies have predominantly allocated limited authority to local communities, primarily centred around forest protection and conservation efforts, while retaining overarching legislative control and centralised management of economic benefits. Additionally, internal dynamics and conflicts within CFAs play a pivotal role in shaping their effectiveness and capacity to negotiate benefits, whenever those become available.

While existing literature extensively discusses factors influencing the level of success of participatory approaches to natural resource management for enhancing livelihoods, there remains a gap in understanding the mechanisms behind successful governance within CFAs leading to equitable distribution of benefits and achievement of conservation goals. Addressing this gap is a focal point of our research, wherein we aim to explore this aspect through the utilisation of the following conceptual framework.

4. Conceptual framework

To frame our eventual discussion of the governance and impacts of PFM in Njukiri Forest we have constructed a conceptual framework capturing key elements of those two aspects as well as key concepts within them – a visual representation of this framework can be seen in Figure 1 below.

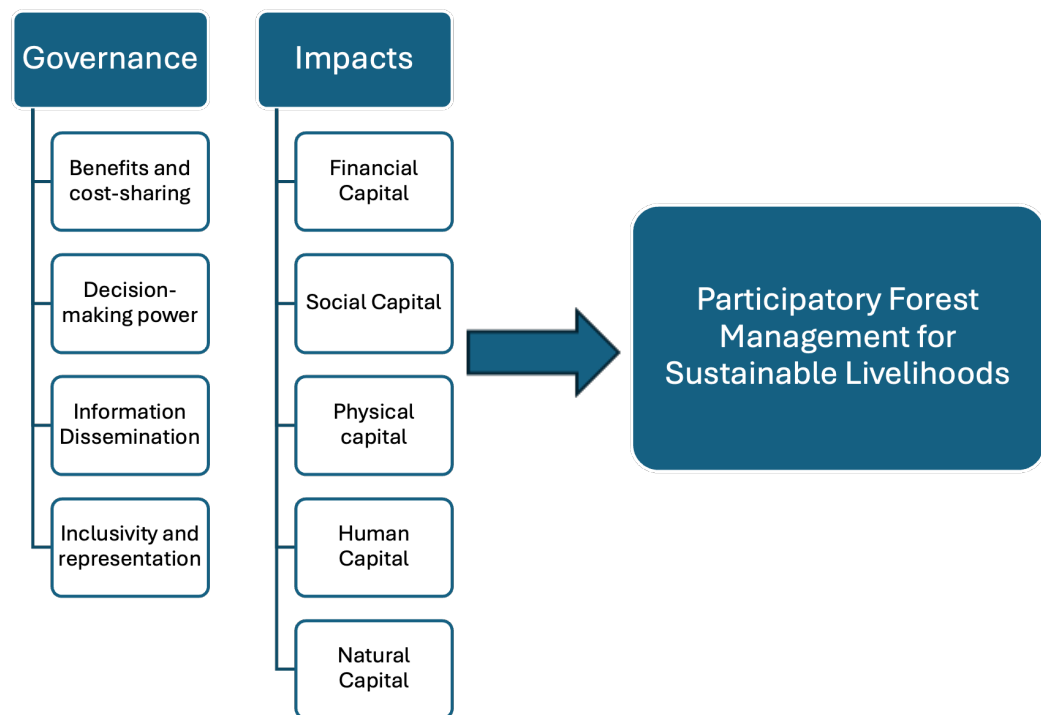


Figure 1. Conceptual framework of research project

The governance section outlines some of the key trends in terms of challenges which are outlined in existing literature on PFM, Community Based Forest Management and other forms of forest governance which emphasise community participation and benefits-sharing. These concepts will

guide our approach and questions in regards to perceptions on the governance of the CFA and the overall governance within the PFM stakeholder group.

With Sustainable Livelihoods being one of the main objectives of the PFM initiative, this is the primary focus of our assessment of the impacts of PFM. A main guiding element for this will be the 5 capitals which constitute a sustainable livelihood as originated by Robert Chambers and used by organisations such as British department for International Development and UN Development Program, to facilitate an understanding of livelihoods relevant to and engaging with local communities (Natarajan *et al.*, 2022). These concepts will form the main components of the household survey, enabling us to speak to the improvement and degradation of individual capitals and access to livelihood assets for the forest adjacent communities in Njukiri Forest.

5. Study area

Figure 2 provides an overview of the study area. Njukiri Forest, situated in the western part of Embu County and bordering Kirinyaga County, lies adjacent to Embu town, a central administrative and commercial hub. Managed as a forest reserve, it spans 436.0 hectares and hosts a rich variety of plant, mammal, and insect species. Simultaneously the KFS is working with the local community to formally manage Njukiri Forest Reserve. This collaboration is governed by a Participatory Forest Management Agreement, which has been in place since 2015. The Participatory Forest Management Plan (PFMP) is a systematic program that outlines all the activities to be undertaken in a forest or a specific part of it, including conservation, utilisation, silvicultural operations, and infrastructural development, for at least five years. (PFMP, 2020) The PFMP is reviewed by stakeholders such as KFS and CFA to negotiate, distribute and protect the forest resources.

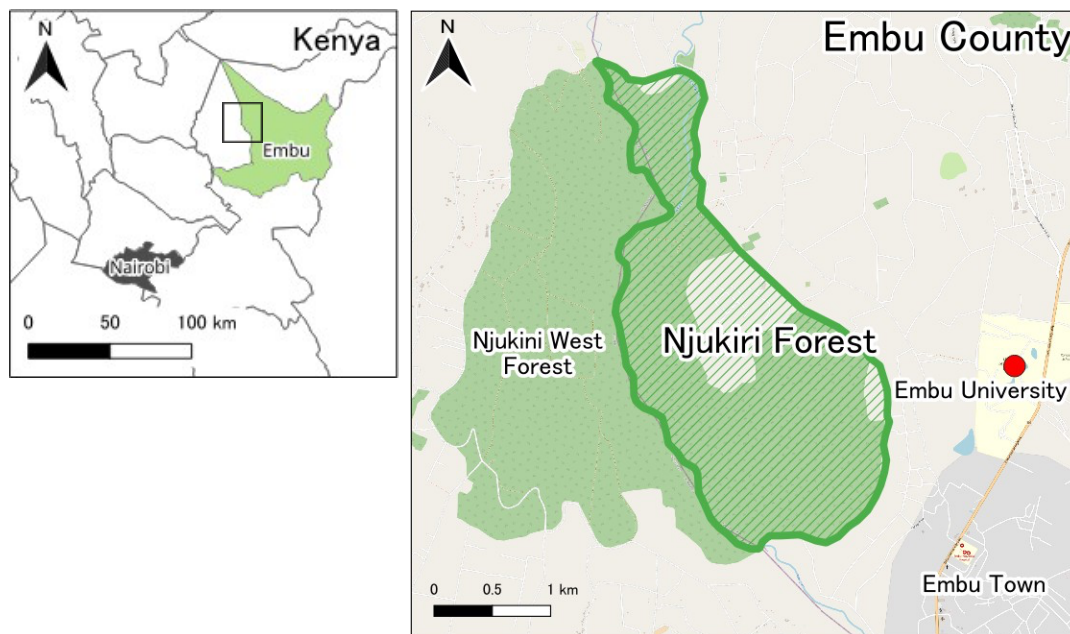


Figure 2. Overview of the study area, Njukiri Forest Reserve.

The forest has some sectors for different purposes as shown in Figure 3. The main sectors are the plantation including the Plantation Establishment at Livelihood Improvement Scheme (PELIS), conservation and rehabilitation, and eco-tourism sites such as Camp Ndunda. The **plantation zone** is an area for highly productive forests comprising exotic industrial soft and hardwood managed by KFS. The **PELIS zone** is a co-management area by KFS and CFA. KFS allows the CFA members to use the area for cultivation only while the trees are young, and the community in terms cares for the young trees along with their cultivation. The **conservation zones** consist of highly protected forests that are mainly spread along riverine areas and wetlands within the forest. The area is sparsely populated with a variety of naturally regenerated trees. **Camp Ndunda** is in the eco-tourism area, so-called Ndunda Falls, locally recognized for its natural beauty, offers an ideal setting for various recreational activities and nature-based tourism. With its picturesque landscape, the site presents opportunities for activities such as picnicking, nature tourism, and team-building expeditions.

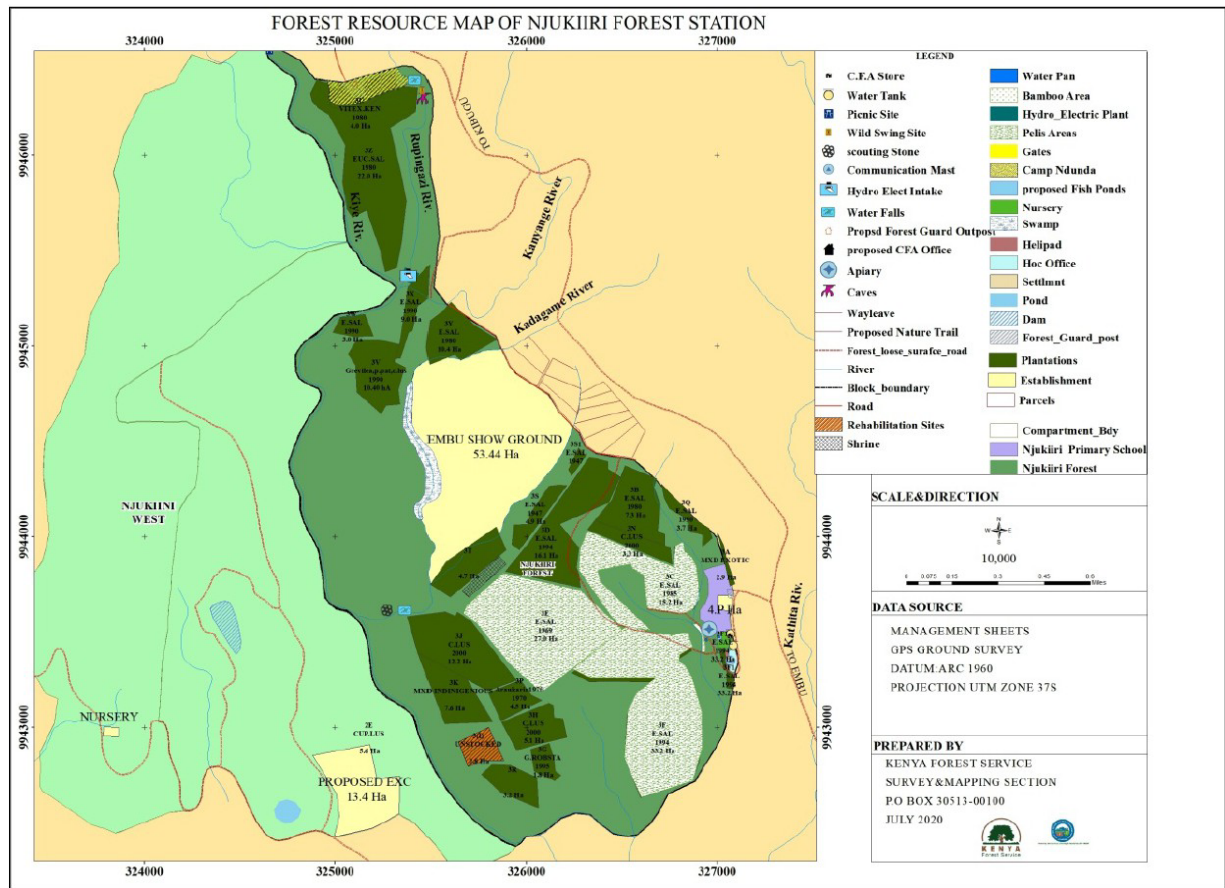
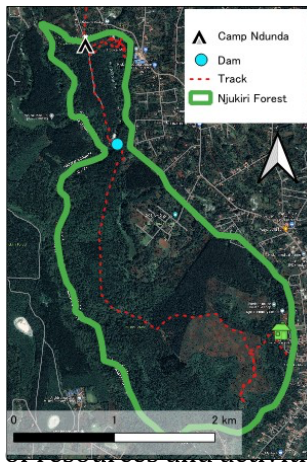


Figure 3. Forest Resource Map of Njukiri Forest Station (PFMP, 2020)

6. Methodology

We started out with data to establish our understanding of the forest state, the CFA and the governance structures. Following this, a number of key persons from the CFA, KFS and the county were interviewed, and the understanding gained from these sources then informed our survey-questions as well as the key topics selected for focus-group discussions. Brief descriptions of our approach to each method as well as strengths and weaknesses will be outlined below.

Transect walk



We conducted 2 transect walks to observe the physical aspects of the Njukiri forest, including biodiversity, signs of human impact, and land-use patterns. We planned to walk with 2 or 3 community members, preferably both a man and a woman selected by snowball or purposive sampling based on information from village elders and guides upon initial arrival. However we ended up walking with a Camp Ndunda guide who was familiar with plants inside of the camp area, and a KFS officer and 2 KFS rangers for the other areas of Njukiri forest. These informants helped us understand the spatial distribution

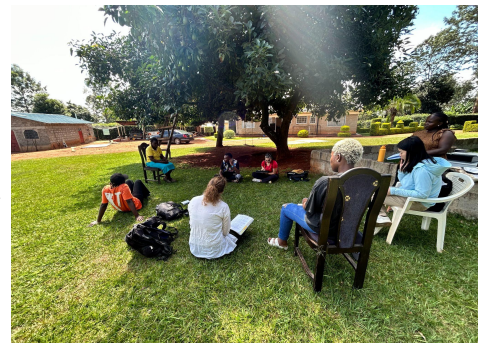
of various resources within the forest area, as well as gain an understanding of any areas of special significance to the community within the forest, though the data may be biased in a specific direction by walking only with the KFS representatives and the official guide. Walking with community members may have brought out different aspects about the community and forest management.

Key informant interview

We conducted semi-structured interviews with 9 key informants including a community elder, a youth leader, the CFA chairman and coordinator, KFS manager, KFS officer and rangers, county forest officer, and the owner of Titoge, the private partner who runs Camp Ndunda. Each interview was between 30 minutes to 1.5 hours where we obtained information about the background of

the actors involved in forest management, the general trends in the use of the forest, the changes in the forest and the status of implementation of new policies.

We noted there are some NGOs involved in the PFM framework, however we didn't have a chance to conduct the interviews with them. The opinions from stakeholders that are not included in this study, might have led us to have more different or critical views to the framework.





Household Survey

We conducted surveys with 30 households including 26 CFA members and 4 non-CFA members living in proximity to Njukiri Forest to gain an understanding of their livelihoods as well as their perceptions regarding PFM and the CFA. We prepared questions which covered background information on the household, CFA activities, the benefits from the forest, primary income-generating activities, and challenges. Questions were adjusted based on relevance and clarity during the three days of data collection but variations were limited.

Sampling was initially done based on a list from the CFA chairman, which helped identify the initial households. From there, snowball sampling was applied to find the next households. We were initially going to make comparisons between CFA members, non-members and former members, however we ended up with a very skewed sample of mostly CFA members, as these were more easily identified and more available. Still we got respondents from a balanced distribution in terms of age and gender as planned.

Forest Assessment



We conducted a forest assessment, with support from a KFS officer and KFS rangers, to investigate the biophysical impact of the PFM and Camp Ndunda on Njukiri forest. The assessment was conducted in 8 sample plots in four zones; the PELIS, the plantation, the conservation zone, and Camp Ndunda. The sample plots of the three zones outside Camp

Ndunda were chosen by combining random and systematic sampling with consideration of feasibility and accessibility. We set the first plot randomly keeping a certain distance from the trail and selected the second plot at 60 metres distance from the first. Meanwhile, the sample plots for Camp Ndunda were selected in a more purposive manner - with emphasis on conserved areas near areas with a high level of human intervention. For each plot, we focused on trees of which the circumference at breast height (1.3m) was bigger than 23.55 cm (7.5 cm diameter) in an 8-metre radius circle. The collected variables were tree species, circumferences, tree heights from breast height, measured with a stick or with a guesstimate. We also paid attention to the condition of the ground surfaces of each plot. To calculate above-ground biomass of each tree,

specific allometric equations were applied for *Spathodea Campanulata* (Lugo *et al.*, 2011), and *Vitex Keniensis* (Kinyanjui *et al.*, 2014), and the generalised equation of pantropical forest for other species (Chave *et al.*, 2014).

There are possibilities of biased results for several reasons; the different or biased methods for sample plot selection, the limited number of sample plots, the primitive methodologies to measure heights, the overestimation of nyroid-type trees, and the utilisation of generalised equations for several species.



Focus Group Discussion



We conducted 2 focus group discussions with CFA members and non CFA members to assess any key differences in perceptions by them. We prepared 7 questions focused on the communities' perceptions, attitudes and experiences related to forest management, forest use, and the impacts of the PFM and the PPP with Camp Ndunda. Questions were posed in English which

were then translated into the local language of Kiembu or to Swahili. Most answers were in Kiembu or Swahili, which were then interpreted and summarised by our translators into their own words.

The FGD of non-CFA members was done with 3 women and 4 men selected by the female owner of a coffee farm in the community. The main speakers were the female leader and a few men, and only one man worked on the ranking exercise. The FGD of CFA members was done with approximately 10 people, however only women participated since the participants were selected from a women's group. This didn't follow our original plan that selects participants with a diverse representation of the community, including different ages, genders, and roles within the CFA. However, this sampling may have had other advantages, as both groups were socially established independently of the focus groups, and thus participants may have felt more comfortable speaking than they would have in a group selected by us as researchers.

Document analysis

To understand the legal and policy framework governing forest management, including the roles, responsibilities, and rights of different stakeholders, and the specific arrangements for

public-private partnerships. We analysed the documents provided by CFA and KFS to understand the legal and policy framework governing forest management in the area, paying attention to how these policies impact on-the-ground practices and community engagement as well as identifying key principles, obligations, rights, and mechanisms.

Geospatial Data analysis

We leveraged geospatial data compared to the collected data on forest conditions, particularly stakeholder perceptions. We used tree canopy cover data with a 30 m resolution for the years 2000 and 2010 (Hansen *et al.*, 2013) and data with a 10 m resolution for the year 2020 (Brandt *et al.*, 2023) to oversee the forest cover transitions. The area of canopy change was calculated with GIS software. Additionally, we used satellite images for the years 2005 and 2020 (Google Earth, 2024) to examine changes in forest cover at Camp Ndunda. The area was calculated by visually checking the images and by hand tracing areas without forest cover.

7. Results

Governance Framework

Before evaluating its effectiveness, it's essential to comprehend how the PFM framework operates. We collected the necessary information by reviewing relevant legislation, examining the Njukiri Participatory Forest Management Plan (PFMP) for the 2021-2025 period, and from the interviews with key informants such as the County Forest Officer, the KFS Manager, the CFA chairman, the CFA coordinator and the investor of Camp Ndunda. As shown in Figure 4, this direct approach allowed us to gain insights into how the PFM framework functions, including its establishment, the roles, duties and benefits of the key stakeholders, as well as how the framework's structure relates to governance. Such understanding provides a necessary foundation for assessing the framework's performance and impact.

KFS, a state authority established under the Forest Act 2005, holds the responsibility for the sustainable management and conservation of Kenya's forests. The Njukiri CFA works under a participatory framework where the local community is involved in managing the forest resources sustainably. The agreement between the CFA and KFS typically details the forest user rights and the responsibilities of each party. The KFS is tasked with implementing and enforcing forestry laws and regulations, holding the authority and oversight responsibilities in forest management. The CFA assists the KFS in enforcing the provisions of the Forest Act 2005, indicating that the CFA operates within the legal framework and works in conjunction with the KFS to support the enforcement of laws and regulations. The CFA conducts the tree planting and sales, while the income from timber plantations is exclusive to the KFS.

Under this arrangement, forest rangers play a significant role. They are on the frontline, preventing illegal activities, and helping to resolve human-wildlife conflicts. They check the access permits and receipts for access to forest products. Both CFA members and non-members are required to pay a specific fee to the CFA and KFS for accessing resources like fuelwood or fodder. The receipt serves as proof of payment and authorization for those activities.

The CFA contributes to the community by providing the opportunities to participate in diverse livelihood-supporting activities. These involve bee-keeping, grass harvesting, collection of

medicinal herbs etc.. Granting access for the collection of fodder and fuelwood is an essential aspect of the CFA's activities, addressing the daily needs of the community for cooking and heating, as well as livestock nutrition. The PELIS Program stands out as a significant initiative under the CFA's purview. It offers community members opportunities to engage in cultivating agricultural crops during the early stages of plantation zones within the forest, which ensures food security, promotes farmers' income, and contributes to reforestation and environmental conservation (KII - CFA chairman). Beans and maize represent the predominant crops cultivated and harvested within these areas. Concurrently, members of the CFA who are granted access to farming plots, are tasked with maintaining and pruning the trees coexisting within them. These trees form integral components of the plantation zones, and agricultural activities are sustained until their maturity, usually within 3-5 years. The CFA controls the community's access to the forest and charges them for forest-related activities and CFA membership.

From the social perspective, the CFA's involvement in Corporate Social Responsibility (CSR) initiatives focuses on enhancing the community's welfare. CSR initiatives include purchasing geometrical sets for schools, sponsoring university and secondary school students, and providing partial to full school fee support for children of CFA members, alongside purchasing Christmas gifts for some of CFA members.

The investor is also significant in this dynamic. This introduces the private sector angle to the PFM. The investor's role is geared towards leveraging forest resources for tourism without compromising conservation efforts. The investor and the community share in the profits generated from ecotourism- Camp Ndunda. Camp Ndunda creates local employment opportunities, provides professional training to enhance skills, and supports infrastructure development and CSR initiatives that improve access to education, healthcare, and essential services for the local community. While the 10% of net total income shall be set aside for maintenance of infrastructure, the 90% shall be shared, with the CFA taking 40% and the investor taking 50% (New Njukiri Muungano CFA, 2015).

Overall, the governance structure of PFM in Njukiri Forest is designed to balance conservation with community development. It creates a model of shared responsibility and benefits, where the state retains regulatory control but devolves certain management rights and economic benefits to local communities and private partners. This interrelationship aims to incentivize forest

conservation by aligning it with local socio-economic interests, potentially leading to a more sustainable management approach that benefits all stakeholders involved.

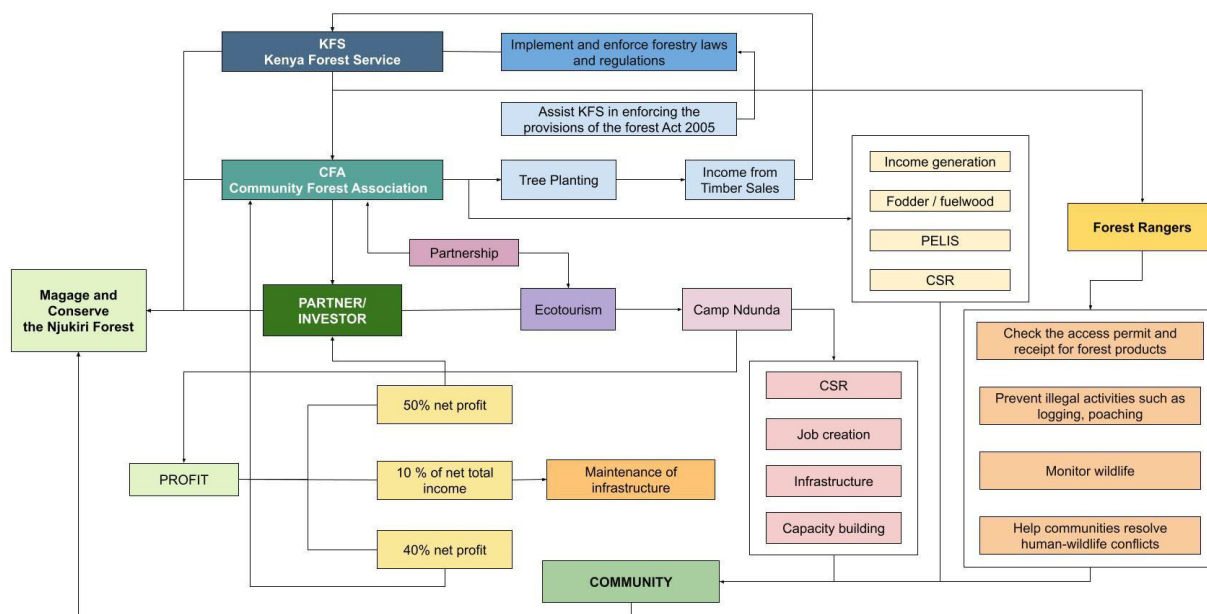


Figure 4. Stakeholder map

Biophysical impacts in Njukiri Forest

Previous studies on PFM have suggested that its impact on biophysical ecosystems may not always be positive, as there is a risk of degradation and relocation. In the case of Njukiri Forest, particularly the area around Camp Ndunda, our hypothesis was that PFM and PPP could have a negative impact on biophysical aspects due to activities like clearing land for accommodation and other facilities. However, through key informant interviews involving the CFA chairman, KFS officers, and other stakeholders, transect walks, and forest assessments, we found that all stakeholders recognized the significant contribution of PFM to forest conservation. We also found some narrative indications of partial degradation, such as illegal cutting during night, human-made forest fires to hide the evidence of the illegal cutting, and dam construction, although they don't appear to be significant-scale events.

Land Use and Biodiversity

Table 1 shows the results of the forest assessment. The PELIS zone is a co-management area by KFS and CFA. KFS allows the CFA members to use the area for cultivation only while the trees are young. Relatively small *Cupressus Lusitanica* and *Jacaranda Mimosifolia*, 3 - 4 year-old, were sparsely observed in sample plots 1 and 2 of PELIS. The area receives plenty of sunlight, so it is suitable for cultivation and is covered with harvested maize.



The plantation zone is for timber harvesting managed by KFS. Only *Eucalyptus Saligna* which is approximately 5 - 10 years old was observed in sample plots 3 and 4. Because of the features of the species and the canopy cover, the surface was more open with few low plants.

The conservation zone is an area for indigenous species. Some areas are hard to proceed for humans with many plants on the surface. Communities collect fuelwoods there but they never cut trees and only pick them up from the ground according to the rangers and CFA members. Sample plots 5 and 6 were the areas where the soil surfaces were taken for the nursery, thus fewer plants were observed and even the roots were exposed.



Camp Ndunda is the ecotourism area in the middle of the conservation zone, covered with indigenous. The most diverse species were observed. Camp Ndunda is well committed to the conservation and keeping nature beautiful, and they even have a signboard to alert visitors not to bring plastic garbage outside of the reception areas, however, in fact, there was some garbage on the ground.

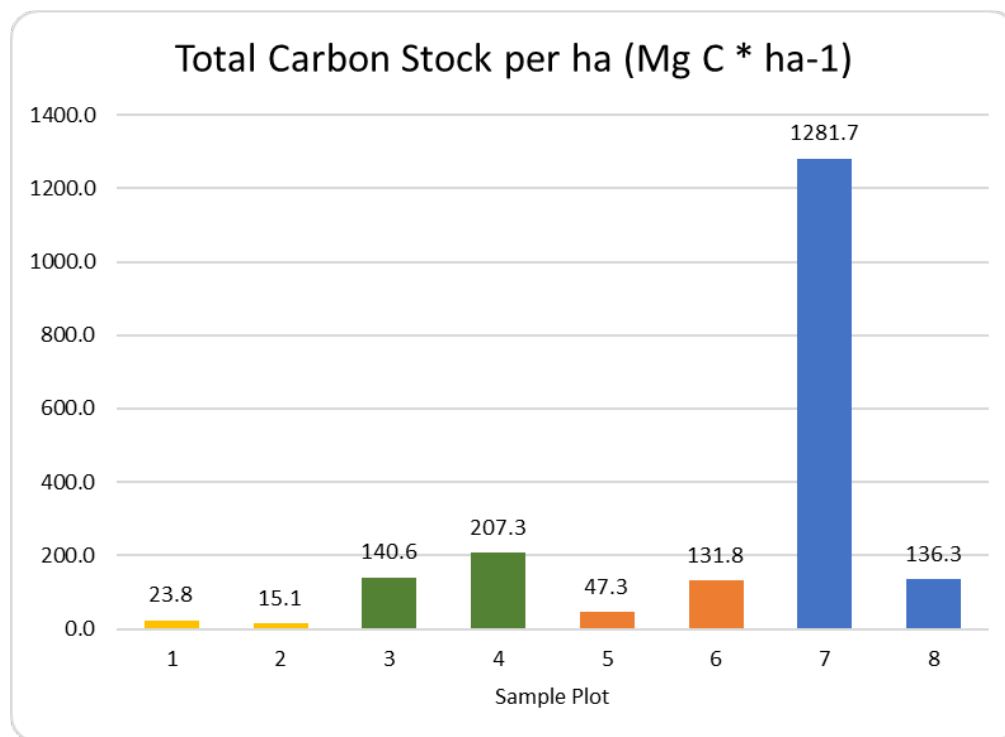
Table 1. The result of forest assessment in 8 sample plots in the Njukiri Forest.

| Plot | Zone | Species (the number of trees) | Min - Max DBH (cm) | Median DBH (cm) | Min - Max TH (m) | Median TH (m) |
|------|---------------------------------------|--|-----------------------|--------------------|---------------------|------------------|
| 1 | PELIS | Cupressus Lusitanica (9), Jacaranda Mimosifolia (1) | 9.55 - 19.75 | 13.77 | 6.93 - 13.30 | 11.7 |
| 2 | PELIS | Cupressus Lusitanica (8), Jacaranda Mimosifolia (2) | 7.68 - 19.90 | 9.24 | 6.95 - 14.10 | 9.70 |
| 3 | Plantation | Eucalyptus Saligna (9) | 17.99 - 28.28 | 24.20 | 22.40 - 29.30 | 23.90 |
| 4 | Plantation | Eucalyptus Saligna (9) | 18.15- 34.71 | 27.39 | 25.30 - 36.30 | 30.60 |
| 5 | Conservation (Human intervened) | Spathodea Campanulata (3), Cordia Africana (1) | 17.20 - 69.27 | 20.94 | 17.50 - 23.30 | 21.80 |
| 6 | Conservation (Human intervened) | Maesopsis Eminii (16), Ehretia Cymosa (2), Cordia Africana (2), Acrocarpus fraxinifolius (1) | 7.96 - 32.17 | 11.46 | 12.80 - 39.30 | 17.30 |
| 7 | Camp Ndunda (Conservation zone) | Ficus Sycomorus (5), Newtonia Buchananii (4), Ficus Capensis (2), Acokanthera Oppositifolia (1) | 7.64 - 143.31 | 9.87 | 4.50 - 50.30 | 5.85 |
| 8 | Camp Ndunda (Conservation zone) | Spathodea Campanulata (7), Vitex Keniensis (2), Ficus sycomorus (2), Maesopsis Eminii (2), Newtonia Buchananii (1) | 10.51 - 42.68 | 20.06 | 6.60 - 24.80 | 17.30 |

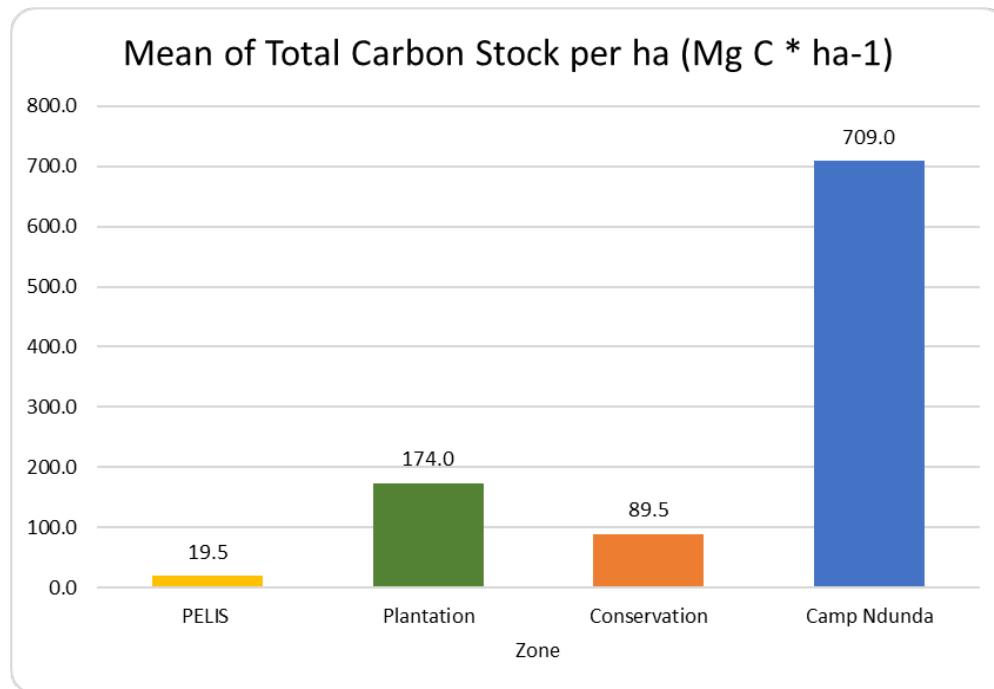
Carbon Stock

Figure 5.1 is the result of the total carbon stock per ha of each sample plot in the Njukiri Forest, ranging from 15.1 in plot 2 to 1281.7 in plot 7. Figure 5.2 shows the mean of TCS per ha of each zone in the Njukiri Forest, which revealed that the camp area is not in worse condition, in contrast to our initial hypothesis. Rather, the Camp has the highest carbon stock capability in the forest, with a mean TCS of 709 MgC*ha⁻¹. Two Newtonia Buchananii with DBH >90cm and height

>40m in plot 7 help contribute to the result of a huge carbon stock, though the methodology we used for measurement and the allometric equation could have distorted the result. Without these two trees, the TCS of plot 7 would be less than 0.5% of the current result, so we can assume that the giant trees are blocking the growth of other plants. In Figure 5.2, PELIS has the lowest TCS, 19.5 MgC*ha⁻¹, but this does not indicate that there has been any degradation as PELIS is a young plantation area. When comparing only the means of plantations and the conservation, plantations have a higher carbon storage capacity than within the conservation zone, even when the number of trees is taken into account. However, it would be difficult to apply the same assumptions to PELIS since different tree species were observed in plantations and PELIS. Soil conditions may also influence the conservation outcomes. The conservation area is not always the best at storing carbon, however some indigenous species such a *Newtonia Buchananii* which were the biggest trees in both plot 7 and 8, when grown over time, have a great potential to help combat global warming or climate change.



*Figure 5.1. Total Carbon Stock per ha (Mg C * ha⁻¹) of each sample plot in the Njukiri Forest*



*Figure 5.2. Mean of Total Carbon Stock per ha (Mg C * ha-1) of each zone in the Njukiri Forest*

Comparison with perceived forest health by community

According to the stakeholders, the state of the Njukiri forest was poor, with unrestricted access leading to activities such as charcoal production and illegal logging before the introduction of PFM. However, since the implementation of PFM, there has been a noticeable improvement in the condition of the forest.

As reflecting their perception, the tree canopy cover data for the years 2000, 2010, and 2020 in Figure 6 shows that the canopy cover area has increased. In particular, the southwest area of Njukiri forest and the area south of the dam, which are part of the current conservation zones, had scarce forest canopy cover in 2000, however, the forest canopy cover increased significantly in 2010 and it has maintained in 2020. In the central area, only slight changes can be seen between 2000 and 2010, however a significant increase in forest canopy cover can be observed in 2020. A large decline is seen in the southeast in 2020, but this won't be considered as deforestation or degradation since these areas are plantation. Overall, approximately 78% of the entire forest area experienced an increase in tree canopy between 2000 and 2020.

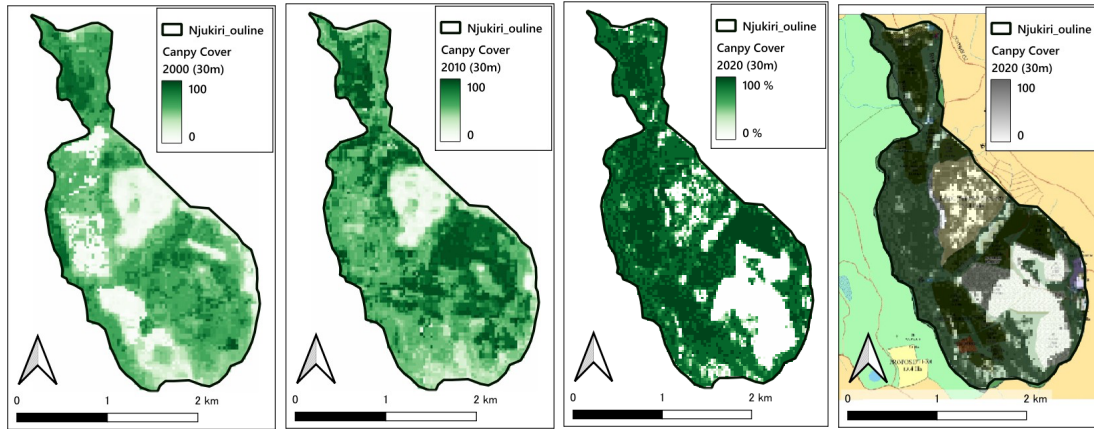


Figure 6. Tree canopy cover transition for the years 2000 (left), 2010 (centre left) and 2020 (centerright). Overlay of Njukiri forest resource map and canopy cover 2020 (right).

Although it appears that the forest area has increased and conditions have improved, we should be sceptical about the Camp areas. The owner of the camp confidently stated that he has been committed to environmental conservation, however, it seems that the forest cover has been slightly decreased when we look into satellite images near the Camp area in Figure 7. It is estimated that the area without forest cover in the camp has changed from 1.33 ha in 2005 to 1.95 ha in 2022.

2005.05

2022.01



Figure 7. Google Earth images near Camp Ndunda for 2005.05 (left) and 2022.01 (right). The areas of non-forest cover were estimated by hand-drawing based on the visual observation.

Overall, we found that all stakeholders recognized the important role of PFM in forest conservation. The camp Ndunda zone and the plantation zone are highly important from a biophysical perspective, but other areas also deserve attention from a land use perspective. It can

be inferred that the forest condition has improved, as indicated by the overall increase in forest cover data over the past 20 years. However, there is a possibility of deterioration in Camp Ndunda despite the recognition that they contribute to the conservation, thus further research is required.

PFM impact on local livelihoods

The results from the household survey illuminate more details of the PFM framework and its provisions regarding benefits derived from Njukiri forest that are directly correlated with the livelihoods of the adjacent community.

We collected a total of 30 questionnaires, out of which 26 were from CFA members. Figure 8 illustrates this part of the results. Among all respondents, 76.67% are female. The majority had a low level of education, only 6.67% of the respondents received higher education. Additionally, the respondents are relatively older, with 50% of them being aged 56 or above. This aligns with the information we obtained during the key informant interviews and FGD, indicating that CFA is primarily composed of women and older people. This composition can be attributed to the traditional gender roles in certain cultures, men are occupied with responsibilities to provide for the whole family including paying the tuition fee, and women are more available to participate in CFA activities like collecting the fuelwood. Many youths move to urban areas in search of better education and employment opportunities.

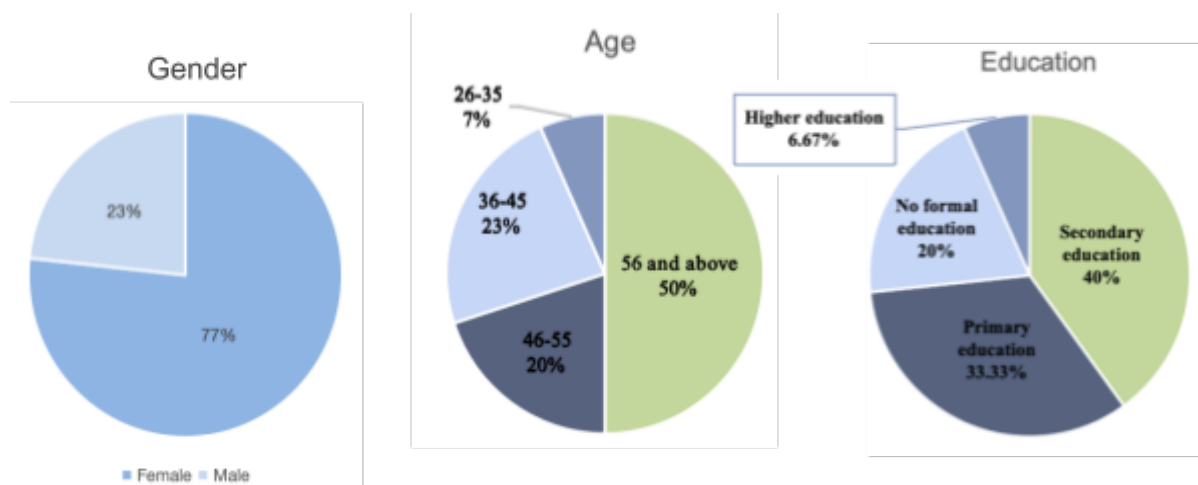


Figure 8. Results of household survey regarding gender (left), age (centre), and education level (right).

Most respondents have been members of the CFA for more than 10 years, and some of them are among the founders of the CFA. According to one founder, the origins of their involvement can be traced back to 2006 when the Njukiri Forester attended a meeting about the PFM in Nairobi. After that, CBOs were established and subsequently converged to form the CFA. There appears to be a slight discrepancy in the responses we received, as the official agreement with KFS and CFA states the CFA was established in 2011. However, 7 out of 26 CFA respondents said they joined CFA before 2011. This inconsistency suggests a possible confusion between CBO and CFA because their CBO is more closely related to their livelihood. And for most people, becoming a member of CBO is the prerequisite for joining CFA. Although CBOs are part of CFA, each CBO has its land outside the Njukiri Forest which means outside the management of CFA.

Also, CBO members are required to remit a fee of 500 KES for CFA membership, a significant increase from 100 KES in the past. Additionally, they have to pay weekly fees for collection of firewood and fodder for cattle. The vice-chairman asserts that this fee adjustment is designated for the production of CFA registration cards and the increased protection and patrolling of the forest. Conversely, individuals not affiliated with any CBO have to pay 3000 KES for CFA enrolment. Non CFA members cite that the fees are so high that it does not make financial sense for them to be members (FGD - CFA Non-members). Similarly, the youth leader interviewed cited the many fees is one the reasons why they, including himself, may not be participating in the CFA (KII - Youth Leader). While we don't have financial information of the non-members FGD, the fact that they had taken a job as farm-hands at another farm in the community, in addition to their concern around affording food for their families there is a high likelihood that they are also not in the most financially favourable situation. This shows that there is a risk of those with fewer or unstable financial capitals being excluded from membership as it stands currently.

Figure 9 shows the results of the benefits recognized by the survey respondents, stemming directly from their engagement in forest-related activities or their participation in the Njukiri CFA, primarily encompass fuelwood collection, participation in the PELIS, gathering of fodder, CSR actions organised by the CFA, and recreational activities in the forest, including Camp Ndunda. Conversely, beekeeping, gathering of non-timber forest products, and timber harvesting were mentioned with less frequency, with timber harvesting being notably scarce, as it strictly remains under the jurisdiction of the KFS with no rights being transferred to the CFA. Additional benefits cited included participation in tree nurseries and the potential for profit sharing among the community following the sale of seedlings. Among these benefits, PELIS emerged as

particularly pivotal for livelihood enhancement, as participants involved in the scheme derived significant value from it. Fuelwood and fodder gathering were also acknowledged as valuable, albeit not as profitable as PELIS, as they constitute essential resources for food provision and daily life but lack the revenue generation aspect inherent in PELIS.



Figure 9. The main benefits from Njukiri Forest and the Njukiri CFA

Respondents' assessments of the proportion of their total livelihood derived from forest resources varied. Less than half of the participants indicated that over 50% of their livelihood stemmed from such resources. Agriculture was identified as the primary livelihood source for households, followed by livestock, with forest-related activities acknowledged as a contributing factor but not the predominant one.

Overall, as visualised in Figure 10, the impact of the framework was perceived positively by participants, who noted improvements in their livelihoods since its implementation. This sentiment is corroborated by enhanced access to critical resources, such as fuelwood, and increased income-generating opportunities from forest-related activities. Some survey respondents acknowledged as indirect benefits stemming from CFA and its initiatives, the overall enhancement of forest quality, encompassing improved environmental conditions, climatic conditions, and ecosystem services. For them, the ameliorated forest quality, in turn, positively influences the provision of livelihood benefits in the long term.

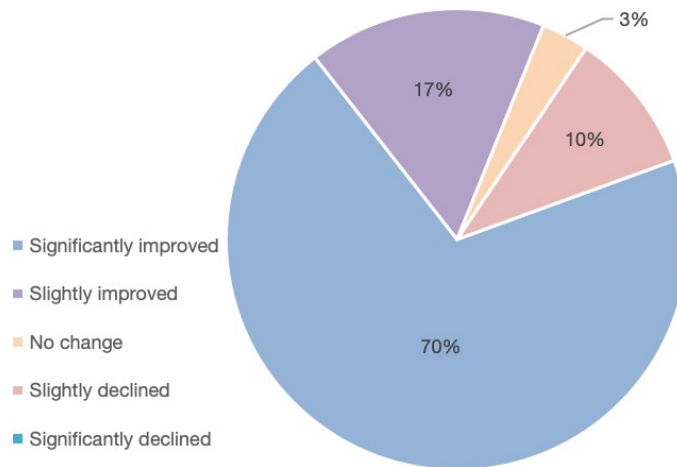


Figure 10. Rating the Impact of PFM on Household Livelihoods

The interviews with officials highlighted various benefits provided by forest management initiatives, including food security, environmental improvements, educational support, and economic opportunities. These benefits are primarily distributed through mechanisms such as PELIS and Camp Ndunda. Distribution mechanisms include attendance-based benefits allocation and decision-making by management committees.

The benefits distributed by forest management initiatives are significant for livelihood improvement, as they contribute to economic stability, social development, and environmental sustainability within local communities. Initiatives like PELIS provide direct support for livelihoods through income generation. Education and access to forest resources are also prevalent.

The interviews with officials predominantly centred on the benefits of PELIS, yet they overlooked the inherent risk of discontinuity inherent in the program. It is evident that the life cycle of the plantations imposes constraints on agricultural activities, thus curtailing farming possibilities. Notably, PELIS operates intermittently, contingent upon the maturity of the plantations. This underscores the impermanence of PELIS as a reliable source of livelihood. Consequently, households cannot rely solely on PELIS and must cultivate diversified income streams to ensure sustainable livelihoods.

Regarding the recognition of benefits from the forest through the CFA, it is essential to note that the forest cannot be viewed in isolation from the management practices implemented by the CFA.

Consequently, the forest is not readily perceived as an accessible resource. For instance, survey respondents who were no longer actively engaged in CFA activities, such as attending meetings, tending to nurseries, or participating in PELIS initiatives, were unable to discern much benefit from the forest. Their disengagement from the CFA effectively precluded them from accessing the benefits derived from the forest. This exclusionary aspect underscores the interdependence between active CFA involvement and the realisation of forest-related benefits.

According to the investor of Camp Ndunda, the agreement between him and the community has ushered in a host of benefits, spanning economic, social, and environmental spheres. Direct financial contributions, including quarterly payments to the CFA and local employment opportunities, have provided a stable income source and reduced dependency on traditional livelihoods. Indirect economic stimuli, such as procurement from local suppliers and professional training programs, have bolstered entrepreneurship and skill development within the community, fostering economic empowerment and sustainability. Moreover, CSR initiatives and community development projects have enhanced access to education, healthcare, and essential services, contributing to overall social welfare and quality of life. Concurrently, environmental conservation efforts, including tree planting and environmental education, ensure the preservation of natural resources for future generations while supporting ecotourism activities.

Perception of governance among community members

Having explored the measurable and perceived impacts of the PFM in the communities surrounding Njukiri Forest, as well as the structures set up to govern the PFM, we will now delve into the perceptions of the governance, inclusivity, and transparency of the system and processes involved in the day to day operations and decision-making in the forest.

The overall perception among communities is that the forest has significantly improved both in terms of forest health, as well as the security for movement and activities within the forest. This is directly attributed to the PFM and the increased presence of Forest Rangers from the KFS which has significantly increased as part of the PFM. Additionally, there is a perception broadly among the community that having the forest be, at least partially, governed by the community has also contributed to a feeling of ownership among the community lessening issues of illegal logging and burning of charcoal within the forest (KII - CFA Chairman; FGD - CFA Membership. FGD - CFA Non-members).

Meanwhile, the difference in familiarity regarding the PFM framework is shown in Figure 11. Among the survey respondents, 53% are not familiar with the PFM framework at all, and only a small fraction, 3%, are very familiar with it. This lack of familiarity can likely be attributed to the limited information sharing. This is further reflected among non-CFA members, where many are not familiar with PFM. During FGD with non-CFA members, they indicate that their reasons for not joining the CFA stem from a lack of understanding of the benefits of joining a CFA, as well as the process involved in becoming a member.

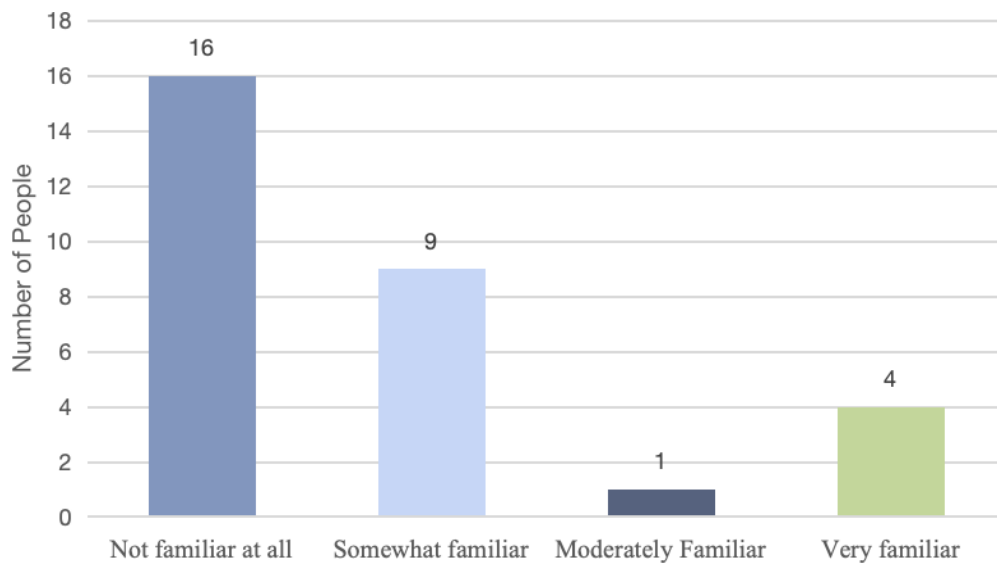


Figure 11. Familiarity with PFM framework

Regarding the frequency of attending meetings, shown in Figure 12, some people attend the meeting once a year, and some people attend the meeting every week, which affects how benefits are distributed among CFA members i.e. members who attend more meetings get more benefits (KII-chairman). However, according to one household survey, the respondents claimed that the information dissemination about meetings is very poor, they are only informed and invited to participate in the meetings during elections, and they don't know when the meetings are taking place. Others are eager to attend meetings but the long distance poses a significant barrier. Particularly for the older members, some people have to walk for a whole day to attend the meeting. Some members said even though they attended the meetings, their opinions were disregarded by the leadership due to their age. Nevertheless, they have contributed a lot to the forest and CFA.

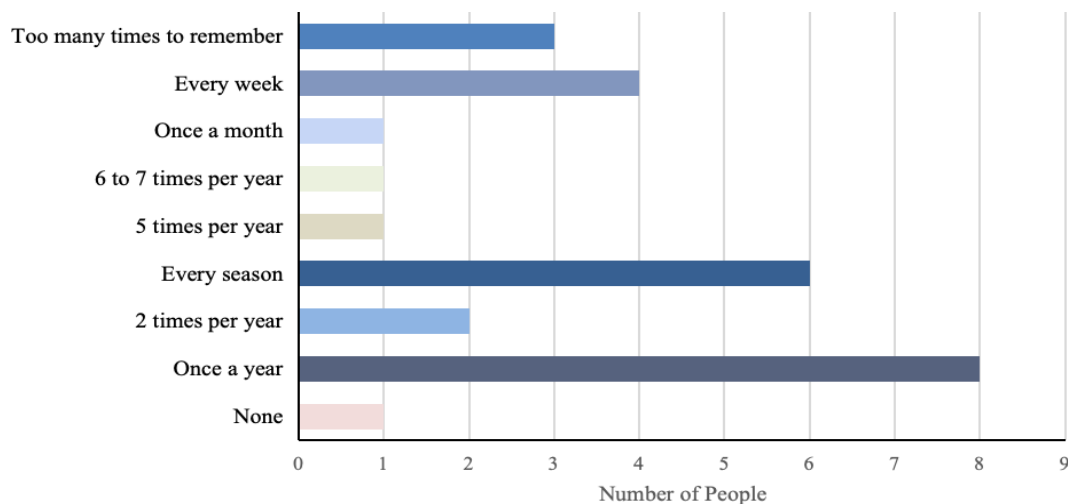


Figure 12. The frequency of meeting attendance.

Financial constraints

As outlined earlier in this report, PFM has led to a significant increase in fees related to forest use. Members of the CFA pay upwards of 500 KES a year in membership fees, and while this is perceived by the CFA Management and KFS as a necessary step to protecting the forest, this is highlighted in several interviews as a challenge.

This is not helped by the fact that there has been a very conscious effort from the side of leadership, to use access to benefit-sharing as a way of rewarding those who participate most in activities under the CFA. Youth, as well as day-labourers, likely have less time available to participate in such activities, at least without significant impact on their livelihood. Elders are similarly affected by this trend in governance, with some surveyed positing that they feel passed over for benefits due to not being able to do as much work as they used to before, even despite their previous contributions to the CFA (Household Survey). However, this appears to not be the case for all elders, as at least some elders enjoy equal access to benefits despite their level of participation (FGD - CFA Members).

These findings allude to some of the strongest trends identified through the qualitative data gathered. Firstly, the issue of a lack of transparency and clarity around the overall governance as well as how benefits are shared, who is involved in this decision-making. And secondly, the fact

that there appears to be a centralisation of power and influence among a few of the larger CBOs who ‘take care of their own’ but also appear to dominate governance structures.

Opaque governance

The rules and regulations governing the CFA, while outlined in both the PFMP and the agreement with KFS, seem to be unclear to members as well as the broader community. As revealed earlier in this report, very few community members had a full understanding of PFM, what it entails, as well as the full scope of activities, and opportunities for accessing benefits. In addition to this, there are large discrepancies in the information given by different respondents regarding aspects of governance. This includes the length of tenure, the form of elections, the insight into decision-making as well as a more general lack of oversight and insight into membership numbers and which members of the community are currently members of the CFA.

While there are many natural reasons for this to be the case, this does highlight a key challenge regarding accountability, especially from the management committee to the broader membership. Having opaque decision-making structures makes it more complex to address and resolve complaints, and given the lack of insight into the structures of the CFA, there is a likelihood that the broader membership is not even aware of what checks and balances are in place for them to address any questions or complaints they may have.

When it comes to the benefits, in particular, there was an explicit acknowledgement from management that there are currently no formalised guidelines for benefits-sharing. While there were anecdotal mentions of ensuring that those most needy derive the most benefits, for example from the PELIS, there are also examples highlighting the shortcomings of this approach. With the limited data available from the CFA, it remains very unclear how they would access the necessary information to accurately assess who may be most in need of support.

When interviewing the private partner, he alluded to having made CSR donations outside of the CFA structures, due to a lack of trust in the distribution of benefits within the association (KII - George, Titoge).

Centralisation of power

By extension of the lack of transparency within governance, there is also evidence of a

centralisation of power among specific groups within the CFA, both contributing to the opacity around decision-making as well as uncertainties around how to qualify for and access benefits.

While the leadership is democratically elected, there are several discrepancies in the descriptions of these processes, who is included, and how.

The elections of management committee members happen at the Annual General Meeting (AGM) which is the main decision-making and dialogue forum of the CFA, however, based on the information gathered, the number of people present at this meeting (around 100) is vastly less than the overall membership of the CFA (400-500) (KII - CFA Leadership).

It is mentioned by several respondents in the survey that two particular CBOs are larger in membership than the others, and exert a significant influence on the decision-making in the CFA, including who has access to which benefits. One of these also happens to be the CBO which the Chairman belongs to, which would cause an imbalance within decision-making structures.

The KFS appears to also have contributed to this, as they have a previous history of directly rewarding a specific CBO (Mumanthi) for their involvement in the CFA - something only this CBO received (Household Survey)

There also appear to be structural issues that have individuals being able to capture and keep powerful positions within the CFA. Former members of leadership often transition into other powerful positions within the CFA or in other forest management forums.

As such, CFA leadership structures as they are currently, do not adequately facilitate a natural transition of the leadership limiting opportunities for influence and access to external forums to a smaller part of the CFA and the community (Household Survey).

Lastly, the group of non CFA-members shared examples of some concerning practices around PELIS, in which members of CFA leadership would claim large pieces of land for themselves within the PELIS areas and then subdivide these and rent them out at a profit, a profit which according to them was directed at these individuals themselves, rather than the CFA (FGD - CFA non-members).

As the results outlined above show, the PFM and the CFA structure in Njukiri forest have had significant positive impacts on the natural capital within the forest, as well as the livelihoods and financial capital of forest adjacent communities. However, as evident in the complexity of the structure, as well as in the perceptions shared by our respondents, the opacity of the governance

and decision-making, along with elements of a centralisation of power means that these benefits may not have been distributed equitably, to benefit community members based on need, but rather based on influence.

8. Discussion

In the coming section, we will discuss these observations within the frame of our conceptual framework, relating these findings to the established knowledge on the impacts and challenges of PFM in contexts where it is implemented.

Benefits from the forest

The implementation of PFM in Njukiri Forest has led to significant improvements of forest health and enhanced livelihoods in surrounding communities. Before the establishment of the CFA, there were no restrictions on how the Forest was used, which contributed to extensive utilisation of forest resources. The unregulated access resulted in deforestation and degradation. And the lack of structured and participatory management meant that the immediate needs for fuelwood, fodder, timber and other forest products took precedence over long-term conservation and sustainability.

Through the PFM framework and management of the CFA, communities are more engaged in the sustainable forest practices. Also, through the vigilant presence of Forest Rangers from the KFS, illegal activities like logging and poaching have decreased. The community plays a central role in forest management and livelihood improvement under the new framework, ensuring the forest's health and sustainability for future generations. The better quality of the forest has a positive impact on the provision of benefits, while indirect impacts are less significant but provide a variety of services and thus long-term opportunities for livelihood improvement.

However, while the commitment of a participatory and community based approach to forest management is admirable, this case, similarly to many others, remains to see a true decentralisation of decision-making. Similarly to cases cited in Mutune *et al.*, (2017) and Chomba *et al.*, (2015) in Njukiri Forest the KFS still maintains control over the most valuable forest resource, timber, as well as receiving the income from two of the three most important forest

resources cited above; fuelwood and fodder. As such while the participatory approach and collaborative partnerships empowers the community to take ownership of forest resources and implement sustainable management practices, the decision-making power and primary financial benefits remain centralised. Furthermore, due to the structure of the PFM approach, with 5-year partnerships and plans between KFS and CFAs, there is limited scope for a holistic plan for how, and based on what conditions, the CFA may eventually become more independent as a forest management actor.

However, this unequal power-dynamic does not take away from the fact that the communities do derive significant benefits from the forest - and while perceptions and levels of use definitely differ, almost all informants deem that the fees they pay are, at least to some extent reasonable with the benefits they gain from them. And regardless of benefits gained, there is a general sense among the community that having the forest be co-managed in a collaboration between government and community is positive from a long-term sustainability and climate enhancement perspective.

A contributing factor for this positive perception of the PFM in Njukiri may be that local livelihoods are not entirely dependent on forest activities, releasing some of the tension on the functionality of the framework. With homestead farming and livestock being the main livelihood sources and the forest being a rather small one, it is evident that the forest primarily plays a complementary role in livelihood provision.

According to perceptions of officials, this is also a contributing factor to the improvement in forest health and successes in conservation. The weekly visits by the majority of the households to Njukiri forest show that the forest is an indispensable aspect of everyday life, without this meaning that the benefits from it comprise the whole foundation of the community's livelihoods.

The positive perception of PFM in the Njukiri forest resonates with the notion that reduced dependency on forests can enhance conservation outcomes, as suggested by the theory reviewed on the forest-poverty nexus. Livelihood diversification, facilitated by access to farming land outside the forest and cattle, minimises pressure on forest resources within the PFM framework, allowing for less degradation of the forest. This echoes the findings of Gikonyo and Kiura (2014), highlighting the positive influence of diversified income sources in reducing reliance on forests and achieving sustainable forest management. Furthermore, the income-generating

opportunities from the forest or forest products, which contribute to benefits through the PFM framework and the operation of the CFA, serve as an additional, not foundational, source of income, reinforcing the community's resilience. This aligns with the argument made by Sunderlin et al. (2005), emphasising the importance of diversified income sources in achieving successful forest conservation. The observed decrease in illegal activities in the forest suggests a correlation with the community's overall well-being and reduced dependency on the forest. Additionally, the distribution of benefits and governance issues, although not optimal, do not impede the overall effectiveness of the PFM framework. This displays the community's adaptability and resilience, demonstrating that while governance issues persist, the positive outcomes of PFM in Njukiri contribute significantly to livelihood enhancement and forest conservation efforts.

Equitability in livelihoods improvement

This trend in the data highlights a key challenge for PFM as a vehicle for improving rural livelihoods and empowering local communities as stated by Chomba, Treue and Sinclair (2015) mainly its failure to “*correct structural inequalities and reduce vulnerabilities*” (Chomba, Treue and Sinclair, 2015, p. 45). As is the case with the Njukiri CFA, the KFS has decentralised much of the responsibility for forest protection, but has yet to relinquish meaningful control of the most valuable common resources and how these are accessed by communities.

As outlined in the results section, there are also significant challenges highlighted by community members surrounding transparency and downwards accountability from the CFA leadership. This is another component highlighted by Chomba et. al (2015), which highlights transparent leadership, including equitable representation and regular, direct elections as another key component to improvements in livelihoods and reduction of vulnerabilities. This, along with the challenge of ensuring strong and equitable participation of specifically marginalised groups such as youth and the elderly, leaves

One of the key outcomes of the elements of opaque governance and decision-making as well as centralisation of power within the CFA, outlined above, is a very disjointed approach to benefits-sharing which lacks a formal structure as well as widely shared and commonly decided guidelines and requirements for who can access what benefits. This means that very few CFA

members outside of leadership have a real insight into the extent of their own access to benefits and that non-members find it difficult to justify the membership fees with an unclear perspective for what is to be gained.

Generally, a lot stands to be gained from increased transparency, both in terms of trust in leadership among the community, and in terms of a more equitable distribution of benefits - as uttered by the private partner in the project, George Cachaga *“once you want to do professional business, just be open”* (KII - Titoge)

Methodology reflections

While there was a wealth of knowledge gained from the informants who participated in this research by sharing their opinions and perspectives, we must also acknowledge that the results we have arrived at have significant limitations and thus may not address all issues relevant to the implementation of PFM in Njukiri Forest.

In order to establish an understanding of the PFM framework as well as accessing members of the CFA, we worked quite closely with the CFA. While this collaboration was very positive, it was also evident that some of our sampling ended up being somewhat biased by our reliance on the CFA leadership as gatekeepers.

Our sampling of survey-respondents was largely reliant on contacts in CFA leadership and thus this group may be skewed towards those who are viewed more favourably by leadership, and who might in turn view leadership more favourably.

We also cannot disregard the power-dynamics inherent to the kind of short-term research we conducted in this case. Coming into a Global South community as Global North researchers means that there is an inherent power-imbalance to all our engagements, based in long-standing racial and colonial histories and influences. As such, there was a clear sense of an interest from informants in portraying the Njukiri PFM collaboration as well as the CFA as positively as possible, both to be viewed favourably by us as outsiders, and as researchers. Our lack of insight into specific local power-dynamics and sensitivities may also mean that there were some perspectives which we have failed to include. As such, these results should be considered as one contribution to a larger picture of the governance and impact of PFM in Njukiri.

Lastly, while having interpretation for most of the data-gathering was a necessity, and ultimately made a huge positive contribution to our data overall, there are limitations and considerations to be made for the fact that all responses were filtered through several people in the process of answering. We opted for interpretation rather than translation, to enable us to be as present and engaged in discussions as possible – however, there is no doubt that the effort and pressure of simultaneous interpretation will have resulted in a loss of nuance and details in some cases. This in particular for the Focus Groups, where interpretation challenges the format because it requires more pauses and more intervention by the facilitator (Quintanilha *et al.*, 2015).

9. Conclusion

Our study conducted in Njukiri Forest shows that Participatory Forest Management has positively impacted the forest health and the livelihoods of adjacent communities. Through CFA initiatives including livelihood improvement programs like PELIS and cooperation with investor for Camp Ndunda, participatory management of forest resources is perceived as beneficial for long-term sustainability and climate resilience by the community. While the governance has benefited the community in several ways, challenges related to the transparency and accountability of CFA leadership need to be addressed. A major consequence of these governance challenges as well as centralisation of power is a disjointed and opaque benefits-sharing mechanism. This has led to a limited understanding of benefits among both CFA and non-CFA members. To achieve the PFM's objectives, it is essential to foster a transparent, equitable, and inclusive governance model.

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11. Appendix

Annex 1- Synopsis

1. Introduction

The calls for increased protection of existing forests and the planting of new forests across the world have increased the need for exploration of more innovative mechanisms for financing these initiatives. An avenue often explored is that of Public Private Partnerships (PPP) in which private companies or private financial institutions enter into consortia with local or national governments to provide financing for forest protection or other projects focused on conservation (Chisika and Yeom, 2021). These partnerships will often include a commercial component to generate profit to be shared between the partners, in addition to the opportunity for the private actor to use their participation as a selling-point with increasingly environmentally conscious consumers.

Another trend within the conservation and forest management sector is that of Participatory Forest Management (PFM). This shift coincides with an increased emphasis on participation more broadly, and entails approaching forest management more inclusively and democratically where local populations are involved in decision-making and management of local forested areas (Frank *et al.*, 2017). However, in order for these processes to be both meaningful and effective for local communities, they must ensure a broad presentation of the different groups within communities, particularly those already marginalised such as women, young people, ethnic minorities, people with disabilities as well as the poorest members of the communities who have less access to resources and influence (Chomba *et al.*, 2015). There are many stakeholders, factors and internal power-dynamics involved in PFM processes and thus attention must be paid to ensuring that processes remain inclusive and just.

Acknowledging the pivotal role of communities living adjacent to forests in curbing forest destruction and degradation, the Kenyan government introduced Participatory Forest Management (PFM). This initiative was initially established through the enactment of the Forest Act (2005) followed by the subsequent National Forest Act (2016). Within the framework of PFM in Kenya, ownership of the forest remains with the government, while forest-adjacent communities, organised as Community Forest Associations (CFAs), are granted user rights. Local

communities have the opportunity to apply for specific rights regarding the utilisation and management of forest resources through the CFAs, provided that these rights do not contradict forest conservation objectives. Within the Act, CFAs are acknowledged as key partners in forest management and are composed of multiple Community-Based Organizations (CBOs) or Forest User Groups (FUGs). To complement these efforts, commercial plantations are also available for lease agreements. In exchange, communities are granted various user rights, including the collection of firewood, grass for thatching roofs, grazing animals, gathering herbal medicine, accessing timber, engaging in scientific and educational activities, and participating in recreational activities.

The underlying principle behind promoting local participation in resource management is grounded on the belief that effective management of resources can be achieved when local stakeholders derive benefits from them and are granted either exclusive or shared decision-making rights in resource management. However, there are several examples of social and environmental challenges relating to these CFAs with issues around representation, distribution of rights and benefits cited in several studies (Chomba, Treue and Sinclair, 2015; Frank *et al.*, 2017). As research indicates, CFAs are actively engaged in a variety of management tasks related to forest protection, monitoring, and administration, the ultimate authority however over decision-making, revenue distribution, and overall control of resources remains with the Kenya Forestry Service. To ensure sustained commitment to the PFM process, it is imperative to share revenue streams generated from forest resources with communities, thereby balancing their incentives with the responsibilities they undertake (Mogoi *et al.*, 2012).

In the Njukiri Forest in Embu County, the two trends described above coincide, with a private actor establishing an ecotourism park in an area of the forest, of which some of the profit goes towards the local CFA and the local communities to use for diverse social initiatives in the local area of Kavinga.

This study endeavours to better understand the impact of this PPP on the local PFM, including the overall effectiveness of the protection efforts, the livelihoods of the local communities and the overall dynamics in the local CFA, leading to the following research question:

2. How has the public-private partnership in the PFM project in Njukiri Forest impacted the socio-economic and environmental dynamics of the project?
 - What are the legal frameworks governing the PFM in Njukiri Forest and how are

they perceived by the community?

- Have there been direct negative or positive biophysical impacts of the PFM and PPP in the Njukiri Forest? What are they, and what is the extent of them?
- How has the PFM project and the partnership impacted the livelihoods of local communities living in proximity to the forest? To what extent can some of these impacts be attributed to the PPP?
- What is the participation and representation like in the CFA at this time, has the PPP had any impact on these aspects?

3. Literature review

In Kenya, PFM involves the collaboration of CFAs to conserve forests while improving livelihoods. The introduction of PFM has led to better forest management and conservation efforts, including the formation of CFAs that actively participate in forest protection, monitoring, and governance (Larson and Dahal, 2012; Mogoi *et al.*, 2012). Studies show that PFM can contribute to improved livelihoods by providing new income opportunities for forest-adjacent communities, such as seedling production and beekeeping (Mutune *et al.*, 2017). While PFM in Kenya offers significant benefits in terms of forest conservation and improved livelihoods, it also faces challenges related to governance, benefit sharing, and internal conflicts. Internal conflicts within CFAs, such as power struggles and leadership issues, pose a threat to their viability (Mogoi *et al.*, 2012). These conflicts underline the necessity for negotiation support to address conflicting interests and bolster governance structures. Despite the participatory approach, the control over important forest resources and decision-making largely remains with governmental bodies. This limits the capacity of CFAs to influence forest management practices and access associated benefits (Mutune *et al.*, 2017).

Public-Private Partnerships (PPPs) in forest management in Kenya represent an innovative approach to addressing the complex challenges of sustainable forest management and conservation. It helps enhance sustainable management and address the emerging development challenges faced by natural forests. Kenya's government has developed policies and established institutions to enhance the implementation of PPPs, indicating a fairly stable condition for building trust among private partners involved in the governance of public natural forests (Chisika and Yeom, 2021). Policies and legislations support PPPs in forest sector development,

indicating opportunities for private investors to enhance the sector's contribution to socio-economic development, farm and private forests are expanding, driven by high demand and returns on investment (Cheboiwo *et al.*, 2020). However, challenges such as complex development and limited funding for conservation, especially benefit-sharing amongst actors and insufficient political goodwill for PPP processes need to be addressed (Chisika and Yeom, 2021). Addressing these challenges necessitates proactive measures aimed at promoting transparency, equity, and social inclusion in decision-making processes. Strengthening legal frameworks is crucial to safeguarding community land rights and preventing land grabbing incidents (Bae, 2023). By bolstering mechanisms that ensure fair participation and equitable distribution of benefits, PFM initiatives can overcome these challenges and realise their potential for fostering sustainable forest management and supporting the livelihoods of local communities.

While PFM contributes to enhancing forest conservation and improving livelihoods in Kenya, achieving meaningful inclusion and consideration of Indigenous Peoples and Local Communities (IPLCs) requires addressing governance challenges, supporting CFAs, acknowledging the value of traditional knowledge and management systems, and removing barriers to participation. Factors influencing the success of collective management of forest resources include household participation in CFA activities, institutional quality, group size, and the education level of the CFA chairperson. These factors underline the importance of fostering an environment that encourages active and equitable participation among community members (Okumu and Muchapondwa, 2020). The socioeconomic significance of the forest is recognized by communities but there is also a lack of sense of personal responsibility for its conservation (Nzau *et al.*, 2020). While PFM can lead to higher total and forest-related incomes for community members, governance often remains largely under the control of the Kenya Forest Service. This suggests that the current forest governance approaches in Kenya may not fully support meaningful participation in practice, potentially limiting the benefits for IPLCs (Mutune and Lund, 2016). Like the implementation of forest management has brought new income opportunities in nursery production and beekeeping. However, PFM has not granted genuine decision-making power over important forest resources such as timber and firewood to the CFAs (Mutune *et al.*, 2017). Also, inadequate access to updated information about management practices and legal rights limits the meaningful participation of local people in forest management. These findings point to the need for better communication and information dissemination (Himberg *et al.*, 2009).

When examining the potential of devolving natural resource management to local communities for poverty alleviation, it becomes evident that sustainable livelihood outcomes affected by co-management approaches for poor forest-dependent communities are dependent on institutional arrangements, which indicate collaborative governance levels. Although livelihoods for participants within co-management projects have improved compared to those outside, institutional frameworks for jointly managing forests are still in a nascent phase of development. For livelihood benefits to be secured there is a need to ensure co-management quality criteria like resource access clarity, benefit distribution, collective decision-making, effective monitoring, and conflict resolution. Instead, the main challenges in PFM frameworks include hierarchical frameworks hindering stakeholder interaction, limited community decision-making power, lack of shared objectives understanding, corruption in resource access, donor dependency, and inadequate property rights (Ming'ate, Rennie and Memon, 2014). More specifically, as research indicates, members of CFAs typically experience higher overall incomes, particularly from forest-related sources, compared to non-members. However, these income disparities are more closely linked to improved labour opportunities and access to markets facilitated by donor organisations rather than differences in access to forest resources. CFAs are granted restricted user rights, but they have limited control over these rights, along with participation in donor-supported, forest-related income-generating activities. Effective forest conservation and equitable livelihood outcomes are anticipated through political/democratic decentralisation, where decision-making authority is decentralised to entities accountable to local residents (Mutune and Lund, 2016). Issues arise from the CFA's representation of forest communities and its limited downward accountability. The participatory process is therefore criticised for deficiencies in engagement and inclusivity.

The effectiveness of community forestry in empowering local communities remains a subject of ongoing debate. National forest policies and actors have largely delegated limited powers to local communities, primarily focusing on forest protection and conservation, while retaining legislative authority and centralised control over economic benefits. On a parallel level, there exists a bias in CFA representation towards small, already influential local elites, which undermines the inclusive nature of CF initiatives (Chomba *et al.*, 2015). It may be that the integration of Community-Based Forest Management (CBFM) within existing economic and social frameworks can have profound implications for rural vulnerability but simultaneously the

socio-economic disparities ingrained in the historical political economy of land and forest allocation, alienation, and dispossession are reflected in the framework. Paradoxically, CBFM, instead of mitigating vulnerability, can exacerbate the plight of marginalised groups through two primary mechanisms: firstly, by imposing fees for access to forest products crucial for livelihoods by state agencies, and secondly, through elite control of local institutions that mediate forest access. Addressing vulnerability requires reducing fees for forest activities like firewood collection and grazing, ensuring equitable representation in local forest institutions, and alleviating structural inequalities in land and forest access (Chomba *et al.*, 2015). Elite capture, land grabbing, and the alienation of marginalised communities represent formidable challenges to its effective implementation. Elite capture refers to the phenomenon where influential individuals or groups within communities disproportionately benefit from PFM initiatives, thereby excluding or marginalising vulnerable community members (Frank *et al.*, 2017). Similarly, land grabbing, often instigated by commercial interests or large-scale development projects, seriously threatens community land rights and undermines the principles of inclusive forest governance (Bae, 2023).

Compared to state-managed forests, several studies show that community involvement improves forest management and aligns with sustainable forest management principles (Kairu *et al.*, 2021). A different study, however, reveals that the advantages of forest conservation are typically greatest in the initial stages following the introduction of an access restriction, following which the general condition of the forest frequently deteriorates. To make up for the reduction in the amount of forest-based products that people could previously obtain, there is also a risk that the degraded area will be relocated (Robinson and Lokina, 2011).

4. Methods/Methodological Framework

The methodology of the study consists of a mix of natural science methods as well as quantitative and qualitative social science methods, which together will enable us to answer our research objective as well as the subquestions, as presented in the matrix in Annex 4. Below will be presented a brief overview of the methods employed, with more in-depth descriptions provided in Annex 5. The order of the methods will enable us to continually build on our understanding of the intricacies of the context and the local governance, a more specified overview of which can be seen in Annex 6.

In order to assess the biophysical impacts of the PFM and the PPP we will conduct a forest assessment, focused on areas both within and outside of the area of the PPP, Ndunda camp, to assess the impacts of this project on the plant and tree biodiversity, as well as the biomass itself. To gain a further understanding of the significance of the Njukiri forest as well as the forest use among the local populations, we will do a transect walk along with 2-3 community members who will share their personal perspectives on the forest, how it has changed over time, and how the access of the local community to the forest has changed.

In order to understand the impacts of the PFM on local livelihoods, we will conduct a household survey, along with the baseline conducted as part of the 2021-2025 Participatory Forest Management Plan for Njukiri Forest to enable us to evaluate any positive or negative changes in the time since the baseline was conducted

In order to gain a full understanding of the different stakeholders involved in the forest governance of Njukiri Forest we will conduct a document analysis of key legal documents and other resources relevant to the governance of Njukiri Forest, as well as key informant interviews with a variety of actors, including local government, academia, private actors as well as community members.

To expand on this overview of the governance structures we will do focus-groups with community members, CFA members as well as non-members to understand how the representation and participation in the governance is perceived among the wider community surrounding Njukiri Forest.

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Annex 2 - Key information Interview, Interview Guide

Government Officials:

- -What role do you believe the government plays in Participatory Forest Management (PFM) in Kenya? Do you have an oversight role on the Njukiri PFM?
- How would you describe the existing legal and policy framework supporting PFM in Kenya?
- From a policy and regulatory perspective, what are the strengths and weaknesses of the current PFM framework?
- How do the national and county government departments collaborate with local communities to facilitate the implementation of PFM projects?
- In your opinion, what changes or improvements could be made to enhance the effectiveness of PFM policies in Kenya?
- Can you elaborate on the strategies or mechanisms employed during the transition phase from FM to PFM? How were stakeholders engaged and involved in this process?
- Were there any significant policy changes or reforms initiated by the government to facilitate the transition to PFM? How did these changes reflect the shift in management paradigms?
- How often do you do forest assessments in the forest?
- Do you recognize any differences of impact on ecosystems by different zones?

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County officer

- What is the role of the KFS in forest management within the local community?
- How does the KFS engage with the community to promote sustainable forest management practices?
- What challenges does the KFS encounter in its efforts to manage the forest effectively?
- How often do you recognize and manage the issue of illegal cuttings?
- How does the KFS collaborate with other stakeholders, such as CFAs and government authorities, to address these challenges?
- How much of the existing plantation and planned plantation?
- What is the plantation for? Timber, gum or other purpose?
- How does timber harvesting work?

Community Leaders:

- How do you perceive the significance and impact of PFM on local communities? How do PFM practices contribute to sustainable natural resource management and livelihood improvement for local communities?
- What do you consider to be the most successful community engagement strategies in implementing PFM projects? Can you describe some examples of successful community engagement strategies within PFM projects you've been involved in?
- What are the primary challenges faced by communities in PFM projects? How do you propose addressing the primary challenges faced by communities in PFM projects?
- How do you ensure meaningful participation and representation of all stakeholders, including marginalised groups, in PFM decision-making processes?
- What additional resources or support could further strengthen the capacity of communities?
- Do local communities feel a greater sense of responsibility and ownership under PFM than FM? How does this affect their conservation efforts?
- How did local communities perceive and respond to the transition from FM to PFM? What were their expectations, concerns, and aspirations regarding this change?

Community Elders:

- How would you describe the historical relationship between the community and the forest?
- What traditional forest management practices have been effective in the past?
- In what ways do you believe the community can contribute to the sustainable management of the forest?
- What are the primary concerns or challenges that the community faces regarding forest management?

CFA (Community Forest Association) Board/Leadership:

- What motivated you to become a member of the CFA?
 - How does the CFA collaborate with other stakeholders, such as the local community and government agencies, to achieve its goals?
 - Does the CFA have any investments in Njukiri Forest?
 - How much of the existing plantation and planned plantation?

Chairman:

Introductory questions:

- How did you become the chairman of the CFA? Could you explain to us about the elections and tenure process? (how long is a term)
- Are there any checks and balances/accountability for the CFA chairman and the CFA leadership? What are these?
- What percentage of forest are used for support livelihood activities and what part of it is strictly protected ^ left induct
- Are there specific conservation targets and corresponding indicators to measure them? Are there planned forest assessments?
- Who gets training? Who gets stakeholder benefits?
- How do you perceive the significance and impact of PFM on local communities? How do PFM practices contribute to sustainable natural resource management and livelihood improvement for local communities?
- What would be the consequences if the private investor was to leave the project, could some parts be viable?
- How is the decision made about how to distribute the benefits from the CFA? Are the financial statements shared with the communities and the CFA membership?
- Where in the Njukiri forest can CFA members get access to?

Benefits and cost-sharing

- What percentage of forest are used for support livelihood activities and what part of it is strictly protected ^ left induct
- How do you perceive the significance and impact of PFM on local communities? How do PFM practices contribute to sustainable natural resource management and livelihood

improvement for local communities?

- Who gets training? Who gets stakeholder benefits?

Decision-making power

- How is the decision made about how to distribute the benefits from the CFA? Are the financial statements shared with the communities and the CFA membership?

Information Dissemination

- Are there specific conservation targets and corresponding indicators to measure them? Are there planned forest assessments?

PFM effects on forest adjacent communities

- What would be the consequences if the private investor was to leave the project, could some parts be viable?

Njukiri Forest Rangers:

- - Can you describe the day-to-day responsibilities of a forest ranger in Njukiri Forest?
- - What are the main threats to the forest's ecosystem, and how do you address them?
- - How do you engage with the local community to raise awareness about forest conservation?
- - What support or resources do you need to carry out your duties more effectively? Can you get these as part of the PFM agreement?
- - What is your relationship with the CFA? How do you collaborate with them?
- How much do you feel contributes to managing or protecting forests inside of camp ndunda and PELIS? (Co-operation areas)
- - Do you recognize any differences of impact on ecosystems by different zones?
- - Where would you recommend for sample plots to do forest assessment?
- -How often do you capture the illegal cuttings?

Local KFS Representatives:

- What is the role of the KFS in forest management within the local community?
- How does the KFS engage with the community to promote sustainable forest management practices?
- - What challenges does the KFS encounter in its efforts to manage the forest effectively?

- - How often do you recognize and manage the issue of illegal cuttings?
- - How does the KFS collaborate with other stakeholders, such as CFAs and government authorities, to address these challenges?
- - How much of the rate do you feel contributes to managing or protecting forests inside of camp ndunda and PELIS? (Co-operation areas)
- - How much of the existing plantation and planned plantation?
- - What is the plantation for? Timber, gum or other purpose?
- - How does timber harvesting work? Is it cut by KFS, the private sector, or the person who wants the timber?
- - How often do you do forest assessments in the forest?
- - Do you recognize any differences of impact on ecosystems by different zones?
- - Where would you recommend for sample plots to do forest assessment?

Youth Leaders:

- What role do you believe young people play in the conservation and sustainable management of Njukiri Forest?
- How can youth engagement be increased in forest management initiatives?
- What specific challenges do young people face in participating in forest conservation efforts, and how can these be addressed?
- Are there any innovative ideas or projects led by youth that have contributed to the conservation of Njukiri Forest?

Representatives from Camp Ndunda:

- Can you describe the activities and programs that Camp Ndunda organises in or around Njukiri Forest?
- How does Camp Ndunda engage with the local community to promote environmental education and conservation awareness?
- In what ways has Camp Ndunda collaborated with other stakeholders, such as CFAs or government agencies, to support forest management efforts?

- What are some success stories or lessons learned from Camp Ndunda's involvement in forest conservation initiatives?

Private Sector Representatives1: Titoge:

- In your industry, how do private sector entities collaborate with PFM initiatives to balance commercial objectives with sustainability?
- What role do you believe the private sector can play in promoting forest conservation and sustainable utilisation?
- What are the main challenges that private sector entities may face in participating in PFM projects?

Private Sector Representatives2: Rainforest Alliance

- When and why did the Rainforest Alliance start partnering with Njukiri Forest Association?
- What role does the Rainforest Alliance play in supporting community involvement in forest management in Njukiri Forest?
- What achievements has the Rainforest Alliance made in advancing PFM in Njukiri Forest?
- How do you assess the effectiveness of NGO collaboration and coordination in PFM projects and do you have examples specific to Njukiri Forest?

Questions for investor

- What motivated you to get involved in the ecotourism sector and management of the Njukiri forest?
- What is the relationship you have with the CFA?
- What motivated you to proceed with the investment in Camp Ndunda?
- What was the process like of arranging the investment, negotiating the agreement and signing it?
- In your opinion, how does Camp Ndunda contribute to the benefit of the community?
- How does Camp Ndunda contribute to the conservation of the forest?
- What is the collaboration like between the different stakeholders?
- Do you have plans of undertaking similar projects elsewhere?
- what are main positive takeaways from the management and operation of Camp Ndunda
 - what are some challenges, concerns or points for improvement

Annex 3 - Household Survey Questionnaire

Thank you for participating in this survey. The information you provide will help us understand the impacts of the participatory forest management project in Njukiri Forest on livelihoods. Your responses are confidential and will be used for research purposes only.

1. Age

What is your age?

- ☐ 18-25
- ☐ 26-35
- ☐ 36-45
- ☐ 46-55
- ☐ 56 and above
- ☐ Prefer not to say

2. Gender

What is your gender?

- ☐ Female
- ☐ Male
- ☐ Prefer not to say

3. Education level

What is the highest level of education achieved a member of your family

- ☐ No formal education
- ☐ Primary education
- ☐ Secondary education
- ☐ Vocational training
- ☐ Higher education/Tertiary education

☐ Prefer not to say

4.1 Household size

What is the total number of people in your household?

4.2 Household size

How many 50+?

4.3 Household size

How many 18-50?

4.4 Household size

How many younger than 18?

5. Occupation

What is your occupation

- ☐ Farmer
- ☐ Laborer
- ☐ Business owner
- ☐ Professional
- ☐ Other

If other, please specify here

6. Household Livelihood

What are the key components which make up the livelihood of your household?

- ☐ Agriculture
- ☐ Livestock
- ☐ Non-farm employment
- ☐ Remittances
- ☐ Forest-related activities
- ☐ Other

If other, please specify here:

7. Are you a member of the Njukiri Community Forest Association? (potential clarification: Do you pay the fee for CFA membership?)

☐ Yes

☐ No

7.1 If yes, for how long?

☐ Yes

☐ No

7.2 If you are not a member, have you been a member previously?

7.3 If yes why did you decide to end your membership?

7.4 If no, why have you not been interested in joining the CFA so far?

7.5 How did you join the Njukiri CFA?

7.6 How much is the fee you pay to become a member of the CFA Option for more information

7.7 Have you ever attended the Annual General Meeting of your CFA?

☐ Yes

☐ No

7.8 How many times a year do you attend the meetings of the CFA?

7.9 Did you participate in the last leadership election?

☐ Yes

☐ No

7.9 If yes, how?

7.10 Which CBO are you a member of?

7.11 Which forest user group(s) do you belong to?

7.12 What motivates you to remain a member of the CFA?

8. How often does your household visit Njukiri Forest?

- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☐ Rarely
- ☐ Never

8.1 What are your main benefits from Njukiri Forest and the Njukiri CFA? PELIS

- ☐ Fuelwood Collection
- ☐ Timber Harvesting
- ☐ Non-timber forest products (e.g. fruits, medicinal plants)
- ☐ Fodder
- ☐ Recreation
- ☐ Bee-keeping
- ☐ CFA CSR
- ☐ Other

Other, please specify

From which of the above do you derive the most value? Space for further comments

8.2 What percentage of your total livelihood is derived from the forest?

10. How familiar are you with the participatory forest management framework?

- ☐ Not familiar at all
- ☐ Somewhat familiar
- ☐ Moderately Familiar
- ☐ Very familiar

11. Are you aware of the clause in the Participatory Forest Management Agreement, that 40% of profits should be given back to the community? (through initiatives such as school sponsorships, etc.)

☐ Yes

☐ No

11.1 If yes, are you aware of how the 40% is shared , and who gets to benefit from it?

12. Have you been involved in decision-making processes related to forest management in Njukiri Forest?

☐ Yes

☐ No

12.1 Please expand

13. From where do you access the forest?

14. What types of forest-related assets do you possess?

☐ Tools/Equipment

☐ Livestock

☐ Beehives

☐ Fishponds

☐ Other

☐ Other, please specify

15. How often do forest products contribute to your household meals

☐ Every meal

☐ Every day

☐ Every week

☐ Every month

☐ Rarely

☐ Never

☐ Option to add more details

16. Are all school-aged children in your household benefitting from PFM sponsored education?

☐ Yes

☐ No

17. Have you received any training or information-sharing related to forestry or conservation availed to you by the CFA?

☐ Yes

☐ No

18. How would you rate the overall impact of the participatory forest management framework on your household's livelihoods?

☐ Significantly improved

☐ Slightly improved

☐ No change

☐ Slightly declined

☐ Significantly declined

19. How would you rate the overall impact of the participatory forest management framework on the state of the forest?

☐ Significantly improved

☐ Slightly improved

☐ No change

☐ Slightly declined

☐ Significantly declined

20. Based on your experience since the implementation of the participatory forest management framework, please indicate the extent to which your household has experienced the following changes in accessing forest resources or income generation opportunities:

Go to next question to answer for each resource

Access to fuelwood

☐ Significantly improved

☐ Slightly improved

☐ No change

- ☐ Slightly declined
- ☐ Significantly declined

Please tell us more

Access to timber

- ☐ Significantly improved
- ☐ Slightly improved
- ☐ No change
- ☐ Slightly declined
- ☐ Significantly declined

Please tell us more

Access to non-timber forest products

- ☐ Significantly improved
- ☐ Slightly improved
- ☐ No change
- ☐ Slightly declined
- ☐ Significantly declined

Please tell us more

Access to income generating opportunities from forest-related activities

- ☐ Significantly improved
- ☐ Slightly improved
- ☐ No change
- ☐ Slightly declined
- ☐ Significantly declined

Please tell us more

.Any other changes in accessing forest resources, income generation opportunities or forest health

conditions?

19. What are the key barriers or challenges your household faces in participating effectively in forest management activities?

20. What solutions or recommendations do you suggest to address the challenges identified above?

22. What is the impact of climate change on CFA activities?

23. How much time is spent on CFA activities?

25. Would you be okay to share with us your contact-information for us to contact you for a potential follow-up interview?

21. Please provide any additional comments, suggestions, or concerns related to your household's livelihoods or the participatory forest management project.

Thank you for your participation. Your input is valuable to us. If you have any further questions or feedback, please feel free to contact us.

Annex 4 - Focus Group, Interview guide

2 FGDs - one with CFA members and one with non-members

- What is being extracted illegally?
- What is the reason that more women participate in forest protection activities than men?
- What
- Establish language

Question guide - Focus Group (45 min-1 hr.)

- Present purpose, format and scope of FGD (5 mins)
 - This focus group is a conversation between yourselves as participants, we will ask some questions to get the conversation started, but otherwise we want you to just speak freely. We are trying to learn about your perspectives on the pros and cons of Participatory Forest Management and the CFA of Njukiri Forest. The things you say will not be shared beyond this room and we will not mention you by name in any reports produced from this research. Any questions before we start?
- Allow participants to introduce themselves, name, forest-zone/area where they live and are they currently members and have they ever been?
-

Question prompts for CFA:

- What was the state of the forest like before the Ndunda Camp and the PFM/CFA?
- Has PFM inspired you to cultivate a culture of tree planting or forest conservation?
- What do you know about the partnership with Ndunda camp? What is your opinion of it?
 - (To understand the level of familiarity with the PPP in the community overall as well as any opinions they may have)
- What have been the effects of the PFM? Have there been challenges? Positive changes? Has there been limited impact?

- (Understand overall perception of the effects of the PFM and the partnership at the current time)
- Have the benefits and the costs of the PFM been fairly distributed within the community?
 - (Understand if the PFM benefits and costs have been distributed fairly across the community or if certain groups have benefited more/bared more of the cost)
- Imagine you could make your own PFMP, What would be your priorities? (Ranking exercise)
 - Brainstorm of elements of importance to participants
 - Collaborative ranking of these elements in order of importance
 - (Further understanding of the extent and impact of involvement, the perception of the overall goals in the plan as well as any elements which community members are missing in the current plan)
- Do you have any other thoughts you would like to share with us before we end this discussion?

Question prompts for non-CFA:

Introduction guide

- Present purpose, format and scope of FGD (5 mins)
 - This focus group is a conversation between yourselves as participants, we will ask some questions to get the conversation started, but otherwise we want you to just speak freely. We are trying to learn about your perspectives on the pros and cons of Participatory Forest Management and the CFA of Njukiri Forest. The things you say will not be shared beyond this room and we will not mention you by name in any reports produced from this research. Any questions before we start?
- Allow participants to introduce themselves, name, forest-zone/area where they live and are they currently members and have they ever been?

Question prompts for non-CFA:

- What was the state of the forest like before the Ndunda Camp and the PFM/CFA?

- What are your thoughts on the CFA?
 - (potential follow-up: What is your opinion of the leadership of the CFA?)
- What do you know about the partnership with Ndunda camp? What is your opinion of it?
 - (To understand the level of familiarity with the PPP in the community overall as well as any opinions they may have)
- What have been the effects of the PFM? Have there been challenges? Positive changes? Has there been limited impact?
 - (Understand overall perception of the effects of the PFM and the partnership at the current time)
- Have the benefits and the costs of the PFM been fairly distributed within the community?
 - (Understand if the PFM benefits and costs have been distributed fairly across the community or if certain groups have benefited more/bared more of the cost)
- Imagine you could make your own PFMP, What would be your priorities? (Ranking exercise)
 - Brainstorm of elements of importance to participants
 - Collaborative ranking of these elements in order of importance
 - (Further understanding of the extent and impact of involvement, the perception of the overall goals in the plan as well as any elements which community members are missing in the current plan)
- Do you have any other thoughts you would like to share with us before we end this discussion?

Annex 5 - Matrix

| Overall Objective: How has the public-private partnership in the PFM project in Njukiri Forest impacted the social and environmental dynamics of the project? | | | | | |
|---|-----------------------|--|--|---|---|
| Specific objective/sub-question | Methods | Data required | Outputs | Data Analysis | Potential risks/barriers |
| Q1: What is the structure of governance of the PFM in Njukiri Forest and how are these structures perceived by the community? | | | | | |
| 1.1 What are the legal frameworks governing the PFM in Njukiri Forest? | 1.1 Document analysis | 1.1.1 Kenya Forest act and other relevant acts 1.1.2 Documents from KFS website 1.1.3 Forest management plans (current and past) | 1.1 Overview of stakeholders and their roles and responsibilities | 1.1 Stakeholder analysis | *Lack of access to the necessary documents *Unclear or conflicting information |
| 1.2 How is the governance in the PFM perceived by the community in the surrounding area? | 1.2 FGD | 1.2.1 CFA Members 1.2.2 Non-CFA Community members | 1.2 Trends in the perception of the PFM governance among community members | 1.2.1 Coding 1.2.2 Triangulation with 1.1 data | *Unclear or biased information from FGD *Lack of willingness to participate |
| Q2: Have there been direct negative or positive biophysical impacts of the PFM and PPP in the Njukiri Forest? What are they, and what is the extent of them? | | | | | |
| 2.1 Are there significant land use change/land cover change compared to 20 years ago? | 2.1 Transect walk | 2.1.1 GPS of POI (point/area) 2.1.2 existing land use/land cover data 2.1.3 Perspectives on the forest cover and forest use from community members | 2.1.1 A GPS map 2.1.2 Qualitative inputs | 2.1.1 overlay and compare with the existing land use/land cover data 2.1.2 Spatio-Temporal change analysis 2.1.3 Triangulation with qualitative and quantitative data | *Might be difficult to cover whole areas and the result could be a partial map. *Might be difficult to find existing detailed land |

| | | | | | |
|--|---|---|--|--|--|
| | | | | | use/cover data, and vice versa |
| 2.2 How do the key persons perceive the biophysical impact of PFM and PPP? | 2.2 Key informative interview (semi-structured interview) | 2.2.1 Camp Ndunda 2.2.2 KFS 2.2.3 Njukiri rangers 2.2.4 CFA 2.2.5 Village head 2.2.6 Youth leader | 2.2.1 knowledge and perceptions of impact of PPP, especially on biophysical conditions 2.2.2 Mind Map | 2.1 Triangulation with perceptions extracted from key informant interviews and existing data | *Might be too complicated to try to collect or create a mind map that includes everyone's opinions |
| 2.3 Is there bio-physical evidence of degradation or restoration of forest in Njukiri? | 2.3 Forest assessment | 2.3.1 Aboveground biomass data (tree height, DBH, species) 2.3.2 Forest cover area on the ground | 2.3.1 Carbon stock 2.3.2 Biodiversity (tree/Herbaceous) 2.3.3 Forest cover area | 2.3.1 Regression analysis of significant differences compared to the existing data 2.3.2 overlay and compare with the existing land use/land cover data | *Hard to judge what condition is degradation or restoration without a baseline. *There might be no difference between two comparison areas. |
| Q3: How has the PFM project and the partnership impacted the livelihoods of local communities living close to the forest? To what extent can some of these impacts be attributed to the PPP? | | | | | |
| 2.1 What are the projected/expected benefits of the PFM and PPP respectively? | 3.1 Document analysis | 3.1.1 Forest Management Plan (FMP) 3.1.2 PPP agreement 3.1.3 Baseline surveys for living standards before PFM/PPP was initiated | 3.1.1 Baseline livelihood indicators for Njukiri community before PFM and PPP 3.1.2 Goals and/or projections for livelihoods effects from the PFM and PPP | 3.1 Meta-analysis of past and projected livelihood impacts from PFM and PPP respectively | *Lack of data available/lack of data granularity to enable comparison *Lack of access to proprietary information on PPP |

| | | | | | |
|--|--|---|---|--|--|
| | | | | | *Challenges in separation between PFM and PPP |
| What are the current livelihood standards in the community? Are there any significant differences between CFA members and non-CFA members? | 3.2 Household Survey | (Based on indicators included in existing surveys if found, otherwise based on MPAT indicators) 3.2.1 Food & Nutrition security 3.2.2 Education 3.2.3 Farm Assets 3.2.4 Non-Farm Assets | 3.2.1 Quantitative survey data 3.2.2 Potentially insight into particularly interesting cases for follow-up in KII or FGD | 3.2.1 Descriptive statistics 3.2.2 Regression analysis of significant differences between CFA-members and non CFA-members | *Lack of number of respondents to make reliable conclusions *Lack of willingness to answer more sensitive questions re. livelihoods |
| How do current livelihoods correspond with baselines and projected development? | 3.3 Trends analysis | Data from 3.1 and 3.2 | 3.3 Level of achievement of project goals for livelihoods as presented in FMP and PPP | 3.3 Triangulation | *Lack of conclusive trends in data |
| Q4: What is the participation and representation like in the CFA at this time, has the PPP had any impact on these aspects? | | | | | |
| What are the known and unknown trends of CFA and PPP activities? | 4.1 Document Analysis | 4.1.1 Previous/existing report of PFM/CFA/PPP 4.1.2 Local media (online news, blog, or articles) | 4.1 Baseline of the known social dynamics | 4.1 Identify social trends within the CFA and the impact of the PPP. What is known and unknown? | *Accessibility of documentation |
| What are the pros and cons of CFA and PPP? | 4.2 Key informant interview (semi-structur | 4.2.1 Camp Ndunda 4.2.2 KFS 4.2.3 Nyukiri rangers 4.2.4 CFA | 4.2 Knowledge and perceptions of the social dynamics related to CFA and PPP | 4.2 Descriptive statistics | *Accessibility of key persons *Reliability (could be biased) |

| | | | | | |
|--|----------------------------|--|--------------|----------------------------|---|
| | ed interview) | 4.2.5 Professor of Embu University 4.2.6 Village head 4.2.7 Youth leader | | | |
| | 4.3 Focus Group Discussion | 4.3 Community members, CFA and Non-CFA members | 4.3 Mind map | 4.3 Grounded theory coding | *Accessibility and selection of members *Reliability (could be biased) *Language barriers (participants vs translators) |

Annex 6 - Timeframe

| Date | Day | Main activities | Note |
|--------|-----|--|---|
| Feb 29 | Thu | Meet in Nairobi (at lunch time) | Meet with Kenyan Students |
| Mar 1 | Fri | Travel to field site Discuss and plan KII: CFA leader | Meet with host families and village people Discuss details of overall plan |
| 2 | Sat | AM 1) Key informative interview 1-2 ppl (CFACommunity Leaders+α) PM 2) Transect walk 1- 2 hours 3) Practise how to do household survey and forest assessment | See and understand overview of geographic and cultural practices in the Njukiri forest and surrounding villages |
| | Sun | | |
| 4 | Mon | 1) Transect walk 1-2 hours (preliminary) 2) Key informative interview 1-2 ppl (Community Leaders+α) (preliminary) 3) Practise how to do household survey and forest assessment (preliminary) | Shift the later plans earlier if we finished the transect walk on Saturday |
| 5 | Tue | 1) Household Survey: 10-15 households (2 hh/h x 5) /group/day 2) Forest assessment: 3-6 plots (30-45 mins sampling + 30 mins for walk)/day 3) Key informative interview 1-2 ppl | 3) Better to make an appointment for key informant interview |

| | | | |
|----|-----|---|---|
| 6 | Wed | 1) Household Survey: 10-15 households / group/day 2) Forest assessment: 3-6 plots/day 3) Key informative interview 1-2 ppl | 3) Better to make an appointment for key informant interview |
| 7 | Thu | Plan for FGD | |
| 8 | Fri | FGD/Game Participatory mapping | |
| 9 | Sat | FGD/Game (preliminary) Participatory mapping (preliminary) | |
| 10 | Sun | | |
| 11 | Mon | Presentation? | |
| 12 | Tue | Travel back to Nairobi | |

Annex 7 - Table of Methods Applied

| Method | Description |
|-------------------------|---|
| Transect walk | We conducted 2 transect walks to observe the physical aspects of the Njukiri forest. |
| Key informant interview | We conducted semi-structured interviews with 9 key informants including a community elder, a youth leader, the CFA chairman and CFA coordinator, KFS manager, KFS officer and rangers, county forest officer, and the owner of Titoge who runs Camp Ndunda. |
| Household Survey | We conducted surveys with 30 households including 26 CFA members and 4 non-CFA members living in proximity to Njukiri Forest to gain an understanding of their livelihoods as well as their perceptions regarding PFM and the CFA. |
| Forest Assessment | We implemented forest assessment, with support from a KFS officer and KFS rangers. The assessment was conducted in 8 sample plots in four zones. |
| Focus Group Discussion | We conducted 2 focus group discussions with CFA members and non CFA members to assess any key differences in perceptions by them. |
| Document Analysis | We analyse the documents provided by CFA and KFS to understand the legal and policy framework governing forest management in the area. |