Original Paper

The effect of tree harvesting rights on investment in tree growing and promotion of sustainable tree conservation practices by private land holders in Kenya

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Abstract. *Trees and forests on private lands and farms play a crucial role in providing ecosystem goods and services that support human well-being. To promote sustainable management of these resources, many countries are assigning tree harvesting rights to private landowners. This strategy encourages tree-growing investments and sustainable practices. However, there is limited research on its effects in developing countries. This study focused on Kenya, using a case study approach and document content analysis to examine the impact of assigning tree harvesting rights on sustainable tree growing. Results show that since 1990, tree coverage on private farms in Kenya has increased by 48.12%, reaching 10,385,000 hectares by 2010. Farm forests are key to timber production, especially in Central Kenya, where up to 155 tree species are grown. These forests provide products like firewood and timber, but unsustainable practices such as low tree replacement and high tree densities pose challenges. Small-holder farmers are driven by high population density and market demand but face obstacles such as low tree prices and inadequate management techniques. Despite these challenges, farm forests have been essential, particularly during the Sawlog harvesting ban (2002-2012), and are expected to remain central to Kenya's forestry sector. While assigning tree-growing rights has had positive impacts, including ecological and economic benefits, it has also led to negative sustainability outcomes. Therefore, developing a stable legal framework, improving market access, and offering financial incentives are crucial for supporting sustainable forestry on private lands.*

1. Introduction

Forests and trees on private lands play a crucial role in global ecosystems, contributing significantly to environmental sustainability, economic development, and social well-being (Sivakumar et al. 2024; Turner-Skoff & Cavender 2019). They provide essential services such as carbon sequestration, soil stabilization, and water regulation, while also offering valuable resources such as timber, fuelwood, and non-timber forest products (Turner-Skoff & Cavender 2019). In many developing countries, forests are vital for rural livelihoods, serving as a source of income, food, and energy for millions of people (Turner-Skoff & Cavender 2019). However, the management and conservation of these resources are often challenged by competing land uses, population pressure, and inadequate legal frameworks, which can lead to deforestation, land degradation, and loss of biodiversity (Gupta et al. 2024; Pandit et al. 2018).

In Kenya, trees and forests on private lands are important for human well-being and sustainable development (Mwenda et al. 2024). As such, a number of policies and legal instruments have been developed to promote the sustainable conservation and management of trees and forest resources. Internationally, the country has ratified a number of treaties, agreements and conventions aimed at promoting sustainable management of tree resources. Currently, the country's tree cover is approximately 12.13 % while forest cover is 8.83% of the total land area (Chisika & Yeom, 2024). Tree cover is projected to reach 30% by 2032 while forest cover is projected to reach 10% following a presidential directive that seeks to plant 15 billion trees on approximately 10.6 million hectares of degraded landscapes and ecosystems. To implement this directive, the government has adopted the "whole of society" and "whole of government" approach as all-inclusive strategy for accelerating actions amongst various key actors. Increasingly, the role of private landholders in forest management is recognized as critical, particularly in the context of these trees growing and reforestation efforts. However, the effectiveness of these efforts is often contingent upon the legal and institutional frameworks governing tree harvesting rights. Despite the critical role that tree harvesting rights play in shaping landholder behavior and forest management outcomes, there is a notable lack of comprehensive studies examining this issue in the Kenyan context. Much of the existing research on forest management in Kenya has focused on public forests, community forest management, and land tenure issues, with relatively little attention given to the specific impact of tree harvesting rights on private landholders' investment decisions. Furthermore, while the importance of secure property rights for investment is well-established in economic theory, empirical studies that explore

the application of this principle to tree harvesting rights, particularly in the context of smallholder and private landowners in Kenya, are limited. This research seeks to fill this gap by examining how the clarity, security, and enforceability of tree harvesting rights influence private landholders' decisions to invest in tree-growing activities in Kenya. By focusing on tree harvesting rights rather than broader land tenure issues, this study aims to provide a clearer understanding of the factors that drive or hinder investments in tree growing on private lands.

This study seeks to investigate the effect of tree harvesting rights on the investments made by private landholders in tree growing in Kenya. This research seeks to expand the understanding of the extent to which secure and well-defined tree harvesting rights incentivize landholders to invest in tree planting and sustainable forest management. The study will also explore how uncertainties or risks associated with tree harvesting rights may deter such investments and the potential implications for forest cover and environmental sustainability in Kenya. The study will draw on the theoretical frameworks of Property Rights Theory, Investment under Uncertainty Theory, Resource-Based Theory, and the Sustainable Livelihoods Framework to analyze the relationship between tree harvesting rights and investment behaviors. By doing so, it aims to provide evidence-based insights that can inform policy and legal reforms to enhance forest management and promote sustainable land use practices among private landholders in Kenya. This study contributes by analyzing the impact of tree harvesting rights on investments in tree growing, an under-researched area with significant implications for forest management. Kenya's diverse land tenure and policy commitments make it a crucial case for understanding and improving sustainable management practices for tree resources.

2. Tree harvesting rights, investments in tree growing and sustainable conservation practices

2.1 Theoretical background

Tree harvesting rights refer to the legal and customary entitlements that determine who can cut down, collect, and utilize trees and their products. These rights are crucial for managing forest and tree resources and promoting sustainable land use. The rights often include the authority to decide when and how trees are harvested, who benefits from the harvest, and how the proceeds are shared or reinvested. Tree harvesting rights can vary significantly based on local laws, land tenure systems, and customary practices. Secure and clearly

defined harvesting rights are essential for encouraging investment in tree growing, as they provide landholders with the confidence that they can reap the benefits of their labor. Conversely, unclear or insecure rights can lead to overexploitation or underinvestment, threatening both the economic viability of tree farming and the sustainability of tree resource management.

2.2 Empirical literature review

In 2020, global tree cover was 4.02 billion hectares, covering 30% of Earth's land, including natural, managed, and planted forests (World Resource Institute Website, 2024). Approximately 11% of forests are planted. Tree cover is concentrated in five countries—Russia, Brazil, Canada, the United States, and China—though countries like Equatorial Guinea, French Guiana, and Gabon have over 90% tree cover despite their smaller size. Tropical and subtropical forests account for 61% of global tree cover, boreal forests 24%, and temperate forests 15%. Since 2000, the world has lost 488 million hectares of tree cover, with losses increasing from 13.4 million hectares in 2001 to 28.3 million hectares in 2023. The tropics and subtropics lost 92 million hectares, while boreal forests lost 14 million hectares, though temperate forests gained 4.5 million hectares, possibly including old growth forest losses (World Resource Institute Website, 2024).

Trees outside forests (TOF), found in pastures, urban areas, and along roads, play a crucial role in agroforestry, enhancing productivity, soil quality, and biodiversity. They provide food, timber, and fuel, significantly supporting rural livelihoods. Urban trees improve air quality, reduce heat, and conserve energy. In Beijing, increased urban tree cover led to 81 new bird species (World Resource Institute Website, 2024). TOF also contributes over 75% of the 45.3 billion metric tons of carbon stored on agricultural land globally. However, TOF are often overlooked in conservation discussions. They cover 336 million hectares across the tropics but face challenges in mapping and definition due to diverse landscapes and inconsistent criteria (World Resource Institute Website, 2024; Hansen et al. 2013). Current forest loss data lack resolution for TOF changes, though projects such as the WRI Global Restoration Initiative are working to address this.

Wood products from trees on farms and private land have been vital to global economies for centuries, yet their supply faces increasing threats due to growing scarcity (Waswa et al., 2020). With global wood demand projected to triple from 500 million metric tons in 2018 to 1500 million metric tons by 2050 (Midgley et al., 2017), natural forests are declining (FAO, 2018), and plantation forests face

land use and tenure challenges (Kanel et al., 2012). Global wood imports and exports have risen significantly since 2010, indicating an impending shortage (FAOSTAT, 2021). On-farm trees, which grow faster than forests, can help close the wood supply gap, improve livelihoods, and reduce deforestation (Zomer et al., 2014; Quandt et al., 2018). However, data on on-farm wood remains scarce and uncoordinated, impeding efforts to address forest governance and sustainability issues (UN-FAO, ITTO). The contribution of on-farm wood to global supply and its impact on tropical forest conservation is still unclear.

Mutune et al. (2024) highlighted the significant role of on-farm trees in wood supply as global industrial roundwood demand is projected to rise by 60% by 2030, reaching approximately 2400 mm^3 (FAO, 2018). On-farm wood contributed 7.7-9.0% of the supply in China and 39% in India (Midgley et al., 2017). Despite growth in roundwood production and international trade, high deforestation and unregulated chainsaw logging, which accounts for 30-40% of timber production in tropical countries, threaten sustainability. The study underscores the need for better forest management and increased private landowner investments to address illegal logging and ensure wood supply.

A number of studies have examined the relationship between tree harvesting rights and investment in tree growing by private landholders. Dinh et al. (2023) noted that over the last three decades, Vietnam allocated over 14 million hectares in one of the largest natural resource decentralization programs in the developing world. Critics noted low household tree planting investments and questioned the impact of land institutions. Using nested logit and ordered probit models, the study assessed how perceptions of forestland tenure security influenced tree investment among 239 households in 11 Central Highlands communes. Results showed that concerns about potential land expropriation did not deter short-term acacia or long-term cashew investments. Factors such as labor availability, plantation costs, and market outlooks were significant, while short-term planting surprisingly reduced perceptions of tenure security. The study suggested that enhancing land tenure security and implementing investment-incentivizing policies could boost tree planting.

Lin et al. (2020) observed that in 2003, China introduced a new round of forest tenure reforms (CFTR) to encourage afforestation and boost rural livelihoods. This study analyzed the effects of land tenure security and logging rights on tree planting investments using long-term data from rural smallholders. By employing matching methods and Heckman models to address selection biases, the study found that complete logging rights significantly increased tree planting investments, while secure land tenure had an insignificant effect. Smallholders

confident of obtaining a harvest permit invested, on average, 52% more overall and 36% more in seedlings.

Xie et al. (2013) noted that since the early 1980s, China had implemented property rights reforms in collectively owned forests to encourage farmer participation in forest management. The study analyzed farmers' behaviors regarding labor and financial investments in forest management, using data from Tonggu County in southern China. Findings revealed that positive attitudes towards the reforms and higher income from forest products increased participation, while higher off-farm income reduced it. Farmers with more land and confidence in obtaining logging quotas managed forests more intensively. Conversely, households with older or more educated heads showed less interest in forest management investments.

Deuffic & Ni Dhubhain (2020) established that In Ireland, the consensus to expand forest cover had remained unchallenged for five decades. However, in 2014, private forest owners faced a catastrophic windstorm for the first time, leading to a qualitative survey of those affected. The disaster, beyond causing economic losses, undermined their belief in the benefits of afforestation programs. The study, using relational expectations theory, revealed that Storm Darwin altered their identity from pioneers to perceived failures. The reconstitution scheme provided guidance and reduced the risk of abandoning reforestation. Nonetheless, the storm made landowners more cautious about future afforestation programs.

Mejía et al. (2015) examined those smallholders controlled a significant portion of forestlands in the Ecuadorian Amazon, where timber, though not the primary income source, supplemented diverse livelihoods. Timber extraction was driven by a network of intermediaries connected to urban markets. Most small-scale operations were informal due to complex forestry regulations despite state efforts to simplify them. The benefits from timber extraction for smallholders depended on the organization of harvesting operations, the species harvested, and whether operations were conducted with formal permits. The study evaluated timber's role in smallholders' livelihoods, the impact of operational methods on benefits distribution, and the influence of urban markets on timber supply dynamics.

Kittredge and Thompson (2016) noted that non-industrial private forest ownership dominated the eastern USA, with most private owners valuing non-consumptive benefits and showing minimal interest in timber revenue. A 25-year study of timber harvesting in Massachusetts examined the frequency and volume of harvests for five commercial species on private land, comparing these with

quarterly stumpage prices. For four species, no relationship was found between stumpage prices and harvesting patterns. However, for one species, a consistent effect emerged: the volume harvested, and the number of harvest events were significantly related to stumpage prices west of the Connecticut River. This relationship was not observed in eastern Massachusetts and was inconsistent for other species. The study concluded that, under certain conditions, stumpage prices do influence private landowner harvesting decisions.

Bouriaud et al. (2013) proposed a property rights-based approach to analyze forest property rights in ten ECE countries, focusing on private forests, which total 7.3 million hectares and produce about 25 million cubic meters of timber annually. The study found that while forest management rights were retained by the State, timber withdrawal rights, though recognized in management plans, were economically restricted. Forest management planning was identified as a key top-down instrument with limited input from forest owners. This State-led approach affected the economic content of property rights and the adaptability of private forestry to challenges like climate change and industry demands. The study emphasized the need for detailed analysis of economic rights and the importance of understanding forest management planning to assess the evolution towards more participatory local governance.

Zhao et al. (2020) developed a statistical harvest choice model for Maine to understand how socio-economic factors influence timber supply. Using a multinomial logit model, it found that stumpage prices significantly impacted harvest decisions, though timber supply was inelastic to price changes (elasticities of 0.27–0.73). Simulations indicated that expanding conservation land could reduce total timber supply by 2%, but sawlog harvests might rise slightly. The model informs policies for sustainable timber flows, showing that conservation efforts do not substantially reduce timber harvests in Maine.

Ruseva et al. (2015) used a mail survey of Midwest U.S. private landowners analyzed tree planting behavior and policy effectiveness. Logistic regression showed cost-subsidizing policies, like free seedlings, significantly increased reforestation likelihood, especially for newer, college-educated owners with small recreational parcels. Key motivations included planning horizons, land connection, experience, and peer influence, highlighting the importance of economic incentives and capacity-building in promoting private forestation.

Schaaf & Broussard (2006) explored public perceptions of policy tools for private forests and their links to demographics and timber harvesting attitudes. A survey identified two policy categories: authority (regulations, sanctions) and

empowerment (learning, capacity-building). The public favored empowerment tools. Education predicted support for both categories, while attitudes favoring immediate timber harvesting negatively impacted support for private forest policies.

Rode et al. (2023) noted that native trees were vital for sustainable agriculture, offering economic benefits and protecting biodiversity. This study introduced a methodology to identify incentives for farmers to plant trees, propose financial packages, and integrate policies. Case studies from Uganda and Peru highlighted opportunities like technical support and income generation. However, challenges include weak institutions, limited funding, and low political priority.

However, there is also a growing tendency in many countries to progress towards developing private forest regulations as policy tools for guaranteeing tree harvesting rights and fostering a sustainable private forestry sector. United states of America, Germany, Finland and Sweden are leading in efforts to promote regulations for private forestry (Ellefson et al. 2007; Kotilainen Rytteri 2011; Hirsch & Schmithüsen 2010). The key components of private forest development regulations that confer tree harvesting rights and stimulate investment in tree growing include clear land tenure, incentives for sustainable practices, and flexible management plans. For example, in Finland, laws support private landowners with subsidies and tax benefits, encouraging sustainable timber production. Germany offers incentives for biodiversity conservation and forest restoration, while Sweden allows landowners to balance commercial forestry with environmental standards. These regulations ensure long-term profitability and environmental sustainability, encouraging private investment by providing security and financial incentives to landowners, fostering a stable environment for forestry enterprises (Ellefson et al. 2007; Kotilainen Rytteri 2011; Hirsch & Schmithüsen 2010). In countries without robust private forest development policy guidance, there is the growing tendency to impose tree harvesting bans which at times have dire negative consequences. The case study of Uganda outlined below exposes some of the impacts in the recent times.

2.3 Case study: Ban on tree harvesting for veneer exports in Uganda

In 2023, Uganda imposed a one-year moratorium on unprocessed timber exports, significantly impacting Mubende District, known for its private plantation forests (Infonile, 2024). The district had previously thrived with up to eight sawmills, mostly Chinese-owned, processing logs into veneer sheets for export to China. The government implemented the ban to curb unsustainable logging and address deforestation, fearing that Chinese timber consumption was

exacerbating the problem. While the moratorium aimed to protect forest cover, it led to widespread job losses, reduced operations, and financial hardships, particularly for small-scale tree growers. Local farmers saw tree prices plummet, creating frustration and financial strain. Critics of the ban argued that the government failed to adequately consult stakeholders, leading to confusion over which timber products were affected. Although veneer exports were restricted, other low-value products like woodchips remained exportable, adding to market disruptions. The National Forestry Authority (NFA) defended the decision, citing data on deforestation in the Mubende area. However, local stakeholders questioned the ban's abrupt implementation and the government's regulatory capability. The situation highlighted tensions between environmental conservation and economic interests. Many stakeholders called for a more balanced, consultative approach to foster sustainable timber production without undermining livelihoods.

From the above review, on-farm trees owned by private landowners have a critical role in bridging the gap between rising global wood demand and dwindling natural forests. With global roundwood consumption projected to rise by 60% by 2030 (FAO, 2018), on-farm trees are increasingly vital in supplementing wood supply, contributing significantly to regions such as China and India (Mutune et al., 2024). Despite their potential, the sector faces challenges including deforestation and illegal logging, which threaten sustainability (Mutune et al., 2024). Addressing these issues requires better data on on-farm wood supply and investment in sustainable practices, which can enhance the role of on-farm trees in global wood markets (Waswa et al., 2020) and hence the need for this study. The existing literature shows that cost-subsidizing policies, such as providing low-cost or free seedlings, significantly enhance tree planting investments, as seen in research from the Midwest U.S. and China. However, concerns about tenure security and market conditions can affect investment decisions, as demonstrated in Vietnam and China. Additionally, studies reveal that while policy tools such as empowerment and authority tools influence tree planting, their effectiveness is constrained by weak institutional support and limited funding, as noted in Uganda and Peru. From the case of Mubende District in Uganda the importance of clear, consultative policymaking is emphasized. Sudden government interventions, such as the moratorium on unprocessed timber exports, can disrupt livelihoods, lower tree value, and undermine long-term investments in sustainable forestry and tree growing. Moreover, the review has also identified gaps including the need for more comprehensive analyses of how varying legal and policy tools impact different tree species and management practices across diverse socio-economic contexts.

Furthermore, there is a lack of understanding regarding the long-term impacts of forest management policies on economic and environmental outcomes, and the role of private landowners' participation in shaping effective policy interventions.

2.4 The context for tree harvesting rights and investment in tree growing by private landowners in Kenya

Kenya's total surface area is 59,196,877.24 ha which comprises of 97.8% land area and 2.2% water surface. Only 16% of the land is within medium to high rainfall areas, while 84% of the land is classified as Arid and Semi-Arid lands (ASALs) (KFS 2022). The Kenya's land cover classified into six categories: forest land, grassland, cropland, wetland, settlements and other Lands (KFS 2022). The National Land Cover Assessment conducted in 2021, established that grassland (including wooded grassland and open grassland (savannah)) is the dominant Kenya's land cover /land use constituting 70% of the national land area. (KFS 2022). Cropland is the second largest land cover / land use at 12%, followed by forestland at 8.83%, wetland at 3%, settlement at 0.32% and other land (Roads and other infrastructure) at 6% of the country's land area (KFS, 2022). The Restoration Opportunities Assessment study conducted by the MENR in 2016, also identified 38.8 million ha (65.5%) of Kenya's surface area as a potential area for restoration and tree growing, with Rangelands presenting the greatest restoration opportunities of 25.7 million ha (66.2%) of the national restoration opportunities. Croplands with a restoration potential of 7.6 million ha (19.6%) presents the second largest restoration opportunity; and Forestlands and Road reserves with restoration potential of 5.2 million ha (13.4%) and 0.3 million ha (0.8%), respectively. Rangelands, croplands and forestlands constitute 99.7% of restoration potential.

Trees and forests are vital to Kenya's economy and livelihoods, providing fuelwood for 82% of households, direct employment for over 750,000 people, and indirect benefits to over 4 million citizens. The forest sector contributes an estimated USD 365 million annually to the GDP, though this figure underestimates the sector's true value due to informal markets and subsistence use. The sector adds over KES 20 billion in value to various productive sectors, impacting on agriculture, energy, and tourism, which together contribute 33% to 39% of the GDP. Additionally, the ecological services of forests, such as those from the Mau Forest Complex and Mt. Elgon, are valued at over KES 339 billion annually, representing about 5% of Kenya's GDP. Non-Wood Forest Products (NWFPs) also provide significant economic and ecological benefits.

Kenya's forest sector has undergone significant reforms to promote sustainable management, starting with the Forest Act 2005, later replaced by the Forest Conservation and Management Act 2016 and the 2010 Constitution. Key improvements include establishing the Kenya Forest Service (KFS), decentralizing governance through Forest Conservation Committees, and devolving forestry functions to county governments. The Participatory Forest Management approach led to the creation of 250 Community Forest Associations (CFAs) and 290 Charcoal Producer Associations (CPAs) for managing forests and regulating charcoal production. Additional reforms focused on forest research, private sector investments, and recognizing tenure for natural resources on community lands through the National Land and Land Use Policy.

However, Kenya's population, growing at 2.7% annually and expected to reach 66.3 million by 2030, poses both challenges and opportunities for sustainable tree resource management. A 2014 study by the GATSBY Charitable Fund estimated a national wood deficit of 12 million m^3, projected to increase to 34.4 million m^3 by 2030. The Ministry of Environment and Water Resources (MEWNR) the precursor of the current Ministry of Environment, Climate Change and Forestry projected a rise in the annual wood supply deficit from 10.3 million m^3 in 2012 to 15 million m^3 by 2032. Currently, trees on farmlands and communal forests supply over 90% of Kenya's annual wood needs. The other challenge and opportunity facing tree resources is that forestry in Kenya is a devolved function as per the Constitution, with county governments playing a crucial role in forest management and development. The 2016 Transition Implementation Plans (TIPs) for all 47 counties aimed to outline forestry responsibilities, but about 10 counties have not signed their TIPs, and many who did have not fully implemented them due to challenges in capacity and resource allocation. Despite this, 18 counties have established forestry departments. Empowering county governments with the necessary resources and capacity is essential for achieving the national target of 30% forest cover and fostering effective governance, economic development, and environmental conservation.

Cheboiwo (2016) noted that private forests and trees on farms were steadily increasing in area and species diversity. There are opportunities for public private partnerships in the sector. Equally, private landowners are recognized as important in the sustainable management of trees resources on their lands (Vellum website 2024). Kenya's 15 billion tree agenda is a key initiative in the nation's strategy to combat climate change by planting 15 billion trees over the next decade while involving private landowners. This effort aims to enhance

environmental resilience, counteract deforestation, and promote sustainability. The initiative's success depends on several factors: the careful selection of indigenous tree species to support biodiversity, strategic site selection for planting, and large-scale efforts to maximize impact. Crucially, community, including private landowners' involvement is essential, as it ensures trees are nurtured and protected, fostering a sense of ownership and responsibility (Vellum website 2024). Sustainable practices, such as agroforestry, and long-term management, including continuous monitoring and protection, are also vital. For success, comprehensive planning, adequate funding through public-private partnerships, strong policy support, and education campaigns are necessary (Vellum website 2024). These elements will ensure the initiative not only meets its tree-planting goals but also contributes to a broader strategy of sustainable land management and climate resilience (Vellum website 2024).

However, a recent turn of events surrounding the export of veneer sheets extracted from eucalyptus trees have caused a heated debate as to whether the government supports the growth of a vibrant private forestry sector or not. According to KNA Website (2024), the Kenyan government, through the Ministry of Environment, Climate Change, and Forestry, announced a suspension of raw veneer material exports with immediate effect. This directive, communicated by Cabinet Secretary, also instructed the Kenya Forest Service (KFS) not to issue any 'No Objection Letters' for such exports. It was noted that the suspension of exports was a firm measure aligned with the national environmental development goals espoused in the National Landscape and Ecosystem Restoration Strategy, which aims to restore 10.6 million hectares of degraded landscapes by planting 15 billion trees. The Cabinet Secretary emphasized that halting raw wood veneer exports was crucial to allowing trees to mature fully, thereby contributing to national restoration goals. In the ban notice, the government affirmed that it remained steadfast in its goal to achieve 30 percent tree cover, reinforcing its dedication to environmental conservation.

From this review, private landowners are critical in sustainable tree resource management, particularly within Kenya's ambitious 15 billion tree-planting initiative. However, if not properly evaluated, the current ban on veneer exports could jeopardize the private landowners' interest in private forestry and cause counterproductive consequences for the government's environmental restoration ambitions. Therefore, efforts should be made to investigate the impact of private landowners on sustainable management of tree resources could be enhanced through tree harvesting rights and hence the need for this study.

3. Materials and Methods

3.1 Research design

This study employed a case study research design focusing on Kenya where private landholders engage in tree growing. The case study approach is well-suited for exploring complex and context-specific phenomena, such as the effect of tree harvesting rights on investment decisions. The case study approach also supported the inclusion of qualitative data from diverse sources, offering insights crucial for developing sustainable tree management strategies. This ensured a holistic understanding of the multifaceted effects of tree growing rights, making it a robust and appropriate research design for this context.

3.2 Case study: Kenya

Kenya is in East Africa, bordered by Ethiopia to the north, Somalia to the east, Tanzania to the south, Uganda to the west, and South Sudan to the northwest. It has a diverse geography that includes the coastal plains along the Indian Ocean, the central highlands, and the Rift Valley, which stretches from the north to the south of the country. The highlands are home to the country's highest peaks, including Mount Kenya, the second-highest mountain in Africa.

Kenya's key socio-economic characteristics include a growing population of over 50 million people, with a significant proportion engaged in agriculture, which forms a crucial part of the economy. The country has a mixed economy with key sectors including agriculture, manufacturing, tourism, and services. Nairobi, the capital city, serves as an economic and financial hub for the region. Kenya's economic development is supported by its strategic location along major trade routes and its role as a regional transport and logistics center. Despite this, the country faces challenges such as poverty, income inequality, and environmental degradation, which impact its socio-economic landscape. Efforts are ongoing to address these issues through various development initiatives and policies.

3.3 Data collection

The study was qualitatively undertaken using a literature review and document content analysis to examine the effect of tree harvesting rights on investments in tree growing in Kenya. The study sought to examine the existing legal and institutional frameworks governing tree harvesting and how it affected tree investments. The literature review provided a comprehensive overview of the relevant theories and empirical studies on property rights, investment, and forest management, while the document content analysis focused on analyzing legal

texts, policy documents, and institutional reports related to tree harvesting rights in Kenya. These methods allowed for a detailed examination of the legal and institutional factors that shape tree harvesting rights, as well as their impact on investment behaviors. By combining the case study approach with a thorough review of the literature and legal documents, this study sought to draw policy implications that can inform the development of more effective and equitable frameworks for promoting tree growing and sustainable forest management in Kenya.

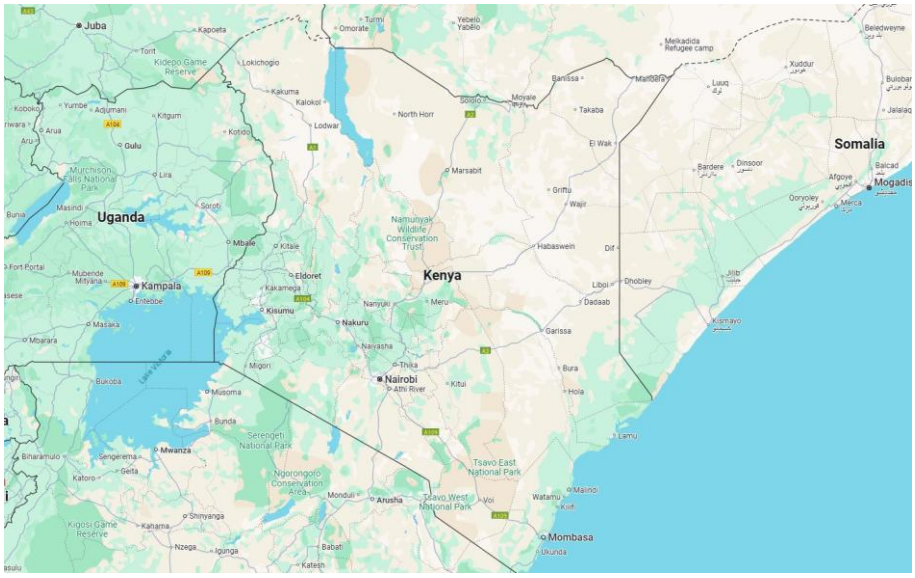

Figure 1. Location map for Kenya

The literature review process in this study involved a systematic search and analysis of existing academic and grey literature on tree harvesting rights and their impact on investments in tree growing. Relevant sources were identified through databases such as JSTOR, Google Scholar, and institutional repositories. Key themes, including land tenure security, economic incentives, and sustainable forestry practices, were synthesized to provide a comprehensive understanding of the topic. The review also included critical evaluation of previous studies, identifying gaps and inconsistencies that informed the study's approach. This

thorough literature review provided the foundation for the research framework and methodology. The document content analysis in this study was conducted through a systematic and structured process. First, relevant documents were selected, including policy papers, legal frameworks, government reports, and research articles that addressed tree harvesting rights and investments in tree growing. Selection criteria were based on relevance, credibility, and recency to ensure the inclusion of accurate and up-to-date information. Next, each document was thoroughly reviewed, focusing on key sections related to the study's objectives. The information was then coded into thematic categories, such as land tenure security, economic incentives, and environmental sustainability. These coded data were further analyzed to identify patterns, relationships, and emerging trends. The themes were synthesized to develop a comprehensive understanding of the issues. Finally, the findings were validated by cross-referencing with the literature review, ensuring consistency and reliability in the conclusions drawn from the document analysis. This methodical approach strengthened the study's overall rigor. The key documents review during document content analysis are shown in Table 1. All direct document references can be found in the reference list at the end of the manuscript.

3.4 Data analysis

The conceptual framework that examines the direct and indirect relationships between tree harvesting rights and investments in tree growing by private landholders in Kenya was used as the analytical tool in this study. From Figure 1, the direct relationship posits that clearly defined and secure tree harvesting rights directly encourage landholders to invest in tree-growing activities, such as planting and sustainable forestry practices. The framework highlights how tree harvesting rights impact tree-growing investments through mediating factors: perception of security, economic incentives, and environmental sustainability. Socio-economic status and geographical location further moderate these effects, emphasizing the role of income, education, and regional disparities. It provides insights into the dynamics of shaping sustainable forestry investments.

This analytical framework (Figure 2) was employed to examine the effect and relationship between harvesting rights and investments in tree growing by private landholders in Kenya. It guided the analysis by identifying key mediating factors, such as landholders' perception of security, economic incentives, and environmental considerations, which influenced their investment decisions. Data were analyzed to assess how secure tree harvesting rights directly encouraged tree-growing activities and how factors such as financial incentives, market

Table 1. Key documents reviewed

Document	Type	Key information sought	Source
The Constitution of Kenya, 2010	Policy	Rights are guaranteed to citizens regarding a clean and healthy environment.	www.kenyalaw.org
The Wildlife Conservation and Management Act, 2013	Policy	Impact of the Act on Tree Harvesting Rights	www.kenyalaw.org
The Forest Conservation and Management Act, 2016	Policy	The legal requirements for tree harvesting and the institutions involved.	www.kenyalaw.org
The Environmental Management and Coordination Act (EMCA), 1999 (Amended in 2015)	Policy	The legal and institutional framework for environmental management.	www.kenyalaw.org
The Forest Policy, 2014	Policy	Guidelines for forest conservation, protection, and management	www.kenyalaw.org
The National Land Policy, 2009	Policy	Information on land tenure and how it affects investments in tree growing and sustainable harvesting practices	www.kenyalaw.org
The Agriculture (Farm Forestry) Rules, 2009	Policy	Information on a rule for maintaining a minimum of 10% tree cover on their farms and tree harvesting rights.	www.kenyalaw.org
The Land Act, 2012	Policy	Information on sustainable administration and management of land in Kenya	www.kenyalaw.org
Logging ban of 2019	Policy	Information on the effect of tree growth and investment	KIPPRA Website (2024)
Logging ban of 1999	Policy	Information on the effect of tree growth and investment	KIPPRA Website (2024)
Ban on export of raw wood veneers in 2024	Policy	Information on the effect of tree growth and investment	Nation Newspaper, 2024

access, and sustainability requirements mediated this relationship. The framework also accounted for socio-economic and geographical variations, providing insights into regional and demographic disparities in investment behavior. The results of this analysis were presented in two thematic areas,

including, the current state of on-farm and private forestry in Kenya and effects of harvesting rights on tree growing investments and sustainable tree conservation practices as shown in the successive parts.

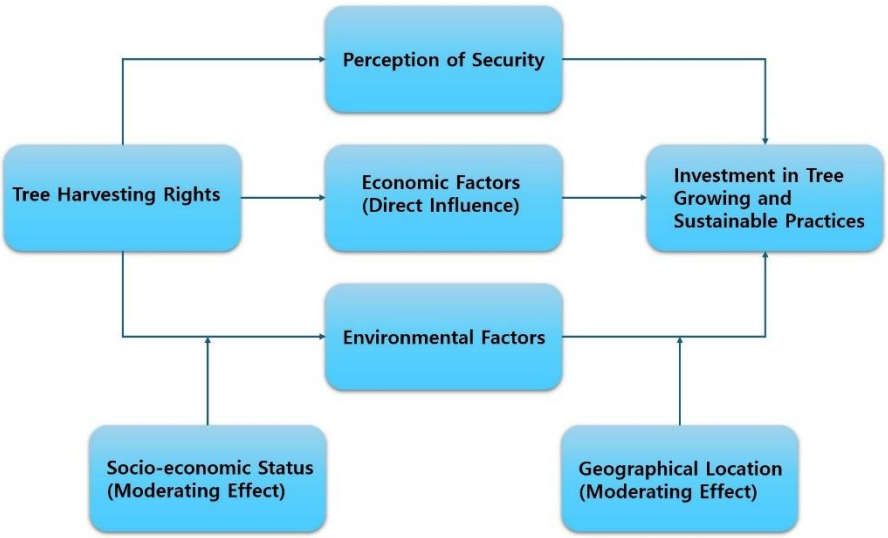

Figure 1. Conceptual framework for the effect of tree harvesting rights on investment in tree growing in Kenya

4. Results

4.1 The current state of on-farm and private forestry in Kenya

Results from reviewed literature show that since 1990, tree coverage on farms and private farms in Kenya has grown by 48.12% to 10,385,000 hectares by 2010, contrasting with a slight increase in private forests and a decline in public plantations. Farm forests are crucial for timber production, with Central Kenya's farms hosting up to 155 tree species and providing various products such as firewood and timber (Cheboiwo 2016). However, practices may be unsustainable due to minimal replacement of harvested trees and high tree densities that can compete with crops. Smallholder farmers are motivated by high population density and market demand but face challenges such as low tree prices, inadequate valuation techniques, and poor management practices. Solutions

include improved infrastructure, extension services, and better valuation techniques. Despite these challenges, farm forests have been vital, especially during the sawlog harvesting ban from 2002 to 2012, and are expected to remain a key part of Kenya's forestry sector (Cheboiwo 2016).

Historically, tea estates, mainly owned by multinationals and local companies, dominated the sector by planting Eucalyptus for tea curing. Due to insufficient public forest plantations, investors including wood-based companies and large-scale farmers have increasingly entered the forest sector. The growing demand for transmission poles, mainly sourced from Eucalyptus grandis, has further fueled this trend. Private sector investment in short rotation species and wood utilization has outpaced public plantations, driven by profit motives and advanced processing technologies. Despite marginal expansion of private sector plantations and high land prices limiting future growth, private sector forests are expected to thrive by leveraging efficiency and technology (Cheboiwo 2016).

Major players involved in private forestry in Kenya include the James Finlay tea estate, established in 1925 in Kenya's Rift Valley, spans 10,000 hectares, with 3,000 hectares dedicated to forests primarily of Eucalyptus species. It has improved its Eucalyptus grandis through rigorous breeding, developing 14 selections for both internal use and sale. The estate uses mechanized operations for planting and harvesting, achieving a high mean annual increment of 50 m^3 per hectare and a sawmill with a 75% recovery rate. Timber from Finlay's operations supports tea processing and is sold locally, while surplus is utilized in infrastructure and packaging. The estate also supports Mau Forest Complex conservation and environmental education. Timsales Company Limited is another major wood-based industrial complex, which has been operational for nearly 70 years. It produces a range of wood products and relies on both public and its own plantations. It manages over 1,500 hectares of Eucalyptus grandis and supports forest development by collaborating with Kenya Forest Service (KFS). Homa Lime Company, founded in the 1920s, diversifies into forestry with 280 hectares of Eucalyptus plantations for firewood and 100 hectares preserved as a national monument. It is out-grower scheme partners with local farmers to cultivate Eucalyptus, ensuring a steady supply of wood and supporting regional tree growers (Cheboiwo 2016).

4.2 Effects of on-farm tree harvesting rights and promotion of sustainable tree growing practices

Private landowners in Kenya have the right to use, lease, sell, or develop their land within the confines of the law. These rights are guaranteed under the

Constitution, 2010 and the Land Act, 2012. Landowners can also engage in agricultural, commercial, or residential activities, provided they comply with environmental and zoning regulations. Results from document content analysis in Table 1 also indicate that there are various legal and policy fronts being pursued in the country to promote tree harvesting rights and investments in tree growing as shown in Table 2. Even though the policy environment provides a strong framework for sustainable tree growing and conservation, it poses mixed implications for tree harvesting rights and investment. In particular, policies such as the Agriculture (Farm Forestry) Rules (2009) incentivize tree cover expansion but the veneer export ban of 2024 may burden landholders with compliance costs and denied access to the most needed markets for tree products.

Table 2. Legal and policy environment for tree growing rights in Kenya

Document	**Does policy promote or hinder tree-growing rights and investments?**
The Constitution of Kenya, 2010	Promotes tree growing through Article 69, which guarantees the right to a clean and healthy environment, including the sustainable management and use of on-farm tree resources.
The Wildlife Conservation and Management Act, 2013	Promotes sustainable on-farm tree harvesting rights but seeks to protect trees as wildlife habitats.
The Forest Conservation and Management Act, 2016	Promotes sustainable tree harvesting rights and establishes Kenya Forest Service to enforce those rights
The Environmental Management and Coordination Act (EMCA), 1999 (Amended in 2015)	This act provides for the establishment of an appropriate legal and institutional framework for environmental management and tree harvesting rights. It includes provisions that affect tree harvesting, particularly concerning environmental impact assessments (EIAs), which may be required before harvesting activities commence.
The Forest Policy, 2014	Promotes on-farm tree harvesting rights, outlines forest conservation, protection, and management guidelines, and emphasizes the importance of involving local communities and private landholders in sustainable forest management, including tree harvesting.
The National Land Policy, 2009	Addresses land tenure issues in Kenya and grants property rights to individuals, thus encouraging tree-growing investments
The Agriculture (Farm Forestry) Rules, 2009	Promotes sustainable tree harvesting by encouraging landowners to retain 10% tree cover on their farms.
The Land Act, 2012	Promotes tree harvesting rights by promoting sustainable administration and management of land in Kenya
Logging ban of 2019	The ban targeted public and community forests. It served to promote tree harvesting rights on private farms.
Logging ban of 1999	Promote tree harvesting rights on private farms by banning tree harvesting in targeted public forests.
Ban on export of raw wood veneers in 2024	Curtailed tree harvesting rights on private farms by withdrawing a market for tree owners.

Results from the reviewed literature on Kenya's context for on-farm tree growing and document content analysis of sources in Table 1 show that implementation of harvesting rights have various ecological, social, and economic effects on investments in tree-growing. Table 3 highlights the actual and potential effects of rights.

Table 3. Effects of tree harvesting rights

Type of effect	Positive effects	Negative effects
Ecological	▪ The incentive for increasing tree coverage and private farms (Cheboiwo 2016) ▪ Increased on-farm tree biodiversity (Cheboiwo 2016) ▪ Increased provision of ecosystem services such as firewood and timber (Cheboiwo 2016).	▪ Disrupts the provision of ecosystem services ▪ Reduced biological diversity on farms ▪ Increased risk of deforestation. ▪ Increased risks of soil erosion and environmental degradation ▪ Increased risk of proliferation of invasive species ▪ Unsustainable management of tree resources (Cheboiwo 2016).
Social	▪ Increased household income and employment opportunities ▪ Increased revenue to fund development projects ▪ Increased decision-making power of communities in tree-growing initiatives ▪ Increased awareness and education about sustainable management practices	▪ Conflicts between different interest groups, ▪ Increased social inequality. ▪ Health and safety risks where tree harvesting is unregulated
Economic	▪ Income generation for individuals and businesses ▪ Economic development in rural areas by funding infrastructure projects, public services, and local businesses ▪ Proliferation of efficient innovations and technologies for tree harvesting ▪ Increased export opportunities and revenue for economic growth ▪ Attract capital and investment. The James Finlay tea estate and other companies have significant investments in Kenya	▪ It can lead to resource depletion. ▪ The timber market can fluctuate, leading to economic instability for those dependent on tree harvesting and related industries. ▪ It can lead to costly remediation and restoration efforts and reduced ecosystem services that have economic value. ▪ Disputes over tree harvesting rights and land use can lead to legal battles, increased security costs, and social unrest. ▪ Low tree prices when there is an oversupply in the market

In summary, the results show that the effect of tree harvesting rights on investment in tree growing and conservation practices in Kenya is mixed. Policies encourage sustainable tree management and increase investments through incentives such as land tenure security, farm forestry rules, and environmental protection. However, market barriers, such as the 2024 veneer export ban, limit investment potential by restricting access to key markets. The ecological, social,

and economic impacts include positive effects such as income generation, increased tree coverage, and job creation, but also negative consequences such as resource depletion, deforestation risks, and conflicts, highlighting the need for balanced and effective policy implementation. These results are discussed in the successive parts.

5. Discussion

This study explored the often overlooked but essential aspect of forest management, focusing on tree harvesting rights and their influence on private landowners' investment in tree growing.

5.1 The role of private landowners in bridging the demand-supply gap for wood products

In Kenya, the analysis highlights key findings, emphasizing the vital role private landowners play in bridging the gap between increasing global wood demand and declining natural forest cover. With global markets increasingly seeking sustainable wood sources, Kenya's farm forestry sector, driven by private landowners, has become crucial to meeting these demands (Mutune et al. 2024; FAO 2018). Farm forests now contribute significantly to the production of timber, firewood, and other wood products (World Resource Institute Website, 2024; Midgley et al., 2017; FAO, 2018; Zomer et al., 2014; Quandt et al., 2018;). However, authors in this study believe that the success of these efforts is heavily dependent on the regulatory framework governing tree harvesting and the overall investment climate for private forestry (World Resource Institute Website, 2024).

5.2 Influence of regulatory framework on private investment in forestry

Several factors influence private landowners' willingness to invest in tree growing. Secure land tenure, government incentives, and a supportive regulatory environment are important for encouraging private forestry investment (Dinh et al. 2023; Lin et al. 2020; Xie et al. 2013; Bouriaud et al. 2013). In Kenya, legal structures such as the Forest Conservation and Management Act of 2016 and the Farm Forestry Rules of 2009 play critical roles in promoting tree harvesting rights and sustainable forestry practices on farmlands. The Act empowers private landowners to engage in tree planting and manage their resources sustainably, while Kenya's National Land Policy (Table 1&2) enhances land tenure security, a crucial factor in encouraging investments in on-farm tree growing. However, policy challenges, such as the logging bans and market disruptions, such as the veneer export ban, undermine tree-growing investment by private landowners by

creating income instability for smallholder farmers. This finding underscores the need for a more balanced regulatory approach that encourages sustainable forestry while respecting landowners' economic interests.

Moreover, this study finds that multinational companies and large tea estates, such as the James Finlay tea estate and Timsales Company, are among the primary contributors to Kenya's private forestry (Cheboiwo 2016). These entities have heavily invested in fast-growing tree species, including Eucalyptus grandis to meet the market demand for timber and fuelwood. Their ability to make significant investments highlights the potential for large-scale private land owners and enterprises to adopt sustainable practices and respond to market demands. However, smallholder farmers face numerous challenges, including poor market valuation techniques and limited institutional support. These obstacles, along with a complex regulatory environment, hinder smallholders' full participation in the private forestry sector.

5.3 The effect of tree harvesting rights on tree growing investments

The study also reveals the threat posed by unsustainable practices, such as premature tree harvesting without adequate replanting (Table 3), which jeopardizes both the economic viability of tree growing and the ecosystem services provided by forests. These services include carbon sequestration, water regulation, and biodiversity conservation. This study observes that the failure to adopt sustainable management practices is exacerbated by weak institutional frameworks and ineffective enforcement of existing laws. While Kenya's forestry sector has the potential to contribute significantly to climate change mitigation and economic development, the absence of coherent strategies and support structures limits its overall impact. From these findings, the study emphasizes that secure tree harvesting rights are crucial to promoting private investment in forestry. Existing literature from Vietnam and China, demonstrate that secure tenure rights significantly encourage long-term investment in tree growing (Xie et al. 2013; Lin et al. 2020; Dinh et al. 2023). These countries have shown how legal clarity and government support can stimulate private engagement in forestry, a pattern that could be mirrored in Kenya. However, the study also underscores the need to balance economic growth with environmental sustainability. Regulations such as Kenya's Environmental Management and Coordination Act (EMCA) and the Wildlife Conservation and Management Act (Table 1&2) aim to protect ecosystems but can inadvertently create barriers for private landowners. These laws can restrict landowners' flexibility in managing their resources, making tree growing a less attractive venture. Furthermore,

sudden policy interventions, such as the timber export moratorium, disrupt market dynamics and leave landowners uncertain about the long-term viability of their investments. This is particularly relevant in the case of the veneer export ban, where smallholder farmers have expressed concerns about income loss and reduced market access (Table 3). In addition to regulatory issues, the study reveals that tree-growing investments are heavily influenced by market forces. Rising global demand for timber and wood products, coupled with increasing land values, has made private forestry a profitable venture for larger investors. However, smallholder farmers continue to struggle with low prices for their trees and poor management practices, which reduce profitability. To address these barriers, the study recommends improved market infrastructure, better valuation techniques, and enhanced government support, such as subsidies or other financial incentives. Without these measures, smallholders will find it difficult to compete in a market increasingly dominated by larger, well-resourced companies.

The findings of the study align with global trends in sustainable forestry, as seen in regions such as the Midwest U.S. and China (Lin et al. 2020; Kittredge and Thompson 2016; Ruseva et al. 2015). In these countries, government subsidies and incentives such as free seedlings have successfully encouraged increased tree-planting efforts by private landowners. Similarly, Kenya's Forest Policy of 2014 and the Agriculture (Farm Forestry) Rules (Table 1&2), which require farms to maintain at least 10% tree cover, have played a significant role in promoting private investment in tree growing. However, Kenya faces unique challenges that differentiate it from other regions. For instance, research from Uganda reveals the limitations of weak institutional support and inadequate funding in promoting sustainable forestry practices (Infonile website 2024). While Kenya benefits from institutions such as the Kenya Forest Service (KFS), corruption and bureaucratic inefficiencies still hinder private landowners' ability to fully participate in tree-planting initiatives (Table 1&2).

Moreover, this study highlights the impact of sudden government interventions, such as the 2024 veneer export ban in Kenya, which has sparked controversy. Similar situations in Uganda show how abrupt policy changes can lead to unintended consequences. In Kenya, the government claims farmers are harvesting immature trees, jeopardizing conservation targets (Table 3). However, private landowners argue for economic freedom, emphasizing the need for alternative markets (Table 3). They view their trees as private investments, and restrictions on market access, like those imposed by the ban, undermine their economic potential. Allowing market forces to determine prices would support both sustainable practices and farmer livelihoods. Whereas the authors agree with

the concerns raised by the private landowners in both Kenya and Uganda (Table 1; Table 2; Infonile website 2024; KNA Website 2024), there is also the need to examine this issue from the government's perspective, especially from the geopolitical perspective. One question can be asked, "why would China be interested in Africa's forest and tree resources when its forest cover is increasing? Is Kenya's veneer export prohibition the right move to make given membership to the World Trade Organization? From these questions, it is outrightly clear that China's appetite for Africa's wood resources is subject of international debate. What responsibility should China bear in replenishment of exploited private forest resources? Moreover, whereas players involved in the export ban debacle have valid justification of their demands, this study opines that indeed banning tree harvesting on private farms in Kenya could help conserve biodiversity, combat deforestation, and promote sustainable land use. However, a blanket ban may negatively impact farmers who rely on trees as a source of income, fuel, and construction materials (Table 2 &3). Instead of an outright ban, regulated harvesting with sustainable practices such as agroforestry and replanting programs could strike a balance between conservation and economic needs. Encouraging responsible tree management ensures environmental protection while allowing farmers to benefit from tree harvesting, supporting livelihoods without compromising long-term sustainability. Reviewed literature indicates that in most developed countries where there is a vibrant private forestry sector such as United states of America, Germany, Finland and Sweden efforts are focused on promote regulations for private forestry (Ellefson et al. 2007; Kotilainen Rytteri 2011; Hirsch & Schmithüsen 2010).

5.4 Market forces and investment challenges for smallholders

This paper also observes that the support for veneer exports to China stems from the economic opportunities it provides to eucalyptus tree farmers currently facing market saturation in Kenya. With local markets for eucalyptus poles operating below capacity, new investors in veneer sheets offer a solution by utilizing excess eucalyptus wood. The trend of exporting veneer to China is part of a global phenomenon, as seen in Vietnam, where it has become a thriving business. Rather than opposing exports, the focus should be on scientifically assessing the sector, understanding why semi-processed veneer is exported, and encouraging investment in local plywood manufacturing for both domestic and export markets. For farmers, selling veneer wood, even at lower prices, offers a salvage option as they shift back to more profitable agricultural ventures. The ban on veneer exports, if aimed at increasing eucalyptus tree planting, may

backfire as farmers are already uprooting trees. These circumstances also highlight the importance of extension services in supporting private landholders.

5.5 The need for a comprehensive forestry policy framework

In this paper, authors argue that forestry professionals through the Forestry Society of Kenya (FSK) have a significant role to play in this discussion by amplifying forestry extension methods in Kenya. Cost-effective and easy-to-implement forestry extension systems have proven successful in the country. For example, despite reduced funding under devolved governance, the Forestry Society of Kenya (FSK) could foster interest in private forestry and advocate for innovative mechanisms to promote forestry development, particularly in extension services. Successful models, which rely on dedicated forestry professionals, have demonstrated the viability of creating sustainable forestry networks. In these systems, skilled foresters lead while trained farmers, retired foresters, and teachers serve as frontline extension agents. One notable example is the Farm Forestry Field Schools (FFS) model, developed by the then Forest Department (FD) and now Kenya Forest Service (KFS), Kenya Forestry Research Institute (KEFRI), and the Japan International Cooperation Agency (JICA) between 2004 and 2009. The model trained over 200 forestry extension officers using a participatory approach, focusing on enterprise-based capacity development. Officers work with farmer groups on forestry enterprises like woodlots and tree nurseries. Trained facilitators continue providing services, reducing costs. With support, the system could boost farmer engagement and investment in forestry. Private forest development regulations in Kenya are essential for ensuring sustainable forest management and biodiversity conservation amidst increasing pressure on public forests. Private forests provide crucial ecological services, such as carbon sequestration and water regulation. Clear regulations would promote responsible practices, prevent illegal logging, and encourage investment. However, policy development faces challenges due to lack of funding and political support. Countries like the U.S. and Finland have successfully implemented private forest regulations, enhancing forest health and economic outcomes. These examples show how structured policies can balance environmental protection with economic benefits, offering valuable lessons for Kenya.

The implications of this study are broad, especially in terms of policy formulation and implementation. This study emphasizes the need for secure tree harvesting rights and a supportive legal framework to promote private investment in forestry. It suggests streamlining regulations, offering financial incentives, and

refining policies to better support smallholder farmers, balancing economic and environmental goals to encourage sustainable forestry practices in Kenya.

6. Conclusion and policy implications

This study has highlighted the crucial role of tree harvesting rights in promoting private landowners' investment in tree growing and sustainable conservation practices in Kenya. The findings emphasize the importance of secure land tenure, supportive legal frameworks, and government incentives in encouraging private forestry. However, challenges such as regulatory barriers, sudden policy interventions such as the veneer export ban, and market disruptions have hindered investment in sustainable forestry, especially for smallholders. The study suggests that Kenya's regulatory approach should be refined to balance environmental goals, such as tree cover targets, with economic interests, ensuring that private landowners are incentivized to continue investing in tree planting. Additionally, market forces, including the growing global demand for wood products, should be leveraged to support both sustainable practices and farmers' livelihoods. Strengthening extension services and enhancing financial incentives for smallholders could address investment challenges and foster greater participation in forestry. Drawing lessons from successful models in other countries, the study calls for a comprehensive and consultative forestry policy framework that promotes responsible practices while respecting the rights of landowners. By aligning policy with market dynamics, Kenya can unlock the full potential of its private forestry sector, contributing to both environmental sustainability and economic development. The limitation of this study was relying on secondary data which may present some biases and inaccuracies, as the data may not fully reflect the current situation or capture all relevant variables. Consequently, the findings might not fully capture the realities of private landowners' experiences with tree harvesting rights. Future studies should consider incorporating other methods to provide a different perspective on the issue.

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