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Gender Equality and Social Inclusion in Landscape Management: The Case of Mugina and Rugombo Districts in Burundi

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Summary

Initiatives in landscape management are designed as sustainable solutions to confront environmental and social challenges. Effective management hinges on recognizing the unique needs of local communities. This study examines how gender interacts with multiple identities, including marital status, socioeconomic status, and age, in conjunction with power dynamics. It underscores the significance of these elements in determining access to resources, the dissemination of knowledge and skills, and their role in influencing participation in decision-making processes vital for effective landscape management in the sub-Nyamagana watershed, situated in the Imbo plain of the Mugina and Rugombo districts in Burundi. This is qualitative research founded on data collected in June 2024, which includes eight key informant interviews (comprising four men and four women), 20 household interviews (equally divided between ten men and ten women), and eight focus group discussions (four conducted with male groups and four with female groups). The results demonstrate that the Burundi government has enacted laws to support environmental sustainability and sustainable development. However, the experiences shared by farmers highlight that age, socio-economic factors, and power relations significantly impact their rights to resources, their ability to express their opinions, and their representation in landscape management, which in turn affects the effectiveness of landscape management initiatives. The three primary key results and recommendations are presented below.

- Sustainable farming and natural resource management practices among both men and women farmers from diverse social groups are significantly influenced by their access to resources. Our result shows women, young individuals, and indigenous communities, such as the Batwa, often encounter varied levels of restricted rights to vital resources, including land, financial assistance, and essential information. This lack of access undermines their decision-making and investment potential, contributing to heightened poverty. To effectively address challenges, interventions should consider the varied needs, priorities, barriers, and difficulties of the diverse social groups, guaranteeing their access to essential resources, services, and benefits.
- There is disparity in access and valuation of knowledge which marginalizes certain social groups, including women and small communities such as the Batwa, which in turn leads to a decline in traditional knowledge. For instance, social norms that hinder marginalized groups' mobility and limit their access to training contribute to the loss of critical knowledge and poor management of resources. Addressing the gaps in ecological knowledge for successful landscape management involves the integration of diverse knowledge systems. By merging the diverse traditional knowledge with modern agricultural techniques, it is possible to leverage these experiences to enhance conservation and resource management strategies.
- Men largely oversee natural resource management, which restricts the empowerment of women. Challenges such as domestic responsibilities and financial barriers frequently mute women's contributions, especially in economically disadvantaged households. This lack of varied involvement in landscape management fails to address women's needs, thereby sustaining poverty, reinforcing gender disparities, and leading to suboptimal resource management. To address the issues, it is recommended that relevant stakeholders implement inclusive and gender transformative approaches to enhance equitable involvement in leadership roles and collaborative efforts.

Introduction

Landscape management initiatives encompass comprehensive strategies designed to promote sustainable development while tackling complex environmental and social issues (Denier et al. 2015). These initiatives aim to protect ecosystem services, preserve biodiversity, support rural development, and improve human well-being (Axelsson and Angelstam 2011). Despite the significance of gender and social inclusion in landscape and natural resource management, these aspects are frequently overlooked. Studies indicate that gender and social inclusion are rarely integrated into landscape restoration research, which predominantly focuses on physical factors (Abera et al. 2023). Furthermore, existing literature underscores the necessity of acknowledging gender-based dynamics and the varied knowledge, skills, needs, and priorities of socially diverse groups within local communities in the context of natural resource management (Elias et al. 2016).

The distinct roles and preferences of different gender groups significantly influence strategies for climate change mitigation and adaptation (Phiri et al. 2022). Women often possess unique experiences and relationships with the environment, yet their perspectives are frequently marginalized in conservation initiatives (James et al. 2021). In Africa, women are vital in managing natural resources such as water, agriculture, and fisheries (Botaro and Mulugeta 2020), but they often encounter exclusion and unequal benefits due to prevailing societal norms (Akinola 2018). They face challenges related to land ownership rights and are often excluded from decision-making processes (Tantoh et al. 2021). Low-income women experience additional obstacles in securing land rights necessary for agricultural activities (Treidl 2018). Climate change exacerbates resource access issues, complicating women's ability to fulfill their roles (Fonjong and Zama 2023). Water scarcity increases their workload, resulting in socio-economic and health challenges (Seri 2023). Financial difficulties drive marginalized communities toward unsustainable practices, perpetuating the cycle of poverty (Liu et al. 2021).

Discussions surrounding climate change adaptation frequently portray women as passive victims or caregivers, often overlooking their proactive roles in articulating their needs, rights, and responsibilities (Elias et al. 2016; Djoudi et al. 2016; Aregu et al. 2016). This narrow perspective fails to recognize the intricate power dynamics and the social, political, and economic disparities, such as class, ethnicity, and caste, that influence individuals' capacity to adapt to environmental shifts (Ibid). Researchers highlight that marginalizing women's contributions undermines the effectiveness and sustainability of natural resource management by limiting social learning and neglecting the diverse needs of community members (Aregu et al. 2016). Scholars advocate for a shift from a vulnerability-centric approach to a more nuanced understanding that recognizes shared fragility and seeks to enhance livelihood resilience, which is crucial for achieving gender equity and fostering social transformation in the face of global environmental challenges (Elias et al. 2016; Djoudi et al. 2016). To achieve fair and effective conservation results, it is vital to comprehend and address gender considerations, as gender shapes power dynamics, rights, and the societal values assigned to different individuals (Anthem and Westerman 2021).

The CGIAR Initiative on West and Central African Food Systems Transformation aimed to improve nutrition and food security in Burundi, particularly considering the challenges posed by climate change. The initiative was organized into five work packages, with Work Package 3 (WP3), led by IWMI, concentrating on inclusive landscape management (ILM). The goal of WP3 was to promote equitable access to land and water resources, fostering a healthy environment that underpins resilient agrifood systems. Within this work package, the research investigated the interplay between gender and various identities, including marital status, wealth, and age, alongside power dynamics. The emphasis was placed on how these factors influence resource rights, the transfer of knowledge and skills, and participation in decision-making processes essential for effective landscape management in the sub-Nyamagana watershed, located in the Imbo plain of the Mugina and Rugombo districts in Burundi. To meet these objectives, the study examined the following questions:

- What are the main gender identities and intersectional issues of landscape within the sub-Nyamagana watershed, situated in the Imbo plain of the Mugina and Rugombo districts in Burundi?
- How do gender identities and intersections influence power dynamics and decision-making processes of landscape management; and what are the implications for resource rights, knowledge and skill transfer, and participation and voice?
- What are the systemic issues that contribute to exclusions of gender identities and intersections in policies and practices that support landscape management in Burundi?

This report outlines a detailed methodology encompassing the research case, an analytical framework, the selected study locations, and the methods utilized for data collection and analysis. The findings emphasize the factors affecting gender-specific livelihood activities, agricultural practices, and the allocation of environmental rights among men and women across various social groups. Subsequently, we engage in a discussion that connects our results to another pertinent research. In conclusion, we provide actionable recommendations aimed at promoting gender-responsive and socially inclusive landscape management in the two districts of Burundi.

Research methods

The focus of our study was on two communes in Cibitoke province: one from the Mugina district and another from the Rugombo district (Figure 1). In 2019 and 2020, the demographic profile of Cibitoke province was predominantly young, with around 79% of the population falling within the 0-35 age range. Additionally, the active population, comprising individuals aged 15 to 64, represented 54% of the total demographic. The age pyramid illustrated a wide base and a narrow peak, reflecting a youthful population and a higher female population compared to males. In terms of economic activities, Cibitoke province is rich in opportunities, particularly in the fields of agriculture and livestock. The province is divided into six communes across three natural regions, each corresponding to a unique agroecological zone, which supports a variety of crops, including food crops, market gardening, industrial crops, and fruits. The livestock sector is also well-developed, primarily featuring cattle along with smaller livestock such as pigs, goats, sheep, and rabbits.

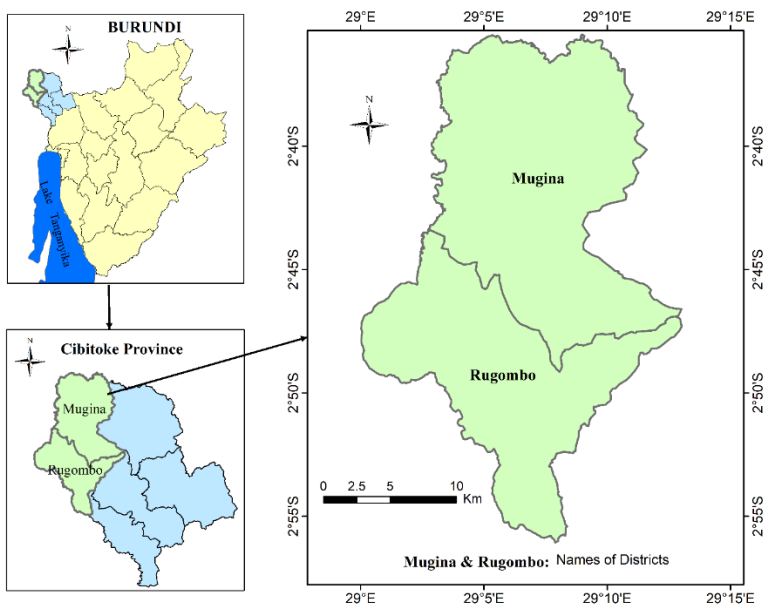


Figure 1: Location of the study area

Analytical framework

To investigate the research questions, we employ the Feminist Political Ecology (FPE) framework. This framework integrates feminist theory with political ecology to analyze the intricate connections between gender, power relations, and environmental issues (Sundberg 2017). FPE emphasizes the importance of incorporating gender perspectives into all dimensions of ecological challenges, going beyond mere social considerations (Zaremba et al. 2021). Key tenets of FPE include examining intersectional vulnerabilities (Nunbogu and Elliott 2021), embracing a variety of perspectives, values, and local knowledge (Elias et al. 2021), and amplifying the voices of marginalized groups in environmental governance (Zaremba et al. 2021). This approach critiques prevailing narratives and promotes more inclusive and context-sensitive strategies in environmental initiatives (Elias et al. 2021). Furthermore, FPE questions the commodification of nature and highlights the need to tackle systemic inequalities within environmental policies and practices (Ibid). As a result, FPE serves as a vital framework for conducting gender analysis in landscape management, facilitating a comprehensive exploration of:

- the experiences, challenges, and opportunities encountered by women in relation to climate change (Harcourt 2020),
- the roles and perspectives in the governance of natural resources (Manoby et al. 2023),
- access to, control over, and comprehension of natural resources (Sundberg 2017), - decision-making processes and the formation of subjectivities in agricultural practices (Spangler and Christie 2020) as well as in resource management (Nyantakyi-Frimpong 2019).

We utilized this framework to examine the effects of gender identities and intersectional issues on the distinct relationships that individual men and women have with landscapes, their rights to resources, the transfer of knowledge and skills, and their involvement and influence in decision-making processes related to landscape management.

Research Case

Most farmers in Burundi rely on rain-fed agriculture, which makes them very vulnerable to climate change (Berckmoes and White 2016; Muchiri and Nzisabira 2020). Smallholder farmers are particularly impacted due to various factors (Warinda et al. 2020; Hillenbrand et al. 2022). Unpredictable rainfall and more frequent droughts reduce crop production, affecting the livelihoods of these farmers. Climate change also leads to more pests and diseases that further decrease crop yields, increasing food insecurity (Skendžić et al. 2021). This situation poses significant risks for farmers, especially women, who face severe economic challenges because of food shortages (Mangheni et al. 2019).

The challenges are heightened by changing weather patterns and irregular rainfall. These difficulties in agricultural production highlight the need for interventions to help smallholder women farmers in Burundi. Many farmers are not familiar with new climate-smart technologies, leaving them struggling with the impacts of prolonged drought and rising temperatures, which harm their main source of income (Kalele et al. 2021). While challenges associated with climate change affect nearly all farmers, women farmers in Burundi are more vulnerable to climate shocks due to pre-existing conditions and gender norms that hinder their agricultural production efforts (Maja and Ayano 2021). Women farmers in Burundi face low economic endowment, which limits their ability to invest in farming inputs and technologies that could improve their yields (Ibid).

Women farmers are particularly susceptible to climate shocks because of existing gender norms that hinder their agricultural efforts. Women often lack the financial resources to invest in better farming methods. They also face restrictions in land rights, making it harder for them to grow food. Furthermore, their access

to important information, resources, and services is often limited, which adds to their challenges (Maja and Ayano 2021). Region-specific socio-economic issues only make these problems worse. Many women in Burundi are confined to household tasks, while men engage in income-generating activities, leading to inequalities in education, economic power, and a widening gender gap (Katungi et al. 2020).

Data collection

The research employed a qualitative methodology to investigate the influence of gender, power relations, and social hierarchies on access to resources, the transfer of knowledge and skills, and the representation and voice of individuals in landscape management initiatives within the sub-Nyamagana watershed, situated in the Imbo plain of the Mugina and Rugombo districts in Burundi. Data was collected from primary and secondary sources. Data from secondary sources were collected to select the analytical framework and understand gender equality and social inclusion in landscape management. Primary data was collected through in-depth household interviews, Focus Group Discussions (FGDs), and Key Informant Interviews (KIIs) using semi-structured questionnaires and checklist questions. Consent forms were completed by participants for both FGDs and KIIs. Data was collected in June 2024, with efforts to ensure diversity among the 92 informants, including men and women of various ages, income levels, marital statuses, and geographic locations. Details on informant selection and participant demographics are presented below.

Household In-depth Interviews: The in-depth interviews engaged a total of 20 participants from two districts. Each district contributed ten informants, consisting of an equal number of five men and five women. The selection process included individuals from both wealthier and resource poor households, with five representatives from each group. Each wealth category was represented by specific demographics: one female spouse, one female household head, one young woman, one adult man, and one young man.

Focus Group Discussions (FGDs): The focus group discussions (FGDs) comprised 64 participants from two districts. Participants were stratified into two wealth categories: better-off households and resource-poor households, with each category further divided into female-only and male-only sub-groups, each containing eight participants. This structure led to a total of 32 participants from each village. Semi-structured questionnaires were utilized to guide the household interviews and focus group discussions, concentrating on vital livelihood activities, understanding of agricultural techniques, experiences with environmental changes, access to resources, and the representation of individuals in decision-making processes concerning landscape management.

Key informant interviews: The key informant interviews involved a total of eight key informants from diverse sectors, specifically: (a) social and family development (2 participants); (b) district water management department (1 participant); (c) district land management department (2 participants); (d) district forest management department (1 participant); and (e) district agriculture office (2 participants). The objective of conducting these interviews was to examine the challenges within the district, understand perceptions of gendered knowledge, assess resource accessibility, explore agency, evaluate gendered environmental rights, and analyze the effects of both formal and informal regulations on these rights.

Data analysis

The focus group discussions, household interviews, and key informant interviews were predominantly conducted in Kirundi, the national language of Burundi, with only two sessions held in English. These discussions were recorded, transcribed, translated into English, and subsequently analyzed. The research employed coding and content analysis (Krippendorff 2018) to conduct an in-depth examination of the primary qualitative data. The findings underscored and examined the implications of gender identities and intersectional issues across four central themes: the relationship with the landscape, resource rights,

knowledge and skill transfer, and participation and voice. In analyzing the relationship with the landscape, we investigated the specific connections that men and women maintain with their environment, particularly in the context of climate change and environmental degradation. In terms of resource rights, we investigated how access to and control over critical resources like land, water, and financial assets influence participation in landscape management and the equitable distribution of benefits. Additionally, we assessed the impact of gender identities and intersectional issues on the transfer of knowledge and skills related to landscape management. Finally, the study explored how these gender identities and intersectional issues shape the participation and voice of men and women within landscape management platforms.

Results

This section assesses how gender identities and intersectional power dynamics shape the experiences of men and women in terms of i) their relationship with the environment, ii) their rights to resources, iii) the sharing of knowledge and skills, and iv) their representation and voice, thereby influencing the effectiveness of landscape management

Impacts of gender identities and intersectional power dynamics on men and women's relationship with the environment

This sub-section delves into how gender identities and intersectional power dynamics influence landscape management. We specifically address the unique interactions that men and women from diverse social groups experience with their landscapes, particularly in agricultural and rural areas, where they play vital roles in managing household income, ensuring food security, and overseeing resource management.

Livelihood of men and women in the study districts predominantly rely on integrated crop-livestock systems. Typical agricultural practices encompass subsistence cultivation of staple foods (such as cassava, maize, soybeans, rice, and sweet potatoes), vegetables (including tomatoes, peppers, beans, and a variety of leafy greens such as eggplants, amaranths, and Colocasia), and fruits (such as bananas). Beyond crop production, men and women also participate in livestock farming with the rearing of cows, goats, chickens, pigs, sheep, rabbits, and guinea pigs - as an additional income source. Products derived from animals, such as milk and eggs, are also either consumed or sold. Beekeeping is practiced for honey production as well. Small-scale trade, like running mini-shops or trading necessary goods, is important for income, especially for women. However, many resource-poor households lack livestock ownership, limiting access to draft power and natural fertilizers. This restricts food security, livelihood options, and income opportunities, for both men and women. Casual labor and gold mining also provide income for some men and women.

Livelihood challenges –Study participants, both men and women, have reported observing changes in the local climate and environment that impact their livelihood activities. They noted drought, flooding, crop diseases, weeds caused by climate change, and deforestation are threatening their livelihood activities. According to them, rainfall patterns have become increasingly unpredictable, with wet seasons either commencing later or concluding earlier than in the past. Participants also mentioned the excessive use of wood resources for timber, firewood, and charcoal is causing a decline in tree cover, affecting soil fertility, and causing erosion of arable land, disrupting rainfall patterns and negatively affecting their livelihood activities. These inconsistencies have led to diminished crop yields compared to previous decades. A man from the focus group discussion in Mugina reported the poorer harvest outcomes due to livelihood threats as: “*We now harvest only two or three bags of produce, a significant decrease from the five bags we used to collect.*”, reflecting poorer harvest outcomes.

Impacts of climate change - Impacts of climate change and environmental degradation varies for the different social groups: women and elderly people being the most affected groups. Women are most

impacted because they are the one responsible for household water, energy, and food supply. A key informant from Rugombo district highlighted how women are most impacted due to climate change as:

“Climate change affects women much more because they are the ones looking for firewood because not everyone uses charcoal. They can't find firewood because there is no more forest. Men also have problems because here at home we consider the man as the head of the family and the one who must take care of the children's schooling and other household needs. We are all affected but women are the most affected.”

Women are also significantly impacted when their male partners migrate due to declining harvests caused by environmental and climate challenges. In the pursuit of alternative income sources, female spouses often assume the responsibility of providing for the family, seeking wage employment opportunities to ensure their families are fed. A woman key informant illustrated this as: *“In a household, when there is famine, the husband can go far away from the family to get money and pay back debts and the wife remains alone with the children she has to feed and is forced to go and do work daily to feed them.”* Elderly people are also amongst the most affected social groups because they no longer have the strength and resources to cope with challenges caused by climate change and the environment with the younger ones.

Mitigation measures – In response to environmental and climate changes, farming practices have undergone considerable transformation, incorporating methods. To ensure crops reach maturity before the onset of shorter rainfall periods, farmers have shifted their seeding schedules to January and February. By diversifying planting dates and crop varieties, they can reduce the risks linked to early cessation of rainfall. The rise in pest populations has led to more use of chemical insecticides, pesticides, and biopesticides from local plant extracts for crop protection. Female farmers combine synthetic insecticides with natural methods, using affordable on-farm resources for organic options like papaya and rabbit urine sprays. Planting pest-repellent plants like papaya around crops also helps control pests. The use of manure and chemical fertilizers have become more prevalent for the purpose of improving soil quality. Farmers with livestock generate compost from manure and grass to enrich the soil.

Additionally, they plant nitrogen-fixing trees to mitigate erosion, engage in crop rotation, and bury post-harvest residues to increase organic matter. Mulching is also practiced for retaining soil moisture. Also, men and highlight contour lines, mulching with plant residues acting like sponges, and vegetative barriers as key for water conservation, while herbaceous plants are used as nutrient catch crops. Men and women respondents reported using modern cultivation methods and technologies such as using improved techniques for ploughing, leveling soil, flooding fields with water, and row planting of crops to enhance both land and nutrient efficiency. Many farmers now plant in rows to help plants get better sunlight and control weeds. Improved irrigation systems provide essential support to crops during dry spells. In drier regions, farmers seek forage to sustain livestock throughout the dry season. Overall, through strategies such as early planting, diversification, irrigation, integrated pest management, and effective nutrient use, farmers have demonstrated remarkable adaptability in addressing the challenges posed by environmental changes. However, ability of men and women from diverse social groups to adopt and apply the best practices depends on resource rights, knowledge and skill transfer, and representation and voice in landscape management initiatives.

Impacts of gender identities and intersectional power dynamics on men and women's resource rights

This sub-section investigates the relationship between gender identities and power dynamics on the rights of men and women to vital resources, including land, water, and finance, and how these relationships influence the effectiveness of landscape management.

Land – Both men and women acquire land through inheritance and market transactions, but socio-cultural norms heavily influence this access. Customary laws generally favor men, leading to larger land inheritances for them than for women. When land is bought by parents, daughters are often excluded from ownership, receiving only their share of ancestral land. Fathers frequently state that the purchased land is meant exclusively for their sons. In terms of inheritance from grandparents, daughters typically receive a smaller portion that they must divide among themselves, while sons are granted full shares. Despite this, there is a rising awareness of rights, encouraging many women to assert their claims. While some advocate for equal land rights for daughters, there is still a group that opposes such changes. A key informant from Mugina district illustrated this as:

“When a woman wants to have more land than her brothers the community members often accuse her of wanting to encumber her brothers. The one who does it is though supported by some others who believe that it is a way of defending her rights but there are some who do not understand it, who do not understand that a girl can have equal land rights as a boy, often they blame the one who dares to claim her rights in the same way as boys.”

Inheritance practices predominantly allocate land control to men; however, there is a growing trend towards collaborative decision-making regarding property within households. Women report that property rights are often shared, allowing for joint management or sale of assets with mutual consent between spouses, although men retain the final authority. A woman from a better off household in the Rugombo district exemplified this collaborative approach by stating, *“I don’t own any land myself, but I plan to acquire some. The property my husband inherited was sold after we discussed it together when we faced an issue.”*

Additionally, women gain access to land through marriage, yet some indicated that they do not have personal ownership since their husbands inherited family land. Typically, such land remains registered in the names of male spouses or their families, which can be reclaimed by the male spouses’ families in the event of divorce or death, thereby leaving female spouses without access to land and other essential resources. The fragmentation of land has emerged as a significant issue, particularly for young men and women from resource-poor households to inherit land from their families. Additionally, the limited size of land can lead to conflicts between spouses, as they often have varying priorities and preferences regarding crop cultivation. A key informant from Mugina district mentioned this as:

“Often the husband can decide to grow a foreign crop on a plot and the wife can categorically object, saying that she will grow cassava and corn there to feed her children. Or the woman may offer crops to plant on a plot and the man may refuse. It all depends on the understanding in the household.”

It is important to mention that indigenous groups with fewer resources acknowledged their lack of land ownership, often opting to rent fields on a seasonal basis when financially viable. For instance, interactions with the Batwa community indicated that they do not have land available for farming, depending instead on other income-generating activities like charcoal burning and timber sales. According to the Grant (2019) Batwa who are still mostly landless face many difficulties relating to land-rights, either through lack of title, discriminatory practices relating to allocation on the part of the authorities, or failure to recognize historic rights to land. Land laws in Burundi still discriminate against Batwa, as they base customary land rights on ‘actual and visible occupation of the land’, while the traditional hunter-gatherer lifestyle tends to not visibly impact on territory.

Water - Water is generally available to everyone. In the Mugina district, men and women respondents have reported having sufficient access to water resources. During the dry season, men and women farmers with plots near water sources extract water from streams using either pumps or watering cans for field irrigation,

although some isolated areas lack necessary support. Men typically engage in market gardening when irrigation is feasible. Our study also reveals, women, with restricted labor options, struggle to irrigate their plots using watering cans. In the Rugombo district, however, water availability and access are more challenging.

In both districts, water shortages frequently occur during dry seasons and droughts, exacerbating competition for limited resources. Gender plays a crucial role in water access, with men generally competing for water from marshes and standpipes for irrigation and brick-making, leading to tensions. In response to water scarcity, both men and women farmers are turning to less water-intensive crops, such as sweet potatoes. Women, responsible for securing household water supplies, face significant hurdles during dry periods, including extended waiting times and large gatherings at standpipes, often requiring them to arrive as early as 3 a.m. and incurring extra expenses.

Finance/loan – In our study, both men and women participants indicated that they secure loans for farming from multiple sources, including own income, banks, microfinance cooperatives, savings associations, and social networks such as family, friends, and neighbors. The results reveal that wealthier farmers, regardless of gender, enjoy improved access to these financial avenues, which bolsters their capacity to implement modern agricultural technologies and practices. This financial support also enables them to employ farm managers who can consistently oversee their operations. This is particularly beneficial for women farmers, who often face challenges in monitoring their fields due to household responsibilities. Membership in cooperatives allows women to easily obtain loans from banks focused on fostering investment and development for women. These financial institutions provide specialized credit services with lower interest rates tailored for women engaged in agricultural activities.

However, for men and women from economically disadvantaged households, obtaining financial assistance or loans poses significant difficulties. Some study participants mentioned that they have difficulty in acquiring loan from local microfinance cooperatives and banks that require. The lack of co-ownership of collateral or co-signatories significantly restricts women's ability to secure productive loans for farming activities. Moreover, both men and women participants have indicated they join communal savings groups alongside their husbands, which allows for independent savings. Nonetheless, participation in these savings groups is not universal among women, primarily due to limited resources for initial and ongoing contributions.

Additionally, married women in the study reported restricted access to household income, as cultural practices often attribute crop income rights solely to their husbands, even when all family members contribute to the farming work. In terms of harvest and income management, spouses engage in discussions regarding their consumption and sales strategies. Most women regard the harvested crops as a shared asset between both partners. Women actively participate in significant sales discussions with their husbands, and although men traditionally held the upper hand in these conversations, there is now an expectation for open dialogue. Any misuse of funds by either partner results in a halt to sales activities. Consensus among all key family members is essential, and no individual can handle or sell the harvest without prior consultation with their husband. While collaboration is crucial, men typically retain the final authority. Our results also show men tend to oversee the more valuable crops, whereas women are responsible for those of lesser value. Female heads of households may possess greater economic influence when acting independently, but conflicts often lead to decisions that favor male perspectives on harvest and income management.

“Here men have not yet understood that women also have rights, and they impose themselves in everything. I think that even the administration is not doing anything to stop this because

when there have been good harvests, men often engage in polygamy under the complacent eye of the administration.”

Men and women facing challenges in securing loans/finance often find it difficult to acquire improved agricultural inputs and accessing land. A key informant from Mugina district provided additional insights into this issue as:

“For men and women farmers, securing funds to purchase quality seeds presents a significant challenge, contributing to ongoing poverty as many continue to rely on traditional seeds that are no longer available in the market. Many also claimed they could not afford them.”

A key informant from Mugina district

Without the availability of fertilizers, superior seed varieties, or integrated pest management strategies, crop yields may not reach their full potential due to insufficient support systems. To cope with the challenges of limited financial access, both men and women farmers often rely on traditional farming methods, which are not universally accessible. For example, farmers unable to purchase chemical fertilizers typically turn to manure as an alternative. Unfortunately, accessing manure is becoming more difficult for economically disadvantaged farmers, especially since not everyone owns livestock.

Impacts of gender identities and intersectional power dynamics on knowledge and skill transfers

This sub-section explores how gender identities and intersectional power dynamics influence the transfer of knowledge and skills among men and women, and subsequently, how these influences affect the effectiveness of landscape management. Men and women gain knowledge on modern cultivation techniques through own experience, outreach from local government organizations, Non-Government Organizations (NGOs), farmers' associations, neighbors, and observing peers to continuously strengthen local agricultural capacity suited to their environmental livelihood context over time.

The agricultural practices in the study regions exhibit a clear gender division. Men undertake physically demanding responsibilities, such as maintaining trees, pruning coffee plantations, planting trees to combat erosion, and creating contour lines. In contrast, women concentrate on lighter duties, including harvesting and weeding. While women are involved in monitoring fields for food security, they generally steer clear of land management matters, which are largely overseen by men. As a result, certain types of knowledge are often more prevalent among one gender compared to the other, although there is considerable knowledge sharing and overlap between the genders. For instance, men typically possess more knowledge regarding soil quality, pest and disease cycles, and weather patterns that affect agricultural practices, as they are usually responsible for land management and crop production. They also have more expertise in managing larger livestock, while women tend to be more knowledgeable about small livestock and poultry. Additionally, natural resource management, such as the stewardship of forests and pastures, is often a domain where men have greater knowledge.

Development organizations teach men and women farmers the benefit of integrating or replacing traditional schemes with modern techniques and technologies such as chemical fertilizers, pesticides, intercropping, etc. to boost productivity. Municipal monitors, experts like agronomists and officers from the Burundian environmental protection agency provide advisory services on agronomic practices and natural resource management for both male and female farmers. These experts hold meetings to raise awareness about environmental issues and promote better farming inputs, technologies and practices. Men and women study participants also indicated they obtain knowledge from their networks. Women respondents noted how they learned improved practices by observing others and imitating successful techniques. *“When some began*

using manure and planting in rows and noticed larger yields, others adopted fertilization as well. Comparing fields highlighted benefits of organized planting over disorderly methods.”. Men respondents also emphasized how farmers mutually share agricultural information by inquiring about each other's cropping systems, inputs, and harvest results. While men share agricultural knowledge by discussing each other's farming methods and results.

Men and women participants in the study reported a significant gap in access to environmental knowledge and agricultural practices, primarily attributed to the limited participation of women and marginalized communities. Typically, only one partner, predominantly men, attends informational meetings and subsequently relays the information at home, which often results in a male-centric perspective in communication often leading to tensions. Men respondents mentioned an organization called Caritas previously hosted trainings teaching agricultural calculation, enterprise skills and best practices. Participants learned record keeping, fertilizer use, and adaptive technologies. Recent bean cultivation training was also reported. Continued skills support was welcomed to build on past lessons. Some women said they participated in ADRA trainings on household wealth management and spousal communication. Some women reported limited access to programs and training opportunities, attributing this to traditional workloads and social norms that restrict their mobility. A key informant from the Mugina district provided insights on this matter as:

“This knowledge related to contour lines and forestry is understood by men while women think that it is a way of reducing arable land. And that's how there is disagreement between men and women and often women destroy these installations. But we need to raise awareness among women so that they know that even if they are plowing, the land should also be protected;”

Conversely, knowledge related to plant biodiversity and the use of herbal medicinal plants is predominantly held by women, who are adept at identifying and utilizing wild plants for various purposes, including food and medicine.

Additionally, the Batwa community faces significant challenges in accessing information, compounded by self-discrimination and social isolation, which often hinder their engagement with the broader population to seek new knowledge. Literature highlights that historical marginalization, coupled with entrenched stigma and discrimination, has led to a lack of confidence among Batwa individuals to assert their rights or participate in wider community activities (Lewis, 2000). This self-imposed isolation is exacerbated by systemic barriers, such as language differences, limited literacy rates, and exclusion from formal education systems (Grant 2019). As a result, the Batwa often remain disconnected from critical information and resources, further deepening their socio-economic vulnerabilities and perpetuating cycles of poverty and marginalization.

Impacts of gender identities and intersectional power dynamics on representation and voice

This section investigates the relationship between gender identities, intersectional power dynamics, and their impact on the voice and representation of men and women, as well as the implications for effective landscape management. Our findings reveal decisions regarding environmental management, particularly those concerning wildlife, hunting practices, and forest stewardship, are primarily determined through administrative processes that begin at the municipal level. Local authorities play a crucial role in overseeing the execution of these tasks. District key informants indicate that community initiatives foster open dialogue, allowing all members to contribute their thoughts. Participants, both men and women, emphasize the significance of village chiefs and sector leaders in facilitating community gatherings to meet local demands. To improve the engagement of male and female farmers from diverse backgrounds, the government actively encourages women's involvement, mandating that a minimum of three women participate in every group of ten during local meetings. Additionally, local governments are focused on

educating men about the value of women's viewpoints and enhancing community cohesion. Cooperatives advocate for the interests of women and marginalized groups, while development organizations provide support for skill enhancement among women in these communities.

Results from our study also shows most men farmer, and few women, particularly from better off households indicated comfortably voice opinions and suggestions during meetings on household or community topics. For example, widowed FGD participant woman from Rugombo district illustrated her active participation in environmental and agricultural related meetings and trainings as “I feel empowered when I ask critical questions such as on expensive water access issues.... When I am invited to meetings, I actively participate by asking questions for clarification and sharing my experiences and knowledge that informs other farmers as well as leaders on technical issues. Men and women study participants who expressed they feel unease speaking publicly indicated also indicated they benefit from attending meetings and trainings. A resource poor man from Mugina district illustrated how he benefits himself and others from attending meetings and trainings as: “I get learning opportunities by attending meetings and trainings informed through listening. I also share the information or knowledge I gained to my family and neighbors.” Nonetheless, despite the progresses women's and indigenous communities’ participation and voice in environmental and agricultural decision-making processes remain limited because of three key barriers: i) lack of targeted inclusion, ii) cultural norms, and iii) lack of self-confidence and poverty.

First, due to lack of targeted inclusion and invitation efforts, environmental decision-making processes are not always designed to proactively engage underrepresented voices, especially of marginalized groups. For instance, the Batwa community, like many indigenous peoples living in remote areas, faces limited participation in socio-economic and political processes due to their small population number, often coupled with geographical isolation. Remote locations often lead to physical barriers that restrict access to essential services such as education, healthcare, and administrative support (Kidd & Zaninka, 2008). Moreover, isolation often results in exclusion from decision-making processes at both local and national levels, further marginalizing the Batwa and hindering their ability to influence policies that directly affect their lives. This perpetuates cycles of exclusion and reinforces the barriers that inhibit their full participation in society.

Second, cultural norms concentrate decision power among male partners and leaders that discourage participation. Women's rights are often dependent on or subordinate to their male partners or family heads. Results of our study reveal households have different organizational structures, leading to varied decision-making dynamics among spouses. There are three main categories: first, households with mutual agreement; second, those where the husband decides independently; and third, a less common scenario where the woman leads in decision-making. Taking the first and second categories, while discussions about decisions often occur within spouses and other household members, it is typically the male spouse who has the final say. Sometimes women propose ideas and are not listened to because of socio-cultural norms, patriarchal culture and beliefs, where Burundian culture does not give them enough space. This is also reflected in a traditional saying in Burundian culture, which suggests that a woman should not speak in the presence of a man, encapsulated in the proverb, “*Nta nkokokazi ibika isake ihari*” (A hen cannot crow in the presence of the rooster). A key informant from one of the two districts explained these factors as:

“The reasons for men having more control over everything stems from multiple and interlinks factors. some men assert that because they are the primary breadwinner, they should also be the decision-maker. Furthermore, there are those who follow the example set by their fathers, believing that since their fathers made the ultimate decisions in their homes, they too should assume that role.”

The dynamic of men bringing women into their homes often leads to a situation where men feel entitled to assert their rights over various family matters. They are also assumed to be public figures of the household.

In this situation, women's primary role within the household are often viewed as support figures, who are not entitled to possess decision-making authority and they are expected to submit to their husbands. Because of such norms and assumptions, environmental rights like control over land, income from crops and participation in community decision making processes are concentrated among men. Male household heads also make key production and sale decisions Another key informant explained his role as someone who provides guidance for his family in production as:

".... I reference my own experiences at home, as I possess a deeper understanding of the matter; I am the one who advises my wife on her responsibilities. I emphasize the significance of planting trees, highlighting that my motivation for planting them stems from concerns about climate change. I clarify that the trees I cultivate can coexist with our crops while also serving to protect the fields from erosion."

Furthermore, traditional roles confined women primarily to the home while men access community groups, limiting exposure. Women are hesitant to join due to self-imposed limits around expected gender roles. Women often face significant hurdles, particularly due to their commitments to household duties, and those who are either breastfeeding or pregnant may struggle with leaving their children alone.

Third, women study participants indicated they also lack self-confidence assuming they are not capable, and it is culturally inappropriate for them to express their views, as public spaces are assumed for men due to cultural norms. According to some men and women respondents, their ideas during such meetings are often ignored due to how they express their opinions and who receives their proposals. They indicated many of their concerns do not reach higher authorities. Moreover, men and women from impoverished backgrounds are hesitant to share their thoughts, convinced that their social standing renders their ideas insignificant, which can result in feelings of inferiority.

Discussion

Landscape management initiatives are strategies for sustainable development that address environmental and social issues (Denier et al. 2015). They protect ecosystem services, preserve biodiversity, support rural development, and improve human well-being (Axelsson and Angelstam 2011). However, gender and social inclusion are often overlooked in landscape restoration research, which mainly considers physical factors (Abera et al. 2023). Recognizing the diverse needs of local communities is essential for effectively designing and implementing landscape management initiatives. Utilizing the Feminist Political Ecology (FPE) framework, we analyzed the ways in which the interaction of gender identities and intersectional power dynamics shapes the unique connections that men and women maintain with their environments. This includes their rights to resources, the exchange of knowledge and skills, and their representation and voice, all of which significantly influence the success of landscape management efforts.

Our research reveals significant disparities in the ways men and women from different backgrounds participate in leadership roles and influence decision-making. These differences are largely attributed to patriarchal systems and economic challenges. Adult men often dominate decision-making in natural resource management, which diminishes the sense of empowerment among women and youth. The lack of representation of women in conservation-related decisions is further intensified by barriers such as domestic responsibilities and financial limitations, which mute their voices, particularly in low-income households. The inadequate engagement of women, men, and youth from various social backgrounds in landscape management processes results in a neglect of their needs, perpetuating cycles of poverty and ineffective resource management.

Decline in agricultural productivity – Most farmers in Burundi rely on rain-fed agriculture, which makes them very vulnerable to climate change (Muchiri and Nzisabira 2020) increasing food insecurity (Skendžić et al. 2021) This situation poses significant risks for farmers, especially women, who face severe economic challenges because of food shortages (Mangheni et al. 2019). To mitigate the challenge local government and its development partners support men and women farmers to adopt improved technologies and practices. However, the ability of various social groups to implement sustainable farming practices is closely linked to their access to vital resources highlighting the importance of gender-sensitive strategies in landscape management. Our result shows women and indigenous people tend to have limited resource rights affecting their productivity. For example, Cultural norms supporting male land ownership create barriers for women, hindering their role in sustainable land management. This limits their decision-making power and investment in land, leading to lower agricultural productivity. Young men and women from low-income households also struggle with land access and rights, deepening poverty issues. This result is in line studies by Tantoh et al. (2021) and Treidl (2018) who highlight the challenges women from low-income households face to secure land rights for agricultural activities and to participate decision-making processes affecting their agricultural productivity. The competition for scarce water resources, particularly during dry seasons, further complicates this issue.

Women, who are often tasked with securing household water supplies, may find it challenging to participate in farming when water scarcity increase their workload. According to Seri (2023), increase in women's workload due to water scarcity often results in socio-economic and health challenges (Seri 2023) thereby reducing overall productivity. The unequal distribution of financial resources between affluent and marginalized farmers adds another layer of complexity to agricultural output. Men and women farmers from wealthier households, regardless of gender, are more likely to invest in modern agricultural practices, while their less privileged counterparts, including many women, are often confined to traditional methods, hindering their advancement and productivity. Additionally, the lack of livestock ownership among resource-poor households limits access to vital inputs, adversely affecting soil fertility and farm yields. Liu et al. (2021) also highlighted financial difficulties drive marginalized communities toward unsustainable practices, perpetuating the cycle of poverty.

Loss of traditional knowledge: Understanding environmental changes and their effects on livelihoods requires local knowledge, while modern agricultural practices are crucial for boosting productivity. The influence of traditional knowledge in landscape management is significantly affected by gender identities and power dynamics, especially in agriculture. As noted by James et al. (2021), women often have distinct experiences and connections with their environment, yet their insights are frequently overlooked in conservation efforts. The unequal distribution of this knowledge, which tends to favor one gender and marginalize specific social groups, can result in the decline of traditional knowledge and hinder advancement. Local environmental management often fails to recognize the contributions of underrepresented groups, particularly women and smaller marginalized communities like the Batwa. The limited participation of these groups in landscape management discussions exacerbates the issue, leaving their perspectives largely unacknowledged. Social norms can restrict women's mobility, limiting their access to vital training and information. Furthermore, cultural expectations that discourage women's involvement in decision-making perpetuate gender disparities and reduce their contributions. This exclusion not only leads to ineffective resource management but also results in the loss of traditional knowledge essential for sustainable practices. The Batwa's inclination towards self-discrimination and hesitance to seek broader knowledge highlights the need for targeted interventions. Researchers emphasize that sidelining women contributions diminishes the effectiveness and sustainability of natural resource management by restricting social learning and ignoring the diverse needs of community members (Aregu et al. 2016).

Ineffective resource management: The management of resources is often rendered ineffective due to the influence of gender identities and the intersectional challenges present within power dynamics in landscape management. For example, without ownership of land, individuals find it difficult to secure the loans and funding necessary for improved farming practices. Women in the study sites often face systemic obstacles in obtaining loans, primarily due to a lack of collateral and the necessity for co-signers, which diminishes their economic power and reinforces traditional male-dominated hierarchies. Cultural practices that prioritize male decision-making within households further erode women's rights to resources, marginalizing their voices and exacerbating gender inequalities, which in turn leads to suboptimal resource management. According to Katungi et al. (2020) many women in Burundi are confined to household tasks, while men engage in income-generating activities, leading to inequalities in education, economic power, and a widening gender gap (Katungi et al. 2020) contributing to disparities in resource management.

Increased conflict: The division of agricultural tasks between men and women creates different knowledge bases, increasing tensions over resource use. Decision-making within households complicates this further, as men often have the final say, sidelining women's voices. This male-centric approach can prioritize male insights and limit women's roles in agriculture. Conflicts can occur when men make decisions without considering women's expertise, causing practices that do not meet community needs. The lack of inclusive discussions can increase inequalities and create competition for resources, especially during scarcity.

Conclusion and Recommendation

Landscape management initiatives are sustainable strategies that tackle environmental and social problems. Recognizing local communities' diverse needs is vital for effective management. Using the Feminist Political Ecology framework, we studied how gender identities and power dynamics affect men's and women's relationships with their environments, influencing their resource rights, knowledge sharing, and representation, which impacts management success. The research highlights critical disparities in leadership participation and decision-making in natural resource management, primarily driven by entrenched patriarchal systems and economic challenges. The dominance of adult men in decision-making roles not only undermines the empowerment of women, youth and but also perpetuates cycles of poverty and ineffective resource management. The marginalization of vulnerable groups, particularly in low-income households, is exacerbated by domestic responsibilities and financial limitations, leading to a neglect of their needs in landscape management processes. Poor households with tiny plots play a crucial role in landscape management by adopting sustainable practices that maintain soil fertility, conserve biodiversity, and prevent land degradation, directly impacting the health of the broader ecosystem. Their interest lies in securing livelihoods, enhancing food security, and protecting their small plots from environmental risks, ensuring long-term productivity and resilience.

Furthermore, the decline in agricultural productivity and the loss of traditional knowledge are deeply intertwined with the unequal distribution of resources and the systematic exclusion of underrepresented groups, including women and small communities like the Batwa. Unequal access to land, water, and other vital resources prevents disadvantaged groups from practicing sustainable agricultural methods, passing down ecological knowledge, or contributing meaningfully to decision-making processes. Women, who often play central roles in farming and resource management, are frequently sidelined, leading to a loss of their invaluable expertise in local ecosystems and crop diversification. The case of the Batwa is different as they are a tiny minority. However, their livelihoods and cultural heritage are closely tied to the environment, while they are overlooked in landscape governance. This exclusion will not reflect the diverse needs, priorities, and traditional practices of all stakeholders.

A holistic strategic action plan for inclusive landscape management should integrate gender-sensitive policies and participatory frameworks to ensure equitable representation of women, youth, and with due consideration of marginal groups like the Batwa in decision-making and leadership roles. Simultaneously, it should prioritize access to resources, knowledge sharing, and capacity building through community-based programs that combine traditional and modern sustainable practices. By fostering financial inclusion, supporting livelihood diversification, and emphasizing community-centered approaches, the plan can address systemic inequalities, enhance resource management, and promote resilient, sustainable ecosystems that reflect the diverse needs of all stakeholders.

Recommendations for Inclusive Landscape Management

The findings carry significant implications for shaping development policies and practices that promote inclusive and sustainable landscape management in Burundi and other regions:

- **Promote Gender-Inclusive Leadership and Decision-Making**
Establish quotas or affirmative action policies to ensure women, youth, and all ethnic groups have equitable representation in leadership roles and decision-making bodies in natural resource management.
- **Enhance Access to Resources and Support Systems**
Implement programs to provide marginalized communities, particularly women and smallholders, with access to land, water, credit, and training in sustainable agricultural practices to strengthen their contributions to landscape management.
- ± **Strengthen Knowledge Sharing and Capacity Building**
Facilitate community-based training sessions and platforms that integrate traditional ecological knowledge with modern sustainable practices, with due attention to the inclusion of underrepresented groups like the Batwa and of course women farmers.
- **Support Livelihood Diversification and Financial Inclusion**
Develop initiatives to diversify income sources for low-income households, reducing reliance on small plots and enabling investments in sustainable landscape practices.
- **Foster Participatory and Community-Centered Approaches**
Incorporate participatory methods that actively engage all community members, including vulnerable groups, in the design, implementation, and monitoring of landscape management strategies to ensure diverse needs and perspectives are addressed.

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