



Understanding the Experiences of Small-Scale Commercial Afforestation Farmers and Governance Conflicts in Manguzi, South Africa: Political Ecology Perspective

Lindokuhle Denis Sibiya^{1,2} · Inocent Moyo²

Accepted: 14 June 2024 / Published online: 6 July 2024
© Steve Harrison, John Herbohn 2024

Abstract

Small-scale commercial afforestation has always played a vital role in stimulating rural livelihoods in South Africa and across the globe. This paper explores the lived experiences of small-scale commercial afforestation farmers in Manguzi, South Africa to understand the factors that influence these farmers to get involved in this afforestation and the impacts on their livelihoods. This paper also investigates the conflict between the farmers and the Department of Water and Sanitation over the policies that control afforestation practices and water use in South Africa. Following a qualitative approach, 26 small-scale farmers were interviewed, and data were analysed using thematic analysis. There are two types of commercial afforestation: large-scale and small-scale. The findings indicate that small-scale commercial afforestation is the only economic activity that has been able to earn rural dwellers a living for more than 30 years in Manguzi. However, it has succeeded at the expense of water resources which is concerning to the conflicted Department of Water and Sanitation. Following political ecology, we argue that environmental issues in Manguzi are the results of socio-economic conditions and that asymmetric power relations exist between the farmers and the Department of Water and Sanitation. The study recommends that the management of afforestation should be firmly grounded in principles of fairness, recognising the rights and agency of the underprivileged within the broader political and ecological framework.

Keywords Sustainable livelihood · Policies · Power: plantations · Water Issues: Development

Introduction

Most rural communities in developing countries including South Africa derive and sustain their livelihoods through farming, ranging from subsistence farming, cash-crop farming as well as small-scale commercial farming (Khathiwada et al. 2017; Kugedera and Kokerai 2018; Beckline et al. 2022; Mendako et al. 2022). The contribution of forests to rural livelihoods is significant globally, with an estimated 1 billion out of 1.2 billion extremely poor households depending on forest resources (Mendako et al. 2022). The literature reveals a noticeable shift from utilizing forests for direct consumption such as firewood and safety reasons to utilizing them for economic benefits and monetary value (Kugedera and Kokerai 2018). In Uzbekistan (Central Asia), afforestation is seen as one of the livelihood diversification options, as it provides a range of employment opportunities that improve the household's income (Bobojonov et al. 2013). In Myanmar, rural people depend on forestry over four times more than any other source of livelihood (Hlaing et al. 2017). Most previous studies on rural livelihoods and forestry have been comparative and adopted a quantitative approach to understanding the proportion of rural people who depend on forests for their livelihoods and the revenues generated thereafter (Kugedera and Kokerai 2018; Wale et al. 2022). In Malawi, it has been revealed that forest income contributes 15% to the total household income (Kamanga et al. 2009). In East Cameroon, forest resources were found to make up over 38% of annual rural household income, while in Sudan, forestry accounted for over 54% of the total household's annual income in rural areas (Beckline et al. 2022). The study that was conducted in the Democratic Republic of the Congo using descriptive statistical analysis to determine the absolute and relative forest income reveals that the annual average income from these forest-based activities was estimated at CDF 1,219,951.58 (USD 659.08) per household, contributing 32.46% to total annual household income (Mendako et al. 2022).

Afforestation also plays a crucial role in the mitigation of climate change by capturing carbon from the atmosphere, thereby diminishing the levels of CO₂, and alleviating global warming (Makhubele et al. 2022; Wale et al. 2022). Furthermore, afforestation impacts the regional climate by altering the bio-geophysical characteristics of the land surface, thereby inducing modifications in surface temperatures, atmospheric temperatures, and moisture concentrations (Zerihun 2021). Afforestation also contributes to the mitigation and adaptation of climate change by facilitating the migration of species to more favourable conditions (Sosibo et al. 2022). However, the effectiveness of afforestation in mitigating greenhouse gas emissions hinges upon various factors such as the type of forest, practices in forest management, and utilization patterns of wood. Afforestation also supports the achievement of Sustainable Development Goals (SDGs) related to poverty alleviation (SDG 1), hunger reduction (SDG 2), health improvement (SDG 3), education (SDG 4), sustainable production and consumption (SDG 12), action on climate change (SDG 13), life on land (SDG 15), and partnerships for goals (SDG 17) (Mulaudzi and Kioko 2022). Afforestation aligns with the concept of nature-based solutions, which promote sustainable land management practices to address climate change and achieve multiple SDGs. Therefore, it could be deduced that afforestation is a crucial strategy for climate action and

sustainable development, contributing to the achievement of the SDGs especially in rural communities. South Africa is positioning itself as a proactive player in climate change management through various afforestation programs and policy initiatives. For instance, the South African National Climate Change Response Policy of 2011 highlights the significance of practising sustainable forest management and afforestation as integral components of the nation's comprehensive approach to reducing greenhouse gas emissions and adjusting to the effects of climate change (Mulaudzi and Kioko 2022). This policy framework further outlines the various measures and strategies aimed at enhancing the resilience of ecosystems and human populations to climate-related challenges (FAO 2023).

Small-scale commercial afforestation is a contingent concept; therefore, its definition is context-specific. In South Africa, it is understood as the planting and managing of forests on relatively small landholdings where there was no previous tree cover primarily for economic benefits (Upfold et al. 2015; Wale et al. 2022). The individuals engaged in these afforestation activities are generally individual farmers, cooperatives, or small businesses with land plots varying from 1 ha to just under 50 ha, however, most farmers possess land holdings between 5 ha and 20 ha (Karumbidza 2005; Howard et al. 2005). In addition, Howard et al. (2005) argue that a small-scale commercial farmer in South Africa is also a "previously disadvantaged individual" (PDI), meaning someone who was disadvantaged by the policies of the previous apartheid government in terms of access to land, education and business opportunities. Most small-scale commercial timber growers in South Africa do not have formal title to the land on which the trees are grown but have a lesser tenure status such as a "permission to occupy" or simply permission from the tribal authority to use the land (Jeje 2012).

In South Africa, particularly small-scale commercial forestry has provided essential resources and income opportunities for rural communities, contributing significantly to their livelihoods. This sub-sector is crucial in sustaining the economic subsistence and livelihoods of more than 1.5 million rural dwellers (Upfold et al. 2015). This sub-sector contributes approximately 42% of the annual income of rural households in South Africa (Ofoegbu 2020; Ogujiuba and Nasiru 2020). However, there are challenges regarding the declining resilience of forests due to climate change and pests as well as the impacts of forests on water resources (Xulu 2018). Other main causes of deforestation in South Africa include the establishment of settlements and agricultural encroachment (FAO 2013).

This sector contributes about 1% to the national Gross Domestic Product (GDP) and in terms of regional GDP, forestry in KwaZulu-Natal contributes 4.4% (South African government 2014). NCT Forestry, a local forestry company relies on small-scale wattle growers for 11.5% of their wattle timber annually, valued at R14.2 m (Upfold et al. 2015). In 2013, small-scale timber growers contributed more than 240,000 tons to Sappi's timber supply (Mamba 2013). Small-scale commercial forestry has always been dominated by men, however, in recent years, women in their 50s seem to outnumber them, mainly due to most men opting for migration in search of better economic opportunities (Aliber and Hart 2009; Kiptot and Franzel 2012). Forestry South Africa (FSA), an association representing all timber growers in South Africa, including small-scale timber growers remains the main stakeholder in this

forestry sector (FSA 2019). Other stakeholders in the sector include the Department of Environment, Forestry and Fisheries (DEFF), the Department of Water and Sanitation (DWS), and various local farmers' associations.

Some studies (DFID 2000; Krantz 2001; Ota et al. 2020; Yego et al. 2021; Nasrnia and Ashktorab 2021) have relied heavily on the Sustainable Livelihood Framework (SLF) to understand the complexity of rural livelihoods. The SLF is an approach that appraises the connections between household assets, institutional arrangements, livelihood strategies and outcomes to assess livelihood sustainability and resilience (Scoones 1998; Yego et al. 2021). However, this approach has also been extensively criticised for various reasons including downplaying the delocalisation of livelihoods and its inability to explicitly draw a strong connection between the power relations and the livelihood strategies that rural people employ to make a livelihood (Natarajan et al. 2022; Scoones 2015). Therefore, the novelty of the current study is the investigation of afforestation and rural livelihoods in the contemporary world using qualitative approaches and different theoretical frameworks such as political ecology to explore power relations in afforestation governance. Political ecology provides a new perspective by revealing how unequal distribution of power can affect marginalised communities who depend on forestry for their livelihoods. Rural livelihoods in South Africa are characterized by widespread poverty and vulnerability, with many people living in rural areas facing these challenges (Gibbens and Schoeman 2020). Despite various programs implemented by the South African government to enhance livelihoods, income, and food security in rural areas, there is limited evidence of the effectiveness of these programs in achieving their intended outcomes (Hajdu et al. 2020; Mokgomo et al. 2022). As a result, forestry remains a major source of income, employment, and livelihood in most of the poorest rural areas in South Africa (Wale et al. 2022; Ham 2011).

Despite a rich literature on rural livelihoods and forestry, little has been done to understand the lived experiences of small-scale farmers and conflicts over the legislative framework which governs afforestation, particularly in South Africa, which is the gap this paper seeks to fill. In South Africa, commercial forestry covers about 1.2 million hectares primarily located in the wetter parts of the country, such as the Mpumalanga, KwaZulu-Natal, and the Eastern and Western Cape provinces (FSA 2016). Small-scale timber growers own or manage about 3.5% of South Africa's commercial timber plantations and there are more than 20,000 small timber growers, particularly in KwaZulu Natal (FSA 2016). Mahlangu and Mubangizi (2015) indicate that between 1980 and 2009, afforestation in the KwaZulu-Natal province increased by 54.3%. Small-scale timber production has proven to be a reliable source of livelihood for rural communities in this province, hence why it is growing at a rapid rate (Tembe 2012).

Of major concern is a high level of illiteracy among small-scale farmers which impedes them from complying with the legal requirements for foresters (Jele 2012; Mtengu and Green 2016). In addition, many smallholder timber plantations seemed to be taking place outside planned land use and have a detrimental effect on water resources, which has led to a conflict with the Department of Water Affairs [DWS] (SA Forestry Magazine 2013). In South Africa, any forest establishment (large-scale or small-scale) is regarded as a Stream Flow Reduction Activity (SFRA). There-

fore, it is a legal requirement that every person who intends to engage in forestry must send a Water Use License Application [WULA] to the DWS (Chap. 4, Sect. 36 of the National Water Act 36 of 1998). The livelihoods of small-scale farmers face uncertain risks as the DWS is legally mandated to stop and remove plantations that contravene the law while persecuting the offender.

Using the lens of political ecology, this paper focuses on the nature and dynamic of power relations involved in small-scale forestry, and this raises the question which shall be answered later in this study; what contribution does small-scale commercial afforestation make to rural livelihoods and how has this type of farming led to conflicts with the government? To answer this question, this introduction is followed by a discussion on the political ecology perspective and consideration of data collection and analysis on which the paper is based. After the findings, the paper concludes by proposing recommendations on what can be done to improve and sustain rural livelihoods as well as the focus areas for future research.

Political Ecology on Power Relations and Vulnerability of the Poor and Afforestation

Political ecology (PE) is a powerful framework for understanding and addressing the underlying drivers of environmental change and developing ethical solutions (Osborne 2017). The underlying rationale behind PE is that unequal power relations play a decisive role in struggles over the environment, emphasizing how the poor are increasingly marginalized and vulnerable in such conflicts (Bryant 1998). Primarily, PE politicizes environmental issues and takes into consideration how the power structure, and the unequal exchanges therein, result in differential outcomes for different actors in case of environmental change (Acheampong 2020). In the lens of PE, there are politically and economically weak actors such as small-scale farmers and superior actors, and this issue of power relations becomes evident when a decision must be made about the response to the environmental issue at hand (Bryant 1998). The views of the weak grassroots actors, usually the poor are overshadowed by the strong actors, making the poor vulnerable to several plights. Socio-economic conditions such as level of education, employment, and poverty level play a key role in weakening and strengthening the actors.

This concept of PE is concerned with questions related to the politics of natural resource management, access, and control, environmental knowledge, and their interactive effects on livelihoods and environmental change dynamics (Bassett and Peimer 2015). It states that to study environmental degradation or issues, one needs to understand the issues of power; that is, who is in the position to dictate, control, access, and use resources. PE examines how power imbalance is reflected in resource exploitation, access, and control (Dinko et al. 2019). The purpose of PE is to understand the connections between environmental degradation, social inequality, poverty, and hunger (Forsyth 2008). Furthermore, PE questions the relationship between economics, politics, and nature (Minch 2011). The small-scale farmers utilize natural resources such as land and water to gain economic benefits from the trees, which then contribute to their quality of life. However, there are politics involved, for instance

in terms of land ownership, most farmers do not have legal documents that permit them to practice afforestation on the land, and the land ownership negotiations are rather verbal (Jele 2012; Mtengu and Green 2016). Other farmers find themselves paying fines for violating land acquisition policies, which reduce their capacity to earn a living.

In Southern Africa, the land is an essential resource in the provision of ecological services from which small-scale farmers derive their livelihoods (Musavengane and Leonard 2022). However, these authors assert that inequalities related to land use and access accompanied by communication and knowledge gaps between the central governments and local communities culminate in land conflicts. A study conducted by Lavelle (2023) which analysed the mechanisms of access in the harvesting and trade of devil's claw (wild plant) in Namibia indicates that equity remains crippled by the structural, systemic and institutional realities. In Namibia, the trade of wild plants such as devil's claw is important to rural livelihoods, especially those of women, however, harvesters do not have autonomy or equal negotiating power to shape the mechanisms of access from which benefits are derived (Lavelle 2023; Sunderland et al. 2011). In Southern Africa, Community-Based Natural Resource Management (CBNRM) was coined to devolve control of natural resources to local populations, however, a myriad of complex issues including power inequalities has made this intention elusive which has dire complications on livelihoods (Heffernan 2023). A study conducted in Zimbabwe indicates that community members are dissatisfied with the current management of indigenous resources because they are excluded from the decision-making and management of the resources on which their livelihoods depend (Shereni and Saarinen 2021).

The insights from the PE elucidate that inequality, unequal power relations and social injustice perpetuate smallholder farmer vulnerability, therefore, intervention to enhance sustainable farming should examine local risks, specificities, and priorities of smallholder farmers (Chandra et al. 2017). A case study of Northern Ghanaian Savannahs reveals that smallholder vulnerabilities are constructed at the intersection of historical ethnic conflicts and neoliberal policies in ways that contest the dominant narratives (Madin 2020). Therefore, to reduce the vulnerabilities of small-scale farmers while enhancing their livelihood security, addressing how local and macro politics mediate access to desirable resources must be prioritised. A political ecology study conducted by Otutei (2014) in the Assin North Municipality, Ghana reveals that small-scale farmers are enmeshed in a competitive battle for the economic benefits accruing from the commercial exploitation of timber afforestation. However, these farmers do not have equal powers in such a competitive battle because legal and regulatory instruments in forestry have conferred much power on state institutions such as the Forestry Commission (Otutei 2014). Therefore, it can be deduced that failures in forest management are inevitable outcomes of the politics of resource use and control, which push weaker actors such as farmers into deep marginalisation.

Despite the emphasis on the active involvement of local stakeholders in forest management policies in India, however, in practice, the government disregard small-scale farmers. This is because forested lands continue to be state-owned and forest-dwelling communities' rights and tenure remain insecure, which makes these communities vulnerable (Valencia 2019). Drawing from PE perspectives, rights-

based and tenure-responsive practices are key to ensuring harmony between forest management and broader rights recognition efforts and the protection of community livelihoods (Valencia 2019). Mahlangu and Mubangizi (2015) and the Food and Agricultural Organization [FAO] (2018) concur that in some instances, small-scale commercial afforestation is hindered by the nature and effectiveness of existing institutional arrangements and that the rural communities are often side-lined in decisions on how the forests they depend on are governed. This again has to do with who is in the better position to exercise power and make decisions that sometimes are oppressive and threatening to others while they are applauded by other actors.

PE also encompasses the issues of the clash of individual interests and the potential for collusion that lie at the heart of political economy (Forsyth 2008). The clash of interests was experienced in India, where small-scale commercial forestry is the key to rural livelihoods but the main concern to the Indian government is that forest plantations interrupt rainfall by collecting water on its canopy, as a result, some of this water is then evaporated back into the atmosphere and prevented from entering rivers and streams, which negatively impact stream ecology (Government of India 2002). However, in India, wherever restriction on access to forest resources is imposed, poverty and suffering among the rural people increase (Biswas 2003). Therefore, investigating the lived experiences of small-scale farmers from the PE perspective expands on the burgeoning domain of literature on rural livelihoods and forestry by revealing that power relations exist in afforestation governance.

Despite the evident contribution of small-scale forestry to rural livelihoods, it also leads to conflicts because forestry disturbs the environmental processes. Yang et al. (2015) reveal that the sub-watershed of the Mekong River Region in China is a very important resource in Xishuangbanna but is now threatened because of small-scale commercial forestry which benefits the farmers economically but disrupts the water ecosystem (Yang et al. 2015). This is similar to what is happening in South Africa, KwaZulu Natal in a town called Manguzi, small-scale farmers earn a living through small-scale forestry, while on the other side, the DWS is concerned with the water crisis in the area. However, the implications and impacts of the response of the DWS are of importance in this study, considering that Manguzi communities were previously disadvantaged, and the poverty level is high. The purpose of this paper is to explore the contribution of this forestry to rural livelihoods, while also analysing the conflicts between small-scale farmers and the DWS.

Methods and Materials

Study Area

Manguzi formerly known as the town of Kosi Bay is a small rural area within uMhlabuyalingana Local Municipality under uMkhanyakude District in the North-Eastern of KwaZulu-Natal Province, South Africa and is approximately about 15 km from the border of Mozambique. Umhlabuyalingana LM is within Catchment Management Area (CMA) No. 4 which is known as Pongola-Umzimkulu, one of the largest CMAs (Fig. 1). The specific location of the municipality is around latitude

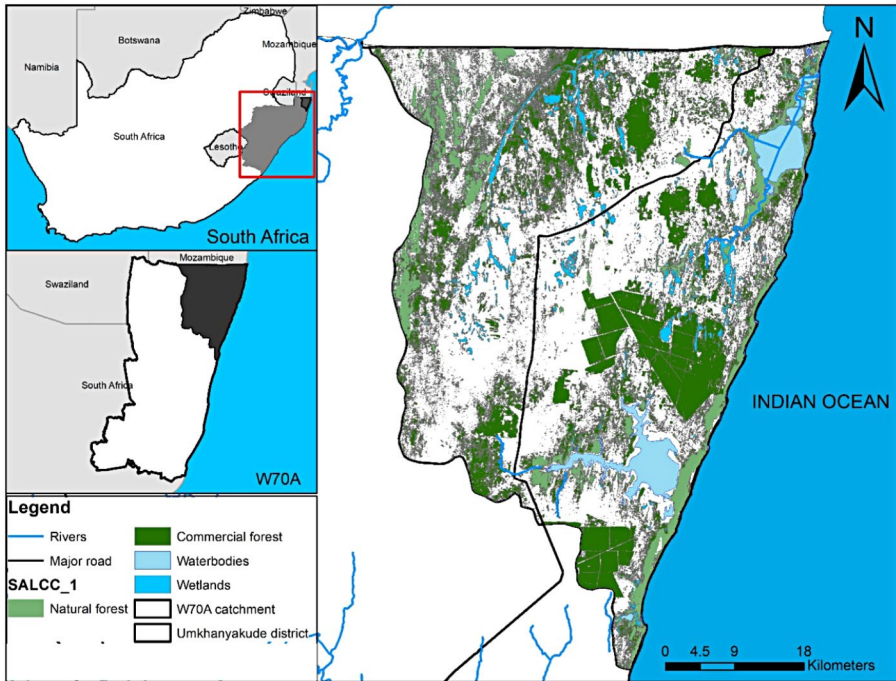


Fig. 1 Location of Manguzi within Quaternary Catchment W70A (Source: Author, 2022)

–27.622 S and longitude 32.014E (Umhlabuyalingana LM IDP 2018: 18). The municipality is extremely rural, implying that it is located far away from town with fewer economic activities/opportunities and lacks basic services such as water, road infrastructure and health care facilities. Other common kinds of rural settlements may include villages in which hamlets and farms are subsets. The total population in Umhlabuyalingana is approximately 172,077 people and the average household size is 6 people per household of which more than 99% are black Africans and the other races (Whites, Coloureds, and Indians) make up a percentage of less than 1%, (Statistics South Africa [SSA] 2016).

The study area is limited to quaternary catchment W70A. A quaternary catchment is a fourth-order catchment in a hierarchical classification system in which a primary catchment is a major unit (DWS 2017). Quaternary catchments are the principal water management units in South Africa. The W70A quaternary catchment forms part of the Mozambique coastal plain and comprises a broad, flat to undulating, sandy region about 60 km in width (Umhlabuyalingana LM SDF 2018). Natural vegetation is the dominant land cover which covers 58% of the total area in Umhlabuyalingana municipality (Umhlabuyalingana LM Spatial Development Framework [SDF] 2018). Umhlabuyalingana municipality experiences a subtropical climate with an average annual temperature of 21.5 °C. The annual rainfall varies between 600 mm and 700 mm on the western side and between 1201 mm and 1250 mm on the eastern side along the coastal sea belt (Umhlabuyalingana LM IDP 2018). The municipality has a gentle slope; however, the sandy nature of the topsoil may result in speedy

erosion should any removal of ground cover take place (Umhlabuyalingana LM IDP 2018).

Commercial agriculture (small-scale and large-scale) is one of the two key drivers of the economy in uMhlabuyalingana LM, the other being tourism. The tourism sector contributes greatly to the local economic development (LED) as it creates job opportunities for the members of local communities, and it is favoured by the existence of various tourist destinations such as the Hluhluwe Umfolozi Park, iSimangaliso Wetland Park, Ndumo Game Reserve; Sodwana Bay; and Tembe Elephant Park and the various cultural Activities and Museums (Umhlabuyalingana LM IDP 2018). Some residents are involved in craftworks which they sell to tourists, and those residents who cannot find means of living migrate to urban areas. In Manguzi, forestry is not a new phenomenon. There is the existence of the Mbazwana and Manzengwenya pine plantations which were established by the then-KwaZulu Department of Forestry in the 1960s. However, the pine did not do well, and most areas were subsequently re-established to gum, mainly *Eucalyptus grandis*.

Research Design

A case study qualitative research design was employed in this study to provide detailed examinations and insights into unique personal lived experiences as suggested by Cresswell (2014) and Smith and Osborn (2015). A case study design is driven by the need to explore a particular phenomenon in-depth and in its natural context, hence why it is sometimes referred to as a “*naturalistic*” design which contrasts with an “*experimental*” design (Crowe et al. 2011). It was considered relevant in this paper because it allowed the researchers to zoom in on a specific case of small-scale commercial foresters in Manguzi, from which lessons can be learnt. Priya (2021) asserts that case studies do not claim to be representative, but their emphasis is on what can be learned from a single case. Therefore, it is hoped that the findings of this current case study shed light on the lived experiences of small-scale farmers and the inequalities entrenched in forest governance in South Africa.

Sampling Procedures

Purposive sampling which is commonly used in qualitative research was adopted in this study. Purposive sampling is a non-probability sampling used to select relevant participants with specific characteristics or experiences important to the research topic and questions (Denieffe 2020). Relevant participants included 26 small-scale farmers, one DWS official and one headman (*induna*). Induna is a Zulu title meaning a headman, this person often acts as a bridge between the local people and the king. Induna was selected to get more insight into the land allocations and general information about the history and value of this afforestation in Manguzi. The official from the DWS responsible for managing illegal afforestation in KwaZulu Natal was selected to find answers as to why these afforestation practices are deemed illegal and what the response could be. Farmers were included to get more information about their lived experiences and conflicts with the DWS. By using purposive sampling in this study, researchers gathered in-depth and meaningful data that provided credible and

trustworthy explanations of the lived experiences of small-scale commercial growers and emanating conflicts with the DWS.

Data Collection and Analysis

Data was collected through semi-structured interviews with the farmers and the DWS official and unstructured interview with Induna. When exploring the unique lived experiences of participants to develop a rich meaning and understanding, interviews are widely used as an effective data collection technique (Creswell 2014). The questions focused on the reasons for practising this afforestation as well as its contribution to the farmers' livelihoods and the relationship between the small-scale farmers and the government. Before the interviews, the researchers asked for permission from the Tembe Traditional Authority (TTA) to conduct the interviews with the small-scale farmers. After the farmers were notified and informed about the objectives of the study, they favoured having the interviews take place in their households, with each interview lasting between 30 min and 1h30m per farmer and with Induna as well. Initially, 23 small-scale farmers were interviewed before reaching saturation where there was no new information generated from the respondents and 3 more farmers were interviewed to check data credibility and reliability, which added up to 26 farmers. The 3 separate interview sessions, each lasting for 1 h were held at the DWS provincial offices in Durban (KwaZulu-Natal Province) with the official.

Document reviewing of the DWS technical reports, policies, and strategic plans was also used to acquire more information on the legislative framework which underpins the functions of the department. The researchers also used observations in observing the location of these forests and their physical contribution to livelihoods. The researchers pledged to preserve the participants' identity and anonymity by utilizing pseudonyms (instead of their real names) and keeping interview scripts and recordings in a secure place. The data were manually analysed using thematic content analysis as suggested by Braun and Clarke (2006). After transcribing the interview recordings, the researchers started by first reading through the transcripts several times, identifying, and classifying similar expressions into themes, which were grouped and arranged in the write-up.

Results and Discussion

Demographic Summary of Small-Scale Farmers in Manguzi

The researchers gathered demographic information (Table 1) to find if farmers' involvement in this afforestation can be attributed to demographic factors such as gender, level of education, skills they possess, and employment status.

Most farmers (62%) interviewed were female, which is a similar trend to most other local municipalities in KwaZulu-Natal and this is because most males prefer to migrate to other places. However, several gender relations matters were raised. For example, women farmers indicated that societal expectations around their domestic responsibilities create time constraints, affecting their ability to fully engage in tim-

Table 1 Demographic information of small-scale farmers (n = 26)

Category	Male (n=10) 38%	Females (n=16) 62%	Total	%
Age				
Below 25	1	0	1	4%
25–39	2	2	4	15%
40–60	5	10	15	58%
Above 60	2	4	6	23%
Education				
No Education	7	7	14	54%
Primary	2	4	6	23%
Secondary	1	3	4	15%
Tertiary	0	2	2	8%
Employment				
Unemployed	2	10	12	46%
Seasonal/part-time employed	5	3	8	31%
Full-time employed	1	2	3	12%
Self-employed	2	1	3	12%

ber farming activities. As a result, males are more knowledgeable and have better access to information related to forest management because they have time to participate in small-scale farmers' associations and forums where useful information is usually shared. This not only makes women rely on male farmers for the management strategies of their plantations but also leads to limited representation of women in decision-making forums related to timber farming. Some women indicated that often male counterparts persuade them to sell or rent out their timber plots. These findings justify why ownership of important assets in farming is skewed in favour of men as Maziya et al. (2020) claim.

About 58% of the farmers were between the ages of 40 and 60; these are people who have full ownership and responsibility for their small-scale plantations. This resonates with the literature that although timber forestry has always been perceived as a men's domain, in recent years, women have become dominant (Aliber and Hart 2009; Kiptot and Franzel 2012). About 15% of the farmers who are between 25 and 39 years old are partially involved, in line weeding, pruning, and cutting of trees, as they get part-time jobs. There are poor education levels among farmers as more than half of the interviewed (54%) have no form and history of schooling, while 23% have primary education, 15% have secondary education and only 8% have tertiary education. The larger proportion of female farmers was unemployed, while most male farmers had some seasonal and part-time form of employment. Only a few had formal employment or self-employment. Those who are employed, occupy semi and unskilled positions such as brick layers, fishers, and mechanics. It was found that in Manguzi, small-scale commercial forestry is still the main economic activity. Before the farmers ventured into small-scale commercial forestry, most of them only relied on government grants, such as social grants, pensions, and social relief grants for income. Community survey indicates that in the entire Umhlabuyalingana municipality household income levels are extremely low, with almost half of the population earning no income (SSA 2016).

Land in Manguzi is owned by Tembe Traditional Authority (TTA), of which some was set aside for small-scale forestry where interested community members were apportioned 5 ha plots each. To access the 5 ha plot, a request for it would be submitted to the induna. Once the request has been approved, the induna would present a handwritten confirmation letter that a certain piece of land is restricted to the respective small-scale farmer. Since these confirmation letters were often handwritten, some farmers did not deem them important and thus continued to use land without them. This, however, hindered the farmers from applying for water use at these plots, as the DWS would need these confirmation letters in the WULA process. Only 5 of the interviewed farmers have Permission to Occupy (PTO) letters from the TTA. Most farmers agreed that land ownership in Manguzi is mostly based on verbal discussions with TTA and history pointing to forefathers owning the land. The fact that the farmers do not own the land leads to numerous conflicts in the area, and the continuation of their afforestation activities cannot be assured. The findings resonate with Schirmer (2007) who argues that when land ownership remains in the hands of small-scale farmers, conflicts are minimal. Given that, about 77% of the interviewed farmers either have primary education or no form of education, most are unemployed and already in their 50s, it can be deduced that the demographic characteristics of the farmers play a role in farmers' compliance or non-compliance with the requirements for establishing a forest.

On Engaging in Small-Scale Commercial Afforestation

We categorize these farmers into 4 groups based on the number of years of engaging in afforestation. These groups are novice, advanced beginner, competent and proficient. The number in the brackets represents the number of farmers who were interviewed from each group.

Novice Group (4) these are relatively new farmers in this industry, they have 5 years or less, and they have not harvested their trees yet since it takes a minimum of six years before they mature depending on the soil profile.

Advanced Beginner Group (10) these are farmers who have been involved in this afforestation for 6 years to 10 years. They have cut their trees once and have seen the contribution to their livelihoods because they have received the revenues.

Competent Group (7) These farmers have been in the industry for 11 years to 15 years and have harvested their trees twice.

Proficient Group (5) these farmers have been involved in forestry for more than 15 years. These farmers have bigger pieces of land than those who joined in the past ten years; others have 5 ha x2 or 5 ha x3. Previously, people from the same household could have 5 ha of land allocated to each person but that is no longer the case, 5 ha is allocated per household. This is because 30 years ago, the land was still available, but today with the increased population, and more people getting involved in forestry, the land is limited. When some household members relocate to other areas for better

life opportunities, the remaining land is taken and added to another relative already involved in forestry, which is why some people own up to 20 ha and more. Most farmers in this group have accumulated assets and other material things since they have harvested their trees more than 3 times.

More than 20 interviewed farmers fall into the first 3 groups, corroborating the literature (Jele 2012) that 20 years ago, people were reluctant and uncertain to get involved because of the long waiting period before they could get the profits. However, having seen others benefiting and improving their standard of living, more people have been getting involved, which is why the DWS has raised water-related concerns because of this afforestation proliferation in the area. The increase in the number of farmers who are still getting involved in small-scale commercial afforestation in Manguzi emphasizes the pivotal role played by this afforestation in rural livelihood generation. Farmers attributed their involvement in this afforestation to unemployment and poverty since most do not have any education; it is difficult to get proper jobs with fixed incomes. This is best captured by the assertion that,

Small Scale Farmer 4

I used to change the sitting positions in my yard, as I had nothing to do to earn an income, so when I saw my neighbours getting involved in forestry, I saw a great opportunity, at least now I have a responsibility of taking care of my 5 ha forestry.

The study findings are consonant with the existing literature which indicates an increase in small-scale afforestation worldwide. This increase is driven by the growing demand for timber worldwide, the importance of forests for carbon sink and a low-emissions economy, and the pressing need to address issues of poverty and unemployment among rural communities (Nambiar 2021; Upfold et al. 2015; Ulla et al. 2021; Schirmer et al. 2015; Gerber 2011). This underscores the need to capacitate small-scale timber growers to increase productivity and economic gains sustainably. This is critical, considering that most small-scale farmers have insufficient knowledge and poor technical capability which not only influence how they establish their plantations but also impede proper management of plantation growth (Ota et al. 2020). The current study suggests that in South Africa, just like in China, Indonesia, Pakistan, Ethiopia, Brazil, Cameroon and India, small-scale forestry could still be viewed as a panacea to stagnant poverty in rural areas, however, this hinges on a comprehensive and integrative forestry policy-framework (Schirmer et al. 2015; Zerga et al. 2021; Goncalves et al. 2020; Wang and Zhao 2022; Beckline et al. 2022; Nambiar 2021).

The Contribution of Small-Scale Commercial Afforestation to the Rural Livelihoods

The role of small-scale commercial afforestation in rural livelihood generation was grouped into three broad categories namely, physical, socio-economic, and humanis-

tic roles. These are the areas in which farmers stated that they have improved because of this afforestation.

The Physical Role in Livelihood Generation

The most noticeable physical contribution of small-scale commercial afforestation to livelihoods is the transition from wooden houses to brick-layered houses. As usual, in rural areas, there are poorly developed houses, but in Manguzi there has been a rapid change in the state of the households. In most households that were visited during the data collection stage, the researchers noticed many newly built brick-layered houses and old wooden houses, which of the latter the farmers used to stay in for some time until they managed to build reliable houses through forestry revenues. Some of the old wooden houses are now used as storerooms and car shelters. One farmer even cracked a joke about the name of the sub-area in Manguzi called “KaNyamazane” which means a Springbok, saying,

Small Scale Farmer 5.

Before the community got involved in small-scale afforestation, we lived in wild caves as springboks but that has recently changed, thanks to these trees.

Many farmers have used their revenues to install the system which they call “*Isigayo*” (informal water pump) to extract underground water. The installation of *Isigayo* is said to cost about R3500 upwards, and it goes 10 m deep or up to 20 m depending on the area. With the inability of the local municipality to supply basic water infrastructure in remote areas, this is the only way the farmers gain access to clean water. In all visited homes, *Isigayo* was installed but it was a different story with one farmer who installed *Isigayo* next to his 5 ha newly planted forest mainly for watering purposes. *Isigayo* could be one of the greatest culprits perpetuating water concerns in the area as local communities extract water directly from underground, and they are not monitored by the municipality as to how many litres are consumed per household. From the farmers’ perspective, if it were not for this afforestation, they would not have access to clean water. The installation of *isigayo* by community members without the engagement of the municipality shows poor development planning and governance.

The current findings are consistent with previous research, such as that conducted by Mlawa et al. (2023) in Tanzania, which indicates that small-scale forestry contributes significantly to physical, social, financial, and human asset improvements which are all necessary to earn a livelihood. This study echoes a need raised by Zerihun (2021) to promote smallholder forestry, given the contribution it makes to ensuring food security and basic services, addressing rampant rural unemployment and enhancing rural livelihoods in South Africa. In Kenya and Pakistan, forestry improves infrastructure and asset endowment to increase market accessibility which enhances the quality of life for many rural communities (Yego et al. 2021; Zada et al. 2019). The study findings revealed that during the proliferation of small-scale commercial forestation in the area, some community members began operating as contractors, to harvest and transport timber for processing thus contributing to the rural development in the area. This confirms the findings of FSA (2016) which claim

that small timber contracting and transport businesses have sprung up in Manguzi, creating a pool of forestry entrepreneurs.

The Socio-Economic Role in Livelihood Generation

The farmers indicated that their socio-economic status has improved and continues to do so as some have used their revenues to start non-timber-based businesses such as livestock farming, transport services, and accommodation. The growers are cognizant that trees are taking time to mature while immediate income is required, so they use this type of forestry as a strong foundation upon which they build other livelihood strategies to escape the poverty deprivation trap.

Small-scale farmer 10

I got involved in forestry in 2003, starting with 2 ha of eucalyptus outside my home, with assistance from Awethu Forestry Investments (an agent facilitating the marketing of timber to the Mondi Richards Bay mill). After receiving the revenues, I bought more land from those who didn't see the potential of forestry and today I own 40 ha of Eucalyptus, employ three permanent staff, and an extra ten people during planting season. I have used the forest revenues to open several other businesses such as a¹spaza shop, a mobile freezer rental, a guest house, and I own 120 cattle.

Small-scale farmer 13

Apart from investing in livestock farming as I have over 80 cattle, I bought a Toyota van which I use to transport the local people to and from town daily.

A study conducted in Pakistan indicates that rural households engaged in small-scale commercial forestry earn 3% more income and own about 24% more assets (Zada et al. 2019). Given the uncertainties over the sustainability of small-scale forestry, the current study reveals how amassed assets over time could be key in sustaining farmers' livelihoods while easing overreliance on forestry. As evident in the literature, sustainable small-scale commercial forestry could be a possibility if farmers have various assets at their disposal and are equipped with management skills, (Nambiar et al. 2021; Mlawa et al. 2023). Various assets enable farmers to diversify their livelihood strategies which is crucial for reducing livelihood threats and vulnerability while stabilising household incomes (Yego et al. 2021). Understanding the socio-economic contribution of small-scale commercial afforestation to rural livelihoods is critical for policymakers to design and implement policies that consider and enhance the sustainability of the livelihoods of rural dwellers. This will ensure that no one is left behind including rural communities as per the motto of the 2030 global agenda also referred to as 17 SDGs (Herrera 2019). Small-scale commercial forestry directly contributes to SDG1 (no poverty), SDG 2 (zero hunger), SDG 3 (good health

¹ Spaza shop is an informal convenience shop, usually run from home, selling everyday small household items (source: <https://www.lexico.com/enn/definition/rondavel>) (Accessed on 15-11-2022: 15H30).

and well-being) SDG 8 (decent work and economic growth) and SDG10 (reduced inequalities).

The Human Development Role of Small-Scale Forestry in Manguzi

In this paper, the humanistic role in livelihoods refers to the impacts that were brought by small-scale commercial afforestation in developing human aspects of the farmers and their families (commonly known as human capital). Farmers indicated that their participation in forestry has equipped them with some essential skills, especially on how they can effectively and efficiently manage their forests. Sappi (a company that buys trees from farmers to produce paper) organizes workshops for small-scale farmers to introduce them to other business ideas they can invest in when they receive their revenue. Sappi also provides 13 training modules, developed specifically for small-scale growers. This training covers all aspects of forestry, including core operational skills as well as safety. One farmer indicates that,

Small-scale farmer 7

I have been able to get a driver's license (C10), which increases my chances of getting formal employment. I have also managed to send my last-born son to the university, and he is now doing his final year (2021) in BCom Accounting at the University of Zululand.

The farmers stated that their health status has improved because health facilities in Manguzi are few; they rely on mobile clinics which come every first Monday of each month. However, now when a family member is sick, they can afford to hire a vehicle to take that person to the hospital. The farmers also revealed that they can now afford family doctors and healthy food, which contribute to their overall well-being.

Farmers indicated that upon the tree cycle (6–8 years), after cutting and transporting trees to Sappi and Mondi pulp mills, they receive large incomes ranging between R90 000 and R320 000 depending on the quality of the trees and the size of the plot. These are the profits after settling debts, advance loans and paying other expenses including contractors, growers' association fees, and Tembe Traditional Authority. Taking into consideration the contribution of forestry to rural livelihoods, the researchers asked what the farmers would do if this afforestation was stopped. Farmers who belong to the advanced beginner and competent group asserted that their livelihoods would not survive, which proves that their livelihoods are primarily dependent on forestry. This dependency on forestry was not astonishing because some scholars (Peterson and Pederson 2010; Ndlovu 2018; Ali et al. 2020) have established a positive correlation between forest dependence and illiteracy, arguing that if people are illiterate, they are more likely to depend on forestry due to the lack of the competitive skills required in non-agricultural activities. For instance, a study which investigated the dependence of rural households on forest resources in Chaprote Valley, Northern Pakistan flags that a household's education level significantly affects the dependency of households on forest resources (Ali et al. 2020). The novice group was not certain whether their livelihoods would cope and survive if this afforestation was stopped, which is not surprising considering that they had not yet harvested their forests. The farmers who

belong to the proficient group stated that they would survive, not because forestry was not having a great impact on their livelihoods, but because they used their money from forestry to diversify their sources of income.

The Conflicts Associated with Forestry and Water Governance in Manguzi

As mentioned in the introduction the National Water Act 1998 obligates every person practising commercial afforestation to apply for a water-use license, if that person does not have a water-use license issued by the DWS, then that afforestation is illegal. One could then argue that this act was promulgated in 1998, while some farmers have been involved in small-scale commercial afforestation for more than 30 years, that is, before this act, does that mean their plantations are legal?

The DWS official

Before 1972 there was no regulation of commercial forestry in South Africa, any forest that was established before 1972 is legal. Between 1972 and 1998, the establishment of plantation forests was regulated through the afforestation permit system where any new plantation had to receive permission before being planted.

This is further documented in the DWS Gazette (2015: 20) “*Afforestation permit means any authorization lawfully issued by the relevant authorities for purposes of afforestation between 1972 to 1998*”. In South Africa, there are three ways in which a forest can be declared as legal; (1) if it was established before 1972, (2) if there is an afforestation permit, and lastly (3) if there is a valid water-use license issued by the DWS. Based on this threefold criterion 23 farmers from the sample are illegal and only 3 had afforestation permits obtained in 1997 are legal. This is one of the sources of conflicts in Manguzi, because based on the legislation, these farmers contravene the law and must be stopped, however, the farmers defiantly indicated that with or without afforestation permits and water use licenses, they will continue with afforestation activities.

The DWS official

If now a person has a forest that was not established before 1972, does not have a permit obtained between 1972 and 1998, and does not have a water-use license, then that forest is illegal and legal actions shall be taken against that owner, which can result in the forest being removed within a stipulated time frame.

Apart from this criterion used to determine if the forest plantation is legal or not, there is also a Watercourse Buffer Zone (WBZ). This is defined as an unplanted area between watercourses and plantations, with a minimum width of 20 m or as specified in water use license conditions, measured from the edge of the delineated watercourses (DWS 2017). If a forest exists within WBZ, it is considered illegal and a serious offence, and therefore requires a Compliance Monitoring and Enforcement (CME) tool. CME, identified in the 2ND National Water Resource Strategy (NWRS)

is a three-phase protocol tool used by the DWS to deal with illegal and non-compliant actions that affect and threaten water resources in South Africa (DWS 2017). The CME is guided by different legislation such as the Promotion of Administrative Justice Act (PAJA) 3 of 2000 which states that everyone is entitled to justice precautions. This act requires the DWS to ensure that the offender is warned and made aware that their activities contravene the policies in place and that further non-compliance would lead to serious intervention. The compliance phase refers to the state of conformity with the law, and monitoring entails desktop and on-site analysis to determine the threats to water resources and issuing warnings to the offender. Enforcement occurs after one or more contraventions have been detected and involves the complete removal of the plantations and fines to the offender. In Manguzi some of the small-scale forests fall within a WBZ, which is why the DWS has initiated CME, which could result in removing these plantations. Most farmers indicated that they knew nothing about such policies, but even if they did, they would continue with their plantations because it is their only source of livelihood. From the preceding discussion, the conflict in Manguzi is based on afforestation practices for livelihoods which contravene the policies in place, and it is far from ending because there are no proven alternatives for the farmers, should their practices be stopped.

In Manguzi conflicts of this nature are not new, since the 1990s, environmental conflicts have existed, largely due to competing interests between poverty and natural conservation (Guyot 2007). As discussed in Section [Study area](#), the Manguzi area is rich in natural resources which mainly serve as tourist attractions while the poverty rate is approximately 88% (Mthembu and Hlophe 2020; Patrik 2020). Therefore, it is not surprising that to escape poverty, local communities usually utilise resources without involving relevant custodians which creates conflicts (Guyot 2007). Previous studies indicate that the increase of forest plantations in Manguzi and the whole quaternary catchment W70A afforestation is the main culprit for declining hydrological resources in the region. Due to rapid forest developments which increased by more than 100% between 1986 and 2019, surface water bodies and wetlands decreased by 49.1% (Ramjeawon et al. 2020). From the perspective of small-scale farmers, the main source of conflict in Manguzi is that other farmers do not have water-use licenses while others do have licenses, therefore, there is so-called “unlawful development of plantations”. The argument raised by the farmers is that if it is forest plantations that are causing water decline in the area, why only those forests that farmers own without licenses must be stopped and removed and not all forests? One farmer alluded,

Small-scale farmer 14

Trees are trees, and they use the same amount of water whether they are planted by someone with papers or someone without papers.

During the interview with the DWS official, it transpired that although no plantations have been stopped and removed in Manguzi yet, the DWS has successfully executed the CME tool in different parts of the country including Cape Town due to non-compliance with the legislation. This resulted in the offender (non-compliant farmer) being issued with hefty fines and the plantations were stopped. According to

the farmers, the DWS instead of being the authoritative dictator must assist and guide them through all the necessary processes to obtain water use licenses and involve other government departments to provide technical assistance. By so doing, the farmers would have sufficient knowledge of the policies they are expected to adhere to. The Department of Agriculture and Rural Development (DARD) and the Department of Forestry, Fisheries and the Environment (DFFE) might come in handy in providing farmers with technical assistance on how they could establish and manage forest plantations sustainably. This underscores the importance of collaborations among all affected and interested stakeholders through dialogue as a pathway to addressing trade-offs associated with forestry (Lazos-Chavero et al. 2016).

Reflection

Political ecology equips us with the lens through which we can understand power relations, the connection between socio-economic factors and environmental issues, and the impacts of environmental outcomes. It is apparent that in Manguzi, the deterioration of water resources results from socio-economic conditions such as high levels of poverty, unemployment, and illiteracy. These factors have driven the rural dwellers to rely and depend excessively on small-scale afforestation for their livelihoods; the more farmers get involved, the more pressure on water resources increases. Since most farmers have no history of any form of education, they lack market-related skills, and therefore, they are not employable, eventually, they are excluded from economic opportunities which makes them vulnerable. It would be unfair to expect these farmers to understand and observe the legislative framework such as exacting WULA, when they are concerned about their livelihoods.

Given the limited availability of employment opportunities and the prevalent state of poverty in Manguzi, even recent graduates are compelled to accept positions such as security guards in supermarkets and local mechanics with meagre or non-existent salaries (Ndlovu 2018). Under these circumstances, it is understandable that farmers would partake in afforestation as their primary economic endeavour, as it greatly contributes to their means of subsistence in the region. Political ecology acknowledges that some environmental issues are caused by a clash of interests between the stakeholders involved, which is what is happening in Manguzi. The livelihoods are the farmers' main priority, while the protection and conservation of water resources are the DWS' priorities. The DWS' execution of the CME tool which will force rural people to refrain from this afforestation that has been the main economic activity for more than 30 years shows that asymmetric power relations exist in forestry governance. The disadvantaged poor farmers are being shadowed and disregarded by the decision of the DWS. As suggested in the literature, In South Africa, small-scale timber production is either hindered or enhanced by the nature and effectiveness of existing institutional arrangements (Mahlangu and Mubangizi 2015). Muzekenyi et al. (2022) assert that the lack of access to capital, water constraints, and government bureaucracy impedes small-scale commercial farming expansion. Given the repercussions of the CME tool, the current study not only sheds light on how rural-based small growers are kept in a poverty trap but also accentuates why South Africa remains one of the most unequal countries in the world (Francis and Webster 2019).

Political ecology teaches us that due to asymmetric power relations, there are always winners and losers or weak and strong actors in environmental outcomes (Acheampong 2020). Therefore, we argue that in this Manguzi conflict, the farmers find themselves on the losing side because they are in a critical position of losing their only reliable source of livelihood. The response of the DWS shows that rural people do not have power over decisions even though they are the ones who will feel the ramifications as they will be pushed to marginalization and vulnerabilities. Just like in Tanzania, despite having valuable forest resources, most rural communities living adjacent to forests remain in poor living standards due to injustices that exist in forest governance (Mlawa et al. 2023). The heightened restriction on the ability to utilize forest resources led to an exacerbation of impoverishment and distress among the rural dwellers in India (Biswas 2003). This raises a question, in the absence of any viable alternatives being presented, how will the rural communities of Manguzi be able to alleviate their destitution?

Political ecology asserts that the reaction of local people to biases in the environmental outcomes may aggravate conflicts among the role players (Blaikie and Brookfield 1987; Bryant and Bailey 1997). This was evident in Ghana where forest management policies and practices relegated communities to socio-economic and political marginality. This eventually culminated in vehement resistance by local communities leading to violent and non-violent socio-economic and eco-political conflicts (Otutei 2014). Empirical insights from the Philippines indicate that poor forestry governance manifests in unequal access to decision-making leading to local resistance from rural-based small growers who feel excluded and marginalised in the process (Baynes et al. 2016). Drawing from these lessons, in Manguzi there is a potential that, if the DWS adopts an authoritative approach to resolve this conflict, it may degenerate into a violent conflict. This is because from the farmers' point of view, the regulatory authority is interfering with their livelihoods, whereas the DWS believes that it is dealing with illegality and defiance.

Given that forestry-based businesses provide a range of benefits and livelihoods for millions of rural households which help them fight poverty (Nawir et al. 2007; Nambiar 2021), this study argues that fair and integrative solutions that will not be exploitative to the vulnerable growers are possible to the impasse in Manguzi. Lessons can be learnt from countries such as China and Indonesia which have successfully formulated several forestry-based poverty alleviation policies (Wang and Zhao 2022). This not only alleviates poverty and improves the livelihoods of rural households but also safeguards ecologically fragile areas with rich forest resources. Effective forestry governance is critical to fostering sustainable management and use of forests, however, this requires clear and consistent policies at the national government and proper institutional frameworks to promote livelihood-enhancing practices (Le et al. 2012). Strong and inclusive governance in forestry provides a fertile ground for the relationship between communities and the State to thrive. In Ethiopia, a lack of proper relationship between peasant farmers and the government resulted in the deterioration of small-scale farming and the worsening of poverty (Nawir et al. 2007).

Conclusion

This paper aimed to explore the experiences of small-scale commercial afforestation farmers and governance conflicts in Manguzi from the perspective of political ecology. The application of political ecology in this study has been effective in revealing that socio-economic inequalities may push rural people to rely on small-scale commercial afforestation for their livelihoods and that asymmetric power relations exist in forest governance. With high levels of poverty and unemployment in Manguzi accompanied by illiteracy among farmers, small-scale commercial afforestation has been the only economic activity that has earned and improved the livelihoods of these rural dwellers for more than 30 years, which is why more people are getting involved. However, their livelihoods are at heightened risk as this afforestation practice, unfortunately, flouts and contravenes the legislative framework of the Department of Water and Sanitation. The department has executed a Compliance Monitoring and Enforcement tool to deal with this illegal afforestation, which could result in the removal of the plantations.

This paper enriches forestry literature as it underscores the necessity for a more comprehensive, participatory, and fair method in forest management by understanding the convergence of political ecology, power relations, afforestation, and the vulnerability of the underprivileged. To address these dynamics, it is crucial to acknowledge and challenge existing power imbalances and guarantee the active participation of small-scale farmers in the formulation of policies that prioritize social justice. This paper recommends that the management of afforestation practices should be firmly grounded in principles of fairness, recognising the rights and agency of the underprivileged within the broader political and ecological framework. Considering that small-scale farmers rely on forestry for their livelihoods, it is important to address issues of poverty and unemployment before stopping this afforestation. Therefore, there is a need for the implementation of integrated rural development strategies in Manguzi and the provision of entrepreneurship training. This will assist the farmers to explore other viable economic opportunities to support their livelihoods while easing reliance on forestry which threatens water resources. Future research must focus on the efficacy of mechanisms to include rural communities in forestry governance. It may be valuable for future research to employ a deconstructive approach to explore the extent to which environmental management policies consider and address socio-political challenges faced by marginalized and vulnerable groups such as small-scale farmers.

Acknowledgements We acknowledge and thank the Department of Water and Sanitation and the small-scale farmers who gladly provided the information. We are also grateful to the anonymous reviewers for their critiques and insights which contributed significantly to the quality of the paper.

Funding There was no funding granted for this research.

Declarations

The authors declare that they have no competing interests.

References

- Acheampong M (2020) “Critical Ecosystems” as a concept in political ecology – developing a comprehensive analytical framework”, *Journal of Political Ecology* 27(1), 190–212. doi: <https://doi.org/10.2458/v27i1.22909>
- Ali MF, Ashfaq M, Hassan S, Ullah R. (2020). Assessing indigenous knowledge through farmers’ perception and adaptation to climate change in Pakistan. *Pol J Environ Stud*, 29(1), 525–532. <https://doi.org/10.15244/pjoes/85194>
- Aliber M, Hart TGB (2009) Should subsistence agriculture be supported as a strategy to address rural food insecurity?, *Agrekon*, 48:4, 434–458, DOI: <https://doi.org/10.1080/03031853.2009.9523835>
- Bassett TJ, Peimer AW (2015) Political ecological perspectives on socioecological relations. *Natures Sciences Societes*, 23 (2), 157–165. <https://doi.org/10.1051/nss/2015029>
- Baynes J, Herbohn J, Dressler W (2016) Power relationships: their effect on the governance of community forestry in the Philippines. *Land Use Policy*, 54, 169–176. <https://doi.org/10.1016/j.landusepol.2016.01.008>
- Beckline M, Sun ZQ, Ntoko V, Ngwese D, Manan A, Hu Y, Mukete N, Che L, Foncha J (2022) Rural livelihoods and Forest Incomes in the Etinde Community Forest of South West Cameroon. DOI: <https://doi.org/10.4236/oalib.1108793>
- Biswas PK (2003) *Forest, People, and Livelihoods: The Need for Participatory Management*, XII World Forestry Congress, Quebec City, Canada. <https://www.fao.org/3/XII/0586-C1.htm#fn1>
- Blaikie P, Brookfield H (Eds.) (1987) *Land Degradation and Society* (1st ed.). Routledge. <https://doi.org/10.4324/9781315685366>
- Bobojonov I, Lamers JPA, Bekchanov M, Djanibekov N, Franz-Vasdeki J, Ruzimov J, Martius C (2013) Options and constraints for crop diversification: a case study in sustainable agriculture in Uzbekistan, *Agroecology and Sustainable Food Systems*, 37(7), 788–811, <https://doi.org/10.1080/21683565.2013.775539>
- Braun V, Clarke V (2006) Using thematic analysis in psychology. *Qualitative Research in Psychology*. Vol 3, issue 2. DOI: <https://doi.org/10.1191/1478088706qp063oa>
- Bryant RL (1998) Power, knowledge and political ecology in the third world: a review. *Progress in Physical Geography* 22, pp. 79–94. <https://doi.org/10.1177/030913339802200104>
- Bryant RL, Bailey S (1997) *Third World Political Ecology*. London and New York: Routledge. <https://www.routledge.com/Third-World-Political-Ecology-An-Introduction/Bailey-Bryant/p/book/9780415127448>
- Chandra A, McNamara KE, Dargusch P, (2017) The relevance of political ecology perspectives for small-holder climate-smart agriculture: a review. *Journal of Political Ecology*, 24(1), 821–842. doi: <https://doi.org/10.2458/v24i1.20969>
- Cresswell JW (2014) *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (4TH ed). Thousand Oaks, CA: Sage. https://www.ucg.ac.me/skladiste/blog_609332/objava_105202/fajlovi/Cresswell.pdf
- Crowe S, Cresswell K, Robertson A, et al. (2011) The case study approach. *BMC Medical Research Methodology*, 11(1), 19. <https://doi.org/10.1186/1471-2288-11-100>
- Denieffe S (2020) Commentary: purposive sampling: complex or simple? Research case examples. *J Res Nurs*, 25(8), 662–663 <https://doi.org/10.1177%2F1744987120928156>
- Department for International Development [DFID] (2000) *Sustainable Livelihoods Guidance Sheets*. http://www.livelihoods.org/info/info_guidancesheets.html
- Department of Water and Sanitation (DWS) (2017) *Water Quality Management Policies and Strategies for South Africa*. Report No. 4.3. Monitoring and Evaluation Framework. Ed-1. Water Resource Planning Systems Series, DWS Report No.: 000/00/21715/20. Pretoria, South Africa.
- Department of Water and Sanitation, *Regulations on Afforestation Genus Exchanges in Terms of The National Water Act, 1998 (Act No.36 of 1998)* <https://cer.org.za/wp-content/uploads/2010/05/Regulations-on-Afforestation-Genus-Exchanges.pdf>
- Dinko DH, Yaro J, Kusimi J, (2019) Political Ecology and contours of vulnerability to Water Insecurity in Semiarid North-Eastern Ghana. *Journal of Asian and African Studies*, 54(2), 282–299. <https://doi.org/10.1177/0021909618811838>
- Food and Agricultural Organization of the United Nations [FAO] (2013) *Forests, rangelands and climate change in Southern Africa*. Forests and climate change working paper 12. <https://www.unclearn.org/wp-content/uploads/library/fao190.pdf> (accessed 21 May 2024).

- Food and Agricultural Organization of the United Nations [FAO] (2018) The State of the World's Forests. Forest pathways to sustainable development. <https://www.fao.org/documents/card/fr/c/I9535EN/>
- Food and Agricultural Organization of the United Nations (2023) National Climate Change Response Strategy for South Africa. <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC149570/>
- Forestry South Africa. (2019) Timber plantation ownership. <https://www.forestrysouthafrica.co.za/informatics/homepage/forestry-ownership/#:~:text=It%20is%20estimated%20that%20there,000%20small%2Dscale%20timber%20growers.> (Accessed 20 May 2024).
- Forestry South Africa [FSA] (2016) <https://forestry.co.za/best-practices-in-commercial-forestrywater-management/>
- Forsyth T (2008) Political ecology and the epistemology of social justice. *Geoforum*, 39(2): 756–764. <https://doi.org/10.1016/j.geoforum.2006.12.005>
- Francis D, Webster E (2019) Poverty and inequality in South Africa: critical reflections. *Development Southern Africa*, 36(6), 788–802. <https://doi.org/10.1080/0376835X.2019.1666703>
- Gerber JF (2011) Conflicts over industrial tree plantations in the South: who, how and why? *Global Environmental Change*, 21(1), 165–176. <https://doi.org/10.1016/j.gloenvcha.2010.09.005>
- Gibbens M, Schoeman C (2020) Planning for sustainable livelihood development in the context of rural South Africa: a micro-level approach. *Town and Regional Planning*, 76, 14–28. <https://doi.org/10.18820/2415-0495/trp76i.2>
- Goncalves JLD, Ferraz A, Rocha JHT, Peressin M, Alvares AA (2020) Forest out-grower schemes in small and medium-sized farmers in Brazil. *For. Ecol. Manag.* 456, 117654 <https://doi.org/10.1016/j.foreco.2019.117654>.
- Government of India (2002) Joint Forest Management: A Decade of Partnership, Joint Forest Management Monitoring Cell, Ministry of Environment and Forests, New Delhi. <https://ifs.nic.in/Dynamic/pdf/JFM%20handbook.pdf>
- Guyot S (2007) Political dimensions of environmental conflicts in Kosi Bay, South Africa: significance of the new post-apartheid governance system. *Dev South Afr*, 22(3), 441–458. <https://doi.org/10.1080/14797580500252985>
- Hajdu F, Neves D, Granlund S, (2020) Changing livelihoods in Rural Eastern Cape, South Africa (2002–2016): diminishing employment and expanding Social Protection, *Journal of Southern African Studies*, 46(4), 743–772. <https://doi.org/10.1080/03057070.2020.1773721>
- Ham C (2011) Forestry and Rural Development. *Quest*, 7(4). <https://hdl.handle.net/10520/EJC89950>
- Heffernan A (2023) Introduction. In: *The Global Politics of Local Conservation. Environmental Politics and Theory. Palgrave Macmillan, Cham.* https://doi.org/10.1007/978-3-031-24177-2_1
- Herrera V (2019) Reconciling global aspirations and local realities: challenges facing the Sustainable Development Goals for water and sanitation. *World Development*, 118, pp, 106–117, <https://doi.org/10.1016/j.worlddev.2019.02.009>
- Hlaing ZC, Kamiyama C, Saito O, (2017) Interaction between Rural People's basic needs and Forest products: a Case study of the Katha District of Myanmar. *International Journal of Forestry Research.* <https://doi.org/10.1155/2017/2105012>
- Howard M, Matikina P, Mitchell D, et al. (2005) Small-scale timber production in South Africa: what role in reducing poverty? *Fractal Forest Africa*, Fakisandla Consulting, Institute of Natural resources, Rural Forest Management cc, South Africa, and International Institute for Environment and Development, London, UK. https://www.dws.gov.za/iwrp/iwqms/Documents/Report%204.3%20IWQM%20Monitoring%20and%20Evaluation%20Framework_Final.pdf
- Jele Z (2012) The contribution of small-scale timber farming in enhancing sustainable livelihood at Sokhulu. The University of South Africa. https://uir.unisa.ac.za/bitstream/handle/10500/6546/dissertation_jele_z.pdf?sequence=1&isAllowed=y
- Kamanga P, Vedeld P, Sjaastad E, (2009) Forest incomes and rural livelihoods in Chiradzulu District, Malawi, *Ecological Economics*, 68(3). <https://doi.org/10.1016/j.ecolecon.2008.08.018>
- Karumbidza JB (2005) Study of the Social and Economic Impacts of Industrial Tree Plantations in the KwaZulu-Natal Province of South Africa. *World Rainforest Movement.*
- Kiptot E, Franzel S (2012) Gender and agroforestry in Africa: a review of women's participation. *Agroforestry Systems* 84, 35–58 <https://doi.org/10.1007/s10457-011-9419-y>
- Krantz L (2001) The sustainable livelihood approach to poverty reduction: An Introduction. <https://comdev.org/wp-content/uploads/pdf/publications/The-Sustainable-Livelihood-Approach-to-Poverty-Reduction-SIDA.pdf>

- Kugedera AT, Kokerai AK (2018) (Community Forestry: a sustainable to reduce poverty and improve rural livelihoods. *Global Scientific Journal of Environmental Research*, Vol 1, pp 7–10. https://www.researchgate.net/publication/332098552_Community_Forestry_A_sustainable_to_reduce_poverty_and_improve_rural_livelihoods
- Lavelle JJ (2023) An analysis of Access in Devil's claw (*Harpagophytum* Spp.) Harvesting and Trade in Namibia. *Society & Natural Resources*, 36:11, 1398–1417, DOI: <https://doi.org/10.1080/08941920.2023.2228231>
- Lazos-Chavero E, Zinda J, Bennett-Curry A, et al. (2016) Stakeholders and tropical reforestation: challenges, trade-offs, and strategies in dynamic environments. *Biotropica*, 48(6), 900–914. <https://doi.org/10.1111/btp.12391>
- Le HD, Smith C, Herbohn J, Harrison S (2012). More than just trees: assessing reforestation success in tropical developing countries. *Journal of Rural Studies*, 28(1), 5–19 <https://doi.org/10.1016/j.jrurstud.2011.07.006>
- Madin MB (2020) The political ecology of seed security in the Northern Ghanaian savannahs. *GeoJournal*, 87:1811–1829 <https://doi.org/10.1007/s10708-020-10340-y>
- Mahlangu IM, Mubangizi B (2015) Small-scale timber farming in Entembeni community – exploring sustainability and possibilities for leisure and tourism. *Afr J Hospitality, Tourism, Leisure*, 4(1). [http://www.ajhtl.com/uploads/7/1/6/3/7163688/article34vol4\(1\)-2015.pdf](http://www.ajhtl.com/uploads/7/1/6/3/7163688/article34vol4(1)-2015.pdf)
- Makhubele L, Chirwa PW, Araia MG (2022) The influence of forest proximity to harvesting and use of provisioning ecosystem services from tree species in traditional agroforestry landscapes, *International Journal of Sustainable Development & World Ecology*, 29:8, 812–826, <https://doi.org/10.1080/13504509.2022.2107104>
- Mamba S (2013) Evaluation of forestry models for future settlement of forestry plantations under land claims: The case of Jessievale and Roburna forest plantations in Mpumalanga, South Africa. MSc thesis, University of Pretoria, South Africa
- Maziya M, Tirivanhu P, Kajombo RJ, Gumede NA, (2020) Gender disparities in poverty among Smallholder Livestock farmers in South Africa. *S. Afr. J. Agric. Ext*, 48(2), 21–35. <https://doi.org/10.17159/2413-3221/2020/v48n2a535>
- Mendako RK, Tian G, Ullah S, Sagali HL, Kipute DD (2022) Assessing the Economic Contribution of Forest Use to Rural livelihoods in the Rubi-Tele Hunting Domain, DR Congo. *Forests.*, 13, 130. <https://doi.org/10.3390/fl3010130>
- Minch M (2011) Political Ecology. In: Chatterjee D.K. (eds) *Encyclopedia of Global Justice*. Springer, Dordrecht. https://doi.org/10.1007/978-1-4020-9160-5_119
- Mlawa AA, Abdallah JM, Mwakalukwa EE (2023) The contribution of Village Land Forest Reserves in Livelihood Improvement: the case of Songea and Liwale districts in Tanzania. *International Journal of Natural Resource Ecology and Management*, 8(2), 70–77. <https://doi.org/10.11648/j.ijnrem.20230802.15>
- Mokgomo MN, Chagwiza C, Tshilowa PF (2022) The impact of Government Agricultural Development Support on Agricultural Income, Production and Food Security of Beneficiary Small-Scale Farmers in South Africa. *Agriculture*, 12, 1760. <https://doi.org/10.3390/agriculture12111760>
- Mtengu S, Green P (2016) Forestry Stewardship Council in Relation to Market accessibility by small scale timber growers: a case in KwaZulu Natal. *Journal of Human Ecology*. <https://doi.org/10.1080/0970.9274.2016.11907065>
- Mthembu A, Hlophe S (2020) Building resilience to climate change in vulnerable communities: a case study of uMkhanyakude district municipality. *Town and Regional Planning*, 77, 42–56. <https://doi.org/10.18820/2415-0495/trp77i1.4>
- Mulaudzi R, Kioko J, (2022) Understanding broadsheet newspaper attention to climate change objective facts in South Africa. *Environmental Research Communications*, 4(12) <https://doi.org/10.1088/2515-7620/aca1fd>
- Musavengane R, Leonard L (Eds.) (2022) *Conservation, Land Conflicts and Sustainable Tourism in Southern Africa: Contemporary Issues and Approaches* (1st ed.) Routledge. <https://doi.org/10.4324/9781003188902>
- Muzekenyi M, Zuwarimwe J, Kilonzo BM (2022) Utilizing small-scale commercial farming to enhance local economic development in South Africa. *Journal of Contemporary Management*, 19(2). <https://doi.org/10.35683/jcm20007.155>
- Nambiar EKS (2021) Small forest growers in tropical landscapes should be embraced as partners for green growth: increase wood supply, restore land, reduce poverty, and mitigate climate change. *Trees, Forests and People*, 6, <https://doi.org/10.1016/j.tfp.2021.100154>.

- Nasrnia F, Ashktorab B (2021) Sustainable livelihood framework-based assessment of drought resilience patterns of rural households of Bakhtegan basin, Iran. *Ecological Indicators*, 128. <https://doi.org/10.1016/j.ecolind.2021.107817>
- Natarajan N, Newsham A, Rigg J, Suhardiman J (2022). A sustainable livelihoods framework for the 21st century. *World Development*, 155. <https://doi.org/10.1016/j.worlddev.2022.105898>
- Nawir AA, Kassa H, Sandewall M, Dore D, Campbell B, Ohlsson B, Bekele M (2007). Stimulating smallholder tree planting lessons from Africa and Asia. *UNASYLVA-FAO-*, 58(228), 53–57. <https://hdl.handle.net/10568/19766>
- Ndlovu M (2018) A timber processing factory empowering rural areas through value addition. The Urban Logic, University of Witwatersrand, Johannesburg. <http://hdl.handle.net/10539/28284> (Accessed 13 May 2022)
- Ofoegbu C (2020) An Assessment of factors shaping Green Growth Uptake in the Forest Sector at the Rural Community Level in South Africa. In: Atewamba C, Yong ND (eds) *Inclusive green growth. Advances in African Economic, Social and Political Development*. Springer, Cham. https://doi.org/10.1007/978-3-030-44180-7_10
- Ogujiuba K, Nasiru B (2020) Fuel-Wood Energy Sector-Livelihood Nexus: evidence from South Africa. *J Sociology Soc Anth*, 11(3–4), 176–185. <https://doi.org/10.31901/24566764.2020/11.3-4.356>
- Osborne T (2017) “Public Political Ecology: a community of praxis for earth stewardship”, *Journal of Political Ecology*, 24(1), 843–860. doi: <https://doi.org/10.2458/v24i1.20970>
- Ota L, Herbohn J, Gregorio N, Harrison S (2020) “Reforestation and smallholder livelihoods in the humid tropics,” *Land Use Policy*, 92. <https://doi.org/10.1016/j.landusepol.2019.104455>
- Otutei E, (2014) The Political Ecology of Forest Management in Ghana: actors, interests and practices in the Assin North Municipality. *Journal of Environment and Earth Science*, 4(10). <https://www.iiste.org/Journals/index.php/JEES/article/view/12980/13502>
- Patrik HO (2020) Climate change, water security, and conflict potentials in South Africa: Assessing conflict and coping strategies in rural South Africa. In: Filho WL, Luetz LM, Ayal D (Eds). *Handbook of climate change management: Research, leadership, transformation*. Switzerland: *Springer*, pp. 1–18. https://doi.org/10.1007/978-3-030-22759-3_84-1
- Petersen EK, Pedersen ML (2010): The sustainable livelihoods Approach: from a psychological perspective. Aarhus: Institute of Biology.
- PriyaA (2021) Case study methodology of qualitative research: key attributes and navigating the conundrums in its application. *Sociological Bulletin*, 70(1), 94–110. <https://doi.org/10.1177/0038022920970318>
- Ramjewan M, Demlie M, Toucher ML, Van Rensburg SJ (2020) Analysis of three decades of land cover changes in the Maputland Coastal Plain, South Africa. *Koedoe*, 62(1), 1–12. <https://doi.org/10.4102/koedoe.v62i1.1642>
- SA Forestry Magazine (2013) Balancing forestry and community. https://saforestryonline.co.za/articles/business_profiles/singisi_balancing_forestry_and_community/
- Schirmer J (2007) Plantations and social conflict: exploring the differences between small-scale and large-scale plantation forestry. *Small-scale Forestry* 6, 19–33. <https://doi.org/10.1007/s11842-007-9001-7>
- Schirmer J, Pirard R, Kanowski P (2015) Promises and perils of plantation forestry. In *forests, business and sustainability*, Routledge 153–178.
- Scoones I (1998) Sustainable rural livelihoods: a framework for analysis. *Brighton: Institute of Development Studies*, 72, 1–22.
- Scoones I (2015) Sustainable livelihoods and rural development. *Rugby: Practical Action Publishing*. <https://doi.org/10.2458/v23i1.20254>
- Shereni N C, Saarinen J (2021) Community perceptions on the benefits and challenges of community-based natural resources management in Zimbabwe. *Development Southern Africa*, 38(6), 879–895. <https://doi.org/10.1080/0376835X.2020.1796599>
- Smith JA, Osborn M (2015) Interpretative phenomenological analysis as a useful methodology for research on the lived experience of pain. *British Journal of Pain*, (1), 41–42. <https://doi.org/10.1177/2049463714541642>
- Sosibo MT, Ehlers-Smith YC, Ehlers-Smith DA, Downs CT, (2022) Some perspectives on the use and value of Southern Mistbelt forests to surrounding rural communities in northern Eastern Cape, and southern KwaZulu-Natal, South Africa African. *Journal of Wildlife Research*, 52 (1). <https://hdl.handle.net/10520/ejc-wild2-v52-n1-a12>
- South African government (2014) Forestry. South Africa Yearbook, <https://www.gov.za/about-sa/forestry> (Accessed 20 May 2024).

- Statistics South Africa (SSA) Community Survey (2016) retrieved October 15, 2019, from <https://statssa.gov.za/>
- Sunderland TCH, Ndoye O, Harrison-Sanchez S (2011) Non-timber forest products and conservation: What prospects? In Non-timber forest products in the global context, eds. Shackleton S, Shackleton C, Shanley P *Tropical Forestry*, 7, 209–24. Heidelberg: Springer. https://doi.org/10.1007/978-3-642-17983-9_10
- Tembe R (2012) South Africa's biggest land reform forestry project. South African Forestry Online. Retrieved October 29, 2021, from https://saforestryonline.co.za/articles/land_and_community/sas_biggest_land_reform_forestry_project/
- Ullah A, Sam AS, Sathyan AR, et al. (2021). Role of local communities in forest landscape restoration: key lessons from the billion trees Afforestation Project, Pakistan. *Science of the Total Environment*, 772, <https://doi.org/10.1016/j.scitotenv.2021.145613>
- Umhlabuyalingana LM final Integrated Development Plan [IDP] (2018) from <https://www.umhlabuyalingana.gov.za/>. Retrieved November 05, 2019
- Umhlabuyalingana LM Spatial Development Framework [SDF] (2018) retrieved November 05, 2019, from <https://www.umhlabuyalingana.gov.za/>
- Upfold SJ, Dlamini N, Ndlela N (2015) Knowledge to support small-scale tree growers in South Africa. Durban, South Africa: *14th World Forestry Congress*, 7–11 September 2015. <https://foris.fao.org/wfc2015/api/file/552e26669e00c2f116f8e82a/contents/32551f9f-a91049a2-8671-8c263603968a.pdf>
- Valencia L, (2019) Compensatory Afforestation in Odisha, India: A political ecology of forest restoration. Master's thesis, University of Toronto. https://tspace.library.utoronto.ca/bitstream/1807/98427/3/Valencia_Laura_M_201911_MA_thesis.pdf
- Wale E, Nkoana MA, Mkuna E, (2022). Climate change-induced livelihood adaptive strategies and perceptions of forest-dependent communities: The case of Inanda, KwaZulu-Natal, South Africa. *Trees, Forests and People*, 8. <https://doi.org/10.1016/j.tfp.2022.100250>
- Wang Y, Li H, Zhao R. (2022). The role of forestry-based policies in alleviating relative poverty in the Rocky Desertification Area in Southwest China. *International Journal of Environmental Research and Public Health*, 19(23) <https://doi.org/10.3390/ijerph192316049>
- Xulu S, Peerbhaya K, Gebreslasie M, Ismail R (2018) Drought influence on forest plantations in Zululand, South Africa, using MODIS time series and climate data. *Forests*, 9(9), 528. <https://doi.org/10.3390/f9090528>
- Yang W, Diets T, Kramer DB, Ouyang Z, Liu J, (2015) An integrated approach to understanding the linkages between ecosystem services and human well-being. *Ecosystem Health and Sustainability*, 1(5). <https://doi.org/10.1890/ehs15-0001.1>
- Yego P, Mbeche R, Ateka J, Majiwa E (2021) Forest-based livelihood choices and their determinants in Western Kenya. *For Sci Technol*, 17(1), 23–31. <https://doi.org/10.1080/21580103.2020.1870577>
- Zada M, Shah SJ, Yukun C, et al. (2019) Impact of Small-to-Medium Size Forest Enterprises on Rural Livelihood: Evidence from Khyber-Pakhtunkhwa, Pakistan. *Sustainability*, 11, <https://doi.org/10.3390/su11102989>
- Zerga B, Warkineh B, Teketay WM, Sahle M (2021) Land use and land cover changes driven by the expansion of eucalypt plantations in the western Gurage Watersheds, Central South Ethiopia. *Trees For People*, 5, <http://dx.doi.org/https://doi.org/10.1016/j.tfp.2021.100087>
- Zerihun MF, (2021) Agroforestry practices in Livelihood Improvement in the Eastern Cape Province of South Africa. *Sustainability*, 13, 8477. <https://doi.org/10.3390/su13158477>

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.

Authors and Affiliations

Lindokuhle Denis Sibiya^{1,2}  · Inocent Moyo² 

✉ Lindokuhle Denis Sibiya
den.sotobe@gmail.com

Inocent Moyo
minnoxam@gmail.com

¹ Present address: School of Social Sciences, The Independent Institute of Education (IEMSA), 144 Peter Road, Ruimsig, Roodepoort 1724, South Africa

² Department of Geography, University of Zululand, 24 Main Road Vulindlela, KwaDlangezwa, Empangeni 3886, South Africa