Discourses on sustainable forest management and their integration into climate policies in South Africa

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HIGHLIGHTS

- The role of forests in climate change mitigation and adaptation is one of the most contested concepts in international climate policy.
- Climate and forest policies' targets are intrinsically connected in a way that the implementation of one can produce either a trade-off or synergy with the other.
- To strengthen synergies between forestry and climate policies, there is a need for the explicit recognition of mutually supportive links between both policies.
- To effectively integrate forest management discourses into climate policy, regulations and guidelines have to be grounded in the experiences and lessons of forest policy implementations.
- Legislation and law enforcement alone will be insufficient to preserve forest integrity if policies do not promote local ownership, participation and local sustainable development.

SUMMARY

In South Africa, forests can play an important role in achieving the broader goals of climate change mitigation and adaptation. However, national policies on climate change mitigation and adaptation seem to narrow the potential contributions of the forest sector to climate protection targets. This is largely because of the divergence between the management goals of forests for climate protection, and products for both industries and livelihoods. This article uses discourse analysis as a methodological tool to analyze South Africa's climate and forest policies to identify the discourses shaping forest policy goals and mandates, and their integration into climate policy targets for forest-based climate change interventions. Four discourses, namely, preservation of forest integrity, social inclusiveness, equitable benefit sharing, and inclusive development of forests and forest-based communities, were identified as the dominant discourses influencing forest policy goals in South Africa. Their influence on forest management programmes has a mix of costs and benefits outcomes. For example, policy responses to the discourse on the preservation of forest integrity have resulted in ecologically sustainable forests in some cases and in other cases restricted the participation of local people in forest enterprise development. Additionally, climate policies recognized six possible interventions with respect to forest-based climate change mitigation and adaptation in South Africa but were silent about the four discourses shaping forest policy goals. Consequently, existing climate policies do not contain regulations to guide forest management for climate change mitigation and adaptation. We therefore recommend that forest-related goals in climate policy be grounded in the past experiences and lessons of forest policy implementations in order to take advantage of the synergies and reduce the trade-offs with respect to multipurpose management of forests for livelihoods, enterprise development, and climate change mitigation and adaptation.

Keywords: adaptation, mitigation, forestry, sustainability, climate change

Discours sur la gestion forestière durable et son intégration dans les politiques climatiques en Afrique du Sud

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Les forêts peuvent jouer un rôle important en Afrique du Sud, dans le succès de buts plus larges d'atténuation du changement climatique et d'adaptation. Les politiques nationales sur l'atténuation du changement climatique et l'adaptation à celui-ci semblent cependant restreindre les contributions potentielles du secteur forestier aux buts de la protection du climat. Ceci est dû largement à une divergence entre les buts de la gestion des forêts pour la protection du climat et ceux des produits pour l'industrie et comme source de revenus. Cet article utilise une analyse du discours comme outil méthodologique pour évaluer les politiques climatiques et forestières en Afrique du Sud, afin d'identifier les discours modelant les buts de politique forestière et les mandats, et leur intégration dans de buts de politique climatique des interventions de changement climatique basées sur la forêt. Quatre discours : la préservation de l'intégrité forestière, l'inclusion sociale, le partage équitable des bénéfices, et le développement inclusif des forêts et des communautés basées sur la forêt, ont été identifiés comme étant les discours dominants, influençant les buts de politique forestière en Afrique du Sud. Leur influence sur les programmes de gestion forestière résulte en un mélange de coûts et de bénéfices. Les réponses de politique au discours de préservation de l'intégrité forestière, par exemple, ont résulté dans certains cas en des forêts

écologiquement durables, et, en d'autres cas, en une participation restreinte de la participation des populations locales dans le développement des entreprises forestières. De plus, les politiques climatiques ont reconnu six interventions possibles quant à l'adaptation au changement climatique et à son atténuation, basées sur la forêt en Afrique du Sud ; mais elles sont restées silencieuses quant aux quatre discours modelant les buts de politique forestière. Les politiques du climat existantes ne contiennent pas, en conséquence, de règles pour guider la gestion forestière vers l'atténuation et l'adaptation climatique. Nous recommandons donc que les buts des politiques du climat liées à la forêt soient ancrés dans les expériences du passé et les leçons tirées des mises en œuvre de la gestion forestière, afin de prendre avantage des synergies, et de réduire les compromis quant à la gestion polyvalente des forêts en tant que sources de revenus, au développement d'entreprise et à l'adaptation au changement climatique et à son atténuation.

Discursos sobre la gestión forestal sostenible y su integración en las políticas climáticas en Sudáfrica

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En Sudáfrica, los bosques pueden desempeñar un papel importante en la consecución de los objetivos más amplios de mitigación y adaptación al cambio climático. Sin embargo, las políticas nacionales de mitigación y adaptación al cambio climático parecen limitar las posibles contribuciones del sector forestal a los objetivos de protección del clima. Esto se debe en gran medida a la divergencia entre los objetivos de gestión de los bosques orientada a la protección del clima y a productos para la industria y los medios de vida. Este artículo utiliza el análisis del discurso como herramienta metodológica para analizar las políticas climáticas y forestales de Sudáfrica, con el fin de identificar los discursos que definen los objetivos y mandatos de la política forestal, y su integración en los objetivos de la política climática para las intervenciones sobre el cambio climático basadas en los bosques. Se identificaron cuatro discursos como los discursos dominantes que influyen en los objetivos de la política forestal en Sudáfrica, a saber, la preservación de la integridad de los bosques, la inclusión social, la distribución equitativa de los beneficios y el desarrollo inclusivo de los bosques y las comunidades basadas en ellos. Su influencia en los programas de gestión forestal tiene una mezcla de resultados de costos y beneficios. Por ejemplo, las respuestas políticas al discurso sobre la preservación de la integridad de los bosques han dado lugar a bosques ecológicamente sostenibles en algunos casos y, en otros, han restringido la participación de la población local en el desarrollo de empresas forestales. Además, las políticas climáticas reconocieron seis posibles intervenciones con respecto a la mitigación y adaptación al cambio climático basado en los bosques en Sudáfrica, pero no mencionaron los cuatro discursos que definen los objetivos de las políticas forestales. En consecuencia, las políticas climáticas existentes no contienen normas que orienten la gestión forestal para la mitigación del cambio climático y la adaptación al mismo. Por lo tanto, se recomienda que los objetivos relacionados con los bosques en cuanto a las políticas climáticas se basen en las experiencias y lecciones pasadas sobre la aplicación de las políticas forestales, con el fin de aprovechar las sinergias y reducir los compromisos con respecto a la gestión para usos múltiples de los bosques en cuanto a los medios de vida, el desarrollo empresarial y la mitigación y adaptación al cambio climático.

INTRODUCTION

Forests in most developing countries constitute a significant part of the national land area and, consequently, forests are impacted by multiple factors such as tourism, biodiversity, agriculture, mining, and the rural economy (Ambjörnsson *et al*. 2016, Locatelli *et al*. 2015, Hajost and Zerbock 2013, Naidoo *et al*. 2013, Department of Water Affairs and Forestry – DWAF 1998). The predominance of the forest sector is reflected in the way the sector is incorporated in the regulatory framework of other sectors of the national economy such as land use planning and rural development, agriculture, biodiversity, and mineral and mining sectors, at the national, provincial and local levels (Ambjörnsson *et al*. 2016, National Development Plan – NDP 2012). This predominance has made the forest sector in most developing countries a subject of interest in many sectoral and national issues, placing particular interests on how the implementation of forest policy directives may affect other sectors' policy goals and targets (Holmgren 2015, NDP 2012, Locatelli *et al*. 2011, Berliner 2005).

The interlinkage between forests and sustainable development in most developing countries is evident in the historical accounts of policy responses to forest development and its interconnection to sustainable development outcomes (Ferranti *et al*. 2017, Hoppe-Speer *et al*. 2015, Showers 2010, Kumar 2002). In South Africa, for example, during the pre-colonial era (Before 1652[1]), discourses on forests development focused mostly on resource exploitation for various domestic purposes (Showers 2010, Chamshama and Nwonwu 2004). Thus forest management during this era was characterized by communal tenure and extraction of forests resources for subsistence and trade to supplement household income (Shackleton *et al*. 2013, Chamshama and Nwonwu 2004, Kojwang 2004, Obiri and Lawes 2002). Forest development during this era also led to the formal regulation of local peoples' forest resources use, and the designation and protection of forestlands. While these forms of forest resource use

[1] While it is not the focus of the study to provide a full history of South Africa, we have instead focused on dates and timelines that align with the purpose of the study with respect to evolution of forest management discourse and forest policy in South Africa.

generate significant economic value, they are not reflected in the national Gross Domestic Product (GDP) (Showers 2010, Chamshama and Nwonwu 2004, Geldenhuys 2002).

Similarly, during the industrial era (second industrial revolution, 1870–1914) in South Africa, policies on forest development focused on promoting investment in tree growing for commercial tree plantations. During this era, alien species, mostly pine, acacia and eucalyptus, were introduced into South Africa and cultivated in plantations (Showers 2010, Nilsson 2005). Discourses on forest development during this era focused on timber production for smelters, and the coal mining industry (Showers 2010). Diverse forms of forest-based industries e.g. pulp and paper industry, furniture industry, and veneer and particleboard industries, subsequently developed, thereby contributing to national economic growth, employment and job creation (Showers 2010, Chamberlain *et al*. 2005).

However, during these eras (pre-colonial and industrial) in South Africa, forestry programmes had a narrow development focus without consideration of cross-sectoral implications for sustainable development. They produced unintended trade-offs that often led to policy failure (Showers 2010, Irland 2008). For instance, the focus of forest policy on resource extraction during the pre-colonial era resulted in the over-exploitation of forests, leading to deforestation, degradation and fragmentation of the forest landscapes in South Africa (Showers 2010, Chamshama and Nwonwu 2004). Forest policies during this era did not properly integrate the implications of excessive forest exploitation on the ecological resilience and sustainability of the forest ecosystems (Showers 2010, Chamshama and Nwonwu 2004, Geldenhuys 2002). Similarly, the forest policy goal to expand industrial tree plantations during the industrial era in South Africa resulted in the mass eviction and relocation of many indigenous communities and paved the way for the establishment of industrial tree plantations (Showers 2010, DWAF 2005). This was largely because forest policies during this era did not integrate the wellbeing and sustainable development of rural communities into the forest development agenda (Showers 2010, Chamshama and Nwonwu 2004).

Forests in South Africa in the present era (1920–to date), are governed by a plethora of international, regional, national and provincial policies where timber production and forest resource exploitation are regulated within the context of a range of social-ecological objectives (Fedele *et al*. 2018, Poulsen and Hoffman 2015, Ntshona *et al*. 2010). Prominent among these objectives is climate change (Ofoegbu *et al*. 2018, Warburton and Schulze 2006). Climate change and the associated projected changes in temperature and precipitation patterns over South Africa are likely to affect substantial areas of production forestry. Statistical models and eco-physiologically-based models project a substantial loss of land area suitable for tree plantation production in South Africa (Xulu *et al*. 2018, Leibing *et al*. 2013). There is evidence to suggest that the South Africa forest sector is already experiencing economic loss because of climate change (Warburton and Schulze 2006). For instance, drought during 1991–1992 was estimated to cost the forest industries about R450 ($33.9) million (Xulu *et al*. 2018).

Consequently, discourses on forest management in South Africa are increasingly focusing on modalities of mainstreaming the forest policy agenda into the national climate change strategy (Holmgren 2015, Nabuurs *et al*. 2015, Naidoo *et al*. 2013). Nevertheless, how to go about this mainstreaming without repeating the mistakes of the past eras remains a challenge. Questions on how discourses on forest and climate policies can be integrated while taking advantage of their synergy and minimizing trade-offs remain unanswered. This article therefore aims to examine the ways and extent to which discourses shaping forest management in South Africa have been integrated into the country's climate policy. We translate this objective into the following research questions:

(1) What are the dominant discourses shaping forest management in South Africa?
(2) How are these dominant discourses on forest management integrated into South Africa's climate policy with respect to the acknowledged roles of the forest sector in climate change adaptation and mitigation?

LITERATURE REVIEW

Policy interactions, policy failure and forest management

Policy coherence is becoming an increasingly important objective in forest management in South Africa because of the interactions between forest policies and other sectoral policies, e.g. agriculture, biodiversity and environment (Shackleton *et al*. 2013, Nilson 2005: Obiri and Lawes 2002). The South Africa climate policy for instance contains a range of forestry-related targets such as biodiversity conservation, forest protection, and rural livelihood sustainability (NDP 2012, DEA 2011a). Hence, without paying attention to either coherence or incoherence among policies, the possibility of meeting set policy goals in the climate policy will be hampered (Kalaba 2016). This is partly because the interactions between targets set in forest and climate policies can be either synergetic or contradictory. To facilitate the implementation of forestry-based climate policy targets (e.g. Reducing Emissions from Deforestation and Forest Degradation, and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD+)), several studies have found that policy implementation is more likely to succeed where it relies more on existing national forest policies and international agreements. In this case, the REDD+ implementation will have to be consistent with established principles and criteria for sustainable forest management (Karki *et al*. 2013). This will require coherence between climate and forest policy goals to enable the anticipation of potential inefficiencies at different stages of policy implementation. Kalaba (2016) argues the lack of this type of anticipation has caused policy failure in forest management in many developing countries.

Contextualizing the South Africa forestry sector

The total forest area in South Africa is about 40 million hectares (ha), which is about 7.5% of the country's total land area (The Fibre Processing and Manufacturing: FP&M 2014, Department of Agriculture Fisheries and Forestry – DAFF 2010, Lönnstedt 2009). South Africa's forests can be categorised into three main types: Plantations, natural forests and woodlands (FP&M 2014). Natural forests in South Africa cover approximately 0.5 million ha (0.3%) of the country's land area (Mucina and Rutherford 2006). Natural forests are fragmented in series of scattered patches along the eastern and southern margins (escarpment, mountain ranges and coastal lowlands) of South Africa, from the Soutpansberg (inland, 22°40′S) and Tongaland (coast, 27°S) to the Cape Peninsula (34°S) (Geldenhuys 2002).

Tree plantations in South Africa currently cover an area of roughly 1.487 million ha, comprising 53.2% pines of various species, 39.2% eucalypts of various species, and 7.6% acacias (mainly *Acacia mearnsii*) and other species (Dye 2013, Geldenhuys 2002). Commercial tree plantations are situated in the provinces of Kwa Zulu Natal. Mpumalanga, Limpopo, Eastern Cape and Western Cape. Commercial tree plantations employ around 165,900 workers and provide about 62,700 direct jobs and 30,000 indirect jobs. These jobs are often located in rural areas where there are little or no alternative employment opportunities (Chamberlain *et al*. 2005). Tree plantation industries provide raw materials for downstream forest-dependent companies such as pulp milling and paper manufacturing industries, sawmilling industries, and furniture manufacturing industries (Chamberlain *et al.* 2005).

Forest succession due to de-agrarianization has been reported in the Wild Coast region of the Eastern Cape (Njwaxu and Shackleton 2019). Increasingly, a growing number of rural households are decoupling their livelihoods from agriculture. This is largely due to the increase in the number of state social grants and other socioeconomic factors. The abandoned farmlands are gradually becoming woodland/forests. However, the utilization of resources from these abandoned farmlands/forests is poorly understood and the provisioning of ecosystem services from such land is rarely acknowledged in forest policies. Moreover, existing forest policies in South Africa do not yet recognize these type of forests (Shackleton *et al*. 2013, DAFF 2010, DWAF 1998).

Depending on the classification method used, woodlands coverage in South Africa ranges between 29 and 46 million ha (Dye 2013). The woodlands are the most accessible forest resource for poor communities and contribute about R2 000 to R5 000 to poor households annually (Shackleton *et al.* 2007, Dye 2013). Forests in South Africa are valued for their biological diversity, for medicinal benefits, aesthetics, and spiritual/cultural values (Shackleton *et al*. 2013, Shackleton and Shackleton 2011, Mucina and Rutherford 2006). The forest sector (forestry and forest products) contributes about 1% to the GDP (DAFF 2010). More than 80% of rural households in South Africa depend on forest resources for energy (fuelwood), income, and subsistence. Approximately 13 million m^3 of fuelwood is supplied from indigenous forests, savannas and plantation off-cuts annually (Lewis *et al.* 2003).

METHODOLOGY

Theoretical perspective – discourse theory and forest management

We define a discourse in line with Hajer (1995: 44) as "a specific ensemble of ideas, concepts, and categorizations that are produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities". Discourses are used to frame problems, and to distinguish some aspects of a situation (Siddiqi and Rai 2014). Policy discourses, similarly, are ensembles of ideas and concepts that endorse the assumptions for policymaking (Ambjörnsson *et al*. 2016). Discourse analysis is premised on the concept that it is through language that we constitute the world around us, giving some realities meaning while silencing others, influencing how people perceive and understand specific problems, and define appropriate solutions to address them (Ford *et al*. 2016).

Discourse analysis is increasingly used to analyze how discourses are created and maintained in policymaking (Siddiqi and Rai 2014, Somorin *et al*. 2012). We carried out discourse analysis of South Africa's forest and climate policy documents. By policy documents, we refer to all government documents that provide guidance for public action such as national policies, bills and acts of parliament, strategic plans, and annual reports. Accordingly, the discourse analyses of forest policy documents focused on how sustainable forest management (SFM) is understood, framed and reflected in policy over the years. This was done by examining dominant narratives within each policy document, identifying policy measures that address sustainable forest management from the period 1994–2015.

The sources of data were South Africa's climate and forest policy documents, forest sector plan, and climate change adaptation and mitigation plan for the South African agriculture and forestry sectors. The list of policy documents that were analyzed is presented in Table 1.

Analysis

Data analysis began with a first reading and summarization of the national level forest policy documents noting how they deal with the concept of sustainable forest management (SFM). We analyzed the policy documents and identified meanings attributed to SFM, recurring patterns of argumentation and rationales that emerged in relation to SFM. Review and coding of the texts was carried out through iterative rounds of reading, combining journaling with the use of the qualitative analysis software MAXQDA® 12. The coding and journaling strategies used helped organize the textual data for thematic analysis of the dominant discourses on forest management. This approach has been used by Ambjörnsson *et al* (2016), and by Somorin *et al* (2012). To achieve the second objective, we analysed the South African climate policy documents to identify the recommended forest-based interventions for climate change mitigation and adaptation. We further analyzed the extent to which forest management discourses

TABLE 1 *Materials reviewed for the study*

Policy Document	Code	Description of Document
Forest Policy	WPSD	White Paper on Sustainable Forest Development in South Africa, 1995
	NFA	National Forests Act, 1998 (Act 84 of 1998)
	FSTC	Forest Sector Transformation Charter 2007
	SANPIS	South Africa's National Level Principles, Criteria, Indicators and Standards
	FAS 2030	Forestry 2030 Roadmap – Forestry Strategy 2009–2030
Climate Policy	INDC	Intended Nationally Determined Contribution
	NCCRP	National Climate Change Response Policy
	LTAS	South Africa's Long Term Adaptation Scenarios
	LTMS	Long Term Mitigation Scenarios
	NDP	National Development Plan
	DRACF	Draft climate change sector plan for agriculture, forestry and fisheries-2015

are integrated into the identified forest-based climate change interventions and the implications for sustainable forest management. This was done by first analysing the mandates of all national climate policy documents and their links to the forest sector followed by an examination of how the linked mandates relate to dominant discourses in forest management in South Africa.

RESULTS AND DISCUSSIONS

Trends in Forest Management Discourses

The thematic and content analysis of the national forest policy document yielded four descriptive themes that we used to broadly categorized the discourses that have driven sustainable forest management in South Africa. These themes are, 1) Preservation of forest integrity, 2) Social inclusiveness in forest management, 3) Equitable benefit-sharing, and 4) Inclusive development of forests and forest-dependent communities. The extent to which these discourses are addressed in forest policies is presented in Table 2.

Table 2 shows that discourses on the preservation of forest integrity have received the most policy attention with respect to SFM in South Africa. This is followed by discourses on social inclusiveness in forest management. Discourses on equitable benefit sharing and inclusive development of forests and forest-dependent communities have received equal policy attention. In the following sections, we discuss the trends in the implementation of policy mandates and targets with respect to each of the thematic discourses on forest management.

Preservation of forest integrity: The theme "preservation of forest integrity" involves all actions targeted at utilization, management and conservation of forest resources in a manner that ensures the ecological, cultural, social and economic integrity of the forest ecosystem. Preservation of forest integrity has been a dominant discourse in forest management in South Africa for many years. As shown in Table 2, nearly all the reviewed forest policy documents acknowledged the need for and proposed actions for ensuring the preservation of forest integrity in South Africa. However, there has been a remarkable change in how actions for the preservation of forest integrity target are implemented.

TABLE 2 *The extent to which the examined forest policies engage with the observed dominant forest management discourses*

Forest Policy Document	Dominant discourses			
	Preservation of forest integrity	Social inclusiveness in forest management	Equitable benefit sharing	Inclusive development of forests and forest dependent communities
WPSD	3	2	2	1
NFA	2	2	2	2
FSTC	3	3	3	3
SANPIS	3	2	1	2
FAS 2030	3	3	3	3
Total Score Per Dominant Discourse	**14**	**12**	**11**	**11**

0 = no mention, 1 = only mentioning, 2 = mentioned and proposes action, 3 = mentioned and proposed action with set targets

The WPSD was the first policy document to advocate for a more people-oriented integrated approach for the actualization of the preservation of forest integrity target. The WPSD advocated for a shift from exclusive conservation that restricted the rights of local people to access and use forest resources to integration of local people's needs in forest management on a sustainable basis. The NFA and SANPIS made provisions for translating the WPSD advocacy into action by providing guidelines and regulations for integrating people's needs into actions targeted at preserving forest integrity. They set out rules for protecting indigenous forests and ensuring that the public has access to state-forests for recreation, cultural, spiritual and educational purposes without destroying them.

Recognizing that legislation and law enforcement are insufficient for the preservation of forest integrity, participatory forest management was introduced in the '90s in line with the government's policy of sustainable development (Geldenhuys 2002, DWAF 1995). The WPSD paved the way for the involvement of local communities and other stakeholders in decision-making with respect to forest management. Participatory forest management was implemented in many State-owned forests in response to deforestation and forest degradation (DWAF 2005). The logic being that without local people having a significant stake in the management of local forest resources, the efforts of the forest departments in protecting forest will be ineffective (Ofoegbu *et al*. 2017, Khatun *et al*. 2015, Chamshama and Nwonwu 2004).

However, the integration of people's needs and aspiration into forest management has increased human pressure on forests for the exploitation of resources to support people's livelihoods. Hence a major challenge of the forest sector in the present post-industrial era South Africa has centered on how to maintain the sustainable provisioning of the goods and services provided by the forest ecosystems in the face of growing human population (Naidoo *et al*. 2013, DAFF 2010, Grundy *et al*. 2004).

Social inclusiveness in forest management: The theme "social inclusiveness in forest management" involves all actions aimed at promoting and ensuring inclusiveness in the use and management of forests (Inclusiveness, used here, refers to the practice of including all types of social-demographic groups within a community in a forestry project and treating them fairly and equally). This includes promoting inclusiveness in the ownership and management of forests and forest-based enterprises. As shown in Table 2, social inclusiveness is the second most dominant discourse shaping SFM in South Africa. Most of the initial actions to promote inclusiveness in the South Africa forest sector were focused on attaining inclusiveness in participation and benefiting from forest management programmes (Showers 2010). This entails the inclusion of local people in various aspects of forest management including resource monitoring, fire prevention and control, tree planting, and tree plantation maintenance. More recently, actions on the promotion of social inclusiveness have focused on creation and implementation of frameworks to enable previously disadvantaged people (i.e. Black South Africans) gain ownership of forest enterprises (DWAF 2007). The FSTC, for instance, assigns mandates and targets for facilitating the capacity of previously disadvantaged people in South Africa to gain ownership of forest enterprises. The shift in ideology is based on the notion that black ownership is a prerequisite for promoting transformation in the forestry sector in order to address the injustices of the past (DAFF 2010, DWAF 2007).

This highlights the shift in South Africa's political landscape, from the apartheid era to the democratic dispensation. The FSTC and FAS 2030, which were the two policy documents that characterize the outlook of the forest sector in the democratic era, are the only policy documents with proposed actions on how to actualize social inclusiveness in the South Africa forest sector. The policy documents among other targets contain a mandate for ensuring that the opportunities and benefits of the forest sector are extended to black South Africans previously excluded from meaningful participation in the Sector (DWAF 2007). The FSTC aims to attain greater gender parity in ownership of forest enterprises by targeting 10% ownership by black women in existing enterprises. Furthermore, the FSTC commits to substantially increasing the number of previously disadvantaged people, including women, exercising management control over the forest industry.

The pursuit of transformation through the promotion of black people's ownership in forest enterprise in South Africa has metamorphosed into various management arrangements all of which have had significant impacts on SFM in South Africa. At the rural community level, black ownership and participation in forest management has been implemented through co-management arrangements and participatory forest management. Participatory forest management arrangements were aimed at increasing the power and opportunity for local people to benefit from forests. Most State-owned tree plantation are now co-managed with traditional authorities. The intent is to utilize social networks, norms, and cohesion at the community level to promote local people's compliance with regulations guiding forest resource use and management (Ofoegbu *et al*. 2019, Munyanduki *et al*. 2016). In the same vein, the commercial forestry sector has witnessed a growing implementation of various forms of public-private partnerships in a bid to facilitate black ownership in forest management in South Africa (Tshidzumba *et al*. 2018).

Although the translation of the discourse on inclusiveness into action has helped actualize SFM goals in South Africa, they have equally sometimes served as a source of laxities in the enforcement of forest management regulations, particularly for the community forests. Some studies have reported that a range of socially embedded issues negatively affect enforcement of forest management rules and regulations in community forests (Ofoegbu and Chirwa 2019, Grundy *et al*. 2004, Kumar 2002). Friendship and peer relations frequently make traditional authority unwilling to enforce regulations where they have a relationship with the offender (Wangdi *et al*. 2013, Grundy *et al.* 2004). Similarly, some stakeholders in the forestry sector are yet to fully grasp how changing ownership structure, particularly the growing trends towards public-private partnership will affect the sustainability of the commercial forestry sector in South Africa (Tshidzumba *et al*.

2018, Ntshona *et al*. 2010, DWAF 2007). There remains a paucity of studies investigating whether changes in forest ownership such as forest privatization and public-private partnerships have improved the quality of forest management in South Africa. Although it is widely acknowledged that ownership may sometimes influence forest management plans and objectives (Tshidzumba *et al*. 2018), there remains a knowledge gap on how changing ownership patterns and demography are shaping the sustainability of the South African forest sector.

Equitable benefit sharing: The theme "equitable benefit sharing" involves discourses on the promotion of equity in the distribution of benefits arising from forests and forest enterprise management. Policy recommendations to ensure that people benefit equitably from forest management are also increasing. The implementation of the discourse on equitable benefit sharing in most cases seems entangled with the discourse on social inclusiveness. Nevertheless, the FSTC and FAS 2030 included clear mandates and guidelines on the actualization of equitable benefit sharing in forest management. The NFA and SANPIS also contain criteria and indicators for ensuring equitable benefit sharing in forest management. Equity, as addressed in the WPSD, included gender-inclusiveness and benefit sharing in forest and forest enterprise management, and creation of decent employment conditions for workers. With respect to employment equity, the FSTC committed to substantially increasing the number of black people, including black women, in management as well as professional and technically skilled positions in the forest sector. A critical aspect of the discourse is the role of power and influence on the governance of forest resources (across scales from local through sub-national to national) and its impacts on people's access to and benefits from forest management actions.

The pursuit of equitable benefit sharing in forest management was further strengthened by South Africa's ratification (November 1995) and adoption of the 1992 Convention on Biological Diversity (CBD), and the related 2010 Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization. The CBD is one of the multilateral treaties that opened for signature at the 1992 United Nations Conference on Environment and Development in Rio de Janeiro, Brazil (Morgera and Tsioumani 2010, The Convention on Biodiversity 2000). Increasing attention on equitable benefit sharing in the forest sector has led to the parallel development of a range of voluntary social and environmental certification schemes. As a result, nearly all forest plantation companies trading or wishing to export their timber products are now required to show that workers in their plantations receive equitable fair benefits for their labour through various forms of certification schemes (Khatun *et al*. 2015, DAFF 2010).

Inclusive development of forests and forest-dependent communities: The theme "Inclusive development of forests and forest-dependent communities" involves discourses on the promotion of investment and development programmes that target the sustainable development of forests and communities hosting or adjacent to the forestland. Rather than focus solely on forest development, there is a growing recognition of the need for an integrated approach that focuses simultaneously on the development of forests and forest-based communities. The logic behind this shift is the growing recognition of the need for an inclusive development as a means of reducing human pressure on forests by decoupling rural livelihoods from over-reliance on forest ecosystems (Ofoegbu *et al*. 2019). By siting infrastructures and facilities in the communities and enhancing the people's capacity (e.g. human capacity development through education and vocational training), opportunities for participating in the secondary sector of the economy (e.g. employment in industries that produce finished and usable products) are created and the people's capacity to take advantage of these opportunities are strengthened. To this end, the SANPIS contained indicators and criteria that aim to guarantee that forest-based communitys' wellbeing and socioeconomic welfare are catered for through sustainable forest management in South Africa. Many tree plantation companies now provide numerous developmental projects to the rural host communities through their corporate social responsibility platform thereby serving as a facilitator of socio-economic development in many rural communities in South Africa (Shackleton *et al.* 2007).

To enhance the capacity of host communities to benefit from the forest economy, the forestry department develops human resources through forestry-sector skills development initiatives and promotes employment through commercial forestry activities such as forestation and downstream activities (DAFF 2010). Further, forestry projects are increasingly being integrated into provincial and municipal development plans in order to use forestry projects to advance the sustainable development of rural communities (Naidoo *et al*. 2013, ASGISA 2007). To date, however, most of these efforts have concentrated on afforestation and reforestation projects, often taking place in rural areas where there are few other viable opportunities for job creation and economic activity. This discourse is gaining increasing attention due to renewed interest to use the forest sector to facilitate the transition to a green economy in the rural areas. Actions for the transition into a green economy seek options to promote non-destructive exploitation of forest resources and the decoupling of rural livelihoods from unsustainable forest exploitation.

The Forest Sector in the South African National Climate Policy

The role of the forest sector in climate change mitigation and adaptation has become one of the most contested issues in the international climate policy processes (Locatelli *et al*. 2011, Gregorio *et al*. 2015, Locatelli *et al*. 2015). Since 2001, when South Africa became a signatory to the UNFCCC, there has been a series of dialogues in the country on the potential role of the forest sector in the national climate change strategy. The thematic and content analysis of the national climate policy with respect to the recognized roles that the forest sector can play in the national climate change response strategy yielded six thematic groupings (Table 3).

TABLE 3 *Forest-based Interventions Recognized in the South Africa Climate Policy*

Forest-based Climate Change Interventions	Code	Description
Carbon sequestration	CS	Sustainable forest management and conservation for avoidance of deforestation and degradation
Landscape approaches	LA	This describes the application of a landscape approach to forest management working across sectors and beyond the scale of individual forest stand to secure sustainable provision of multiple ecosystem functions and services. "A Landscape Approach is broadly defined as a framework to integrate policy and practice for multiple land uses, within a given area, to ensure equitable and sustainable use of land while strengthening measures to mitigate and adapt to climate change (Milder *et al*. 2010)".
Materials substitution with wood products	MASWP	Substitution of energy-intensive materials with wood products in constructions
Forest bioenergy	FB	Substitution of fossil fuels in energy generation e.g. co-firing of wood pellets with coal for bio-electricity production
Technological approach	TA	Use of genetics and biotechnology for developing resilient tree species
Sustainable consumption	SC	Change in traditional consumption patterns through a recycle, re-use, and cascade use strategy for forest products e.g. wood.

However, the extent to which the climate policy made provisions for the implementation of these forest-based interventions varied (Table 4).

Table 4 shows that LA receives the most policy attention followed by CS and TA. SC and MASWP receive the least policy attention. FB receives moderate policy attention. In the following sections, we discuss the policy focus on each of the forest-based climate change interventions recognized in the South Africa climate policy.

Carbon Sequestration (CS): Three documents (INDC, NCCRP and DRACF) identified and proposed actions for the implementation of CS, while three only acknowledged the potential of CS in national climate change mitigation and adaptation actions. The examined policies mainly acknowledged the role of CS in contributing to national climate change mitigation and adaptation targets and proposed potential actions for actualizing this target. They, however, do not provide guidelines or regulations on how to implement the proposed actions. The LTMS, for example, advocated for the incorporation of forestry-related activities e.g. fire alerts and REDD+ in the national GHG inventory as a step towards inclusion of the forest sector in national GHG emission reduction interventions. The carbon sequestration interventions recognized in the South Africa climate policies are mostly REDD+, afforestation, reforestation, and conservation projects. While afforestation and reforestation are widely tagged with mandates and targets in the climate policy documents, REDD+ was acknowledged as a potential intervention without any policy mandate and targets. This is largely because South Africa is yet to participate in the REDD+ programme (Forest Carbon Partnership 2020, Rahlao *et al*. 2012). Afforestation is seen as having potential for job creation, poverty alleviation and economic development particularly at the rural community level where there are little or no alternative economic development opportunities. The NDP, NCCRP, and INDC identified the Eastern Cape, Mpumalanga and Kwa Zulu Natal as the provinces with potential for the implementation of afforestation and reforestation interventions.

TABLE 4 *The extent current climate policies addressed the forest sector role in climate change interventions*

Policy Document	Forest Sector in South Africa's Climate Change Interventions					
	CS	LA	MASWP	FB	TA	SC
NDP	1	2	1	1	2	1
INDC	2	1	1	1	1	1
NCCRP	2	2	0	2	2	1
LTMS	1	2	0	2	1	0
LTAS	1	1	0	0	2	0
DRACF	2	2	1	0	1	1
Total	**9**	**10**	**3**	6	9	4

0 = no mention, 1 = only mentioning, 2 = mentioned and proposes action

The NCCRP advocated for the exploration of the potential of the forest sector to address the vulnerability of the rural poor, the most vulnerable segment of the national population. Furthermore, the NCCRP called for assessing the potential for carbon sequestration projects in the forest sector, and the potential of such projects to financially support the rural poor. The long-term adaptation scenario (LTAS) examined the available adaptation responses for managing the social-ecological implications of the anticipated impacts of climate variability and change at national and sectoral levels in South Africa. The LTAS recommended several adaptation response options for the forest sector. One of the recommended adaptation responses was the development of an "information system" for informing and guiding policy-makers and other stakeholders on appropriate adaptation goals and investment for the forest sector. The LTAS also recommended a community-based adaptation strategy with special focus on community forestry for community resilience. In addition, the LTAS called for an assessment of adaptation gaps and opportunities to increase resilience to climate change in the forest sector.

Landscape Approaches (LA): The landscape approach as advocated for in the climate policies entails a system thinking towards the integrated operationalization of policy and practice for multiple land-uses, within a given area, to ensure equitable and sustainable use of land while strengthening measures to mitigate and adapt to climate change. The most recognised roles of the forest sector in South African climate policy are those characterised by LA (mostly ecosystem and community-based adaptation). This leans towards a system-thinking approach with respect to forest management for climate change interventions. Thus, rather than focusing on forest site management for climate change mitigation and adaptation, policy recommendations are increasingly leaning towards a forest landscape approach for integrated ecosystem and community-based climate change mitigation and adaptation strategy (DEA 2013). The NDP, LTMS and DRACF all proposed action for actualising LA in climate change response strategy. However, INDC and LTAS only acknowledged the potential role of LA. Given that forests can be managed for multiple purposes such as retaining and filtering fresh water, preserving biodiversity, providing habitats for many species and mitigating climate change, studies have demonstrated that ecological resilience of forest ecosystems is more readily achievable through LA. CS and LA as advocated in the climate policy are thus complementary.

Materials Substitution with Wood Products (MASWP): Three policies (NDP, INDC and DRACF) acknowledged the potential role of MASWP in South Africa climate change interventions. However, we did not record any proposed action for implementing the MASWP. Consequently, there remains a dearth of knowledge and information on the potential contributions of MASWP to South Africa climate change mitigation and adaptation targets.

Forest Bioenergy (FB): Two policy documents acknowledged and proposed actions for the implementation of FB interventions. The NDP and INDC acknowledged the potential role of FB in South Africa. The INDC and NDP acknowledged the potential for bioelectricity generation in South Africa through the co-firing of coal and wood pellets. Although there are many types of forest bioenergy, the action mostly recognized in the policy documents with respect to FB is bioelectricity production.

Technological Approach (TA): The NDP, NCCRP and LTAS proposed actions for implementing a TA, while INDC, LTMS and DRACF acknowledged the potential of a TA to national climate change mitigation and adaptation targets. However, actions proposed under a TA are generally related to commercial tree plantation industries. The TA intervention consists of actions targeting breeding of tree species and varieties that are adaptable to the projected future climate scenario of South Africa. The intervention currently targets the commercial tree plantation sector in South Africa. Several studies have demonstrated the potential of TA interventions to ensure the profitability and sustainability of forest industries in the face of changing climate challenges (Ofoegbu and Chirwa 2019, Grieg-Gran *et al.* 2015, Warburton and Schulze 2006).

Sustainable Consumption (SC): All analyzed policy documents ignored action for implementing SC. However, four documents acknowledged the potential contributions of SC to climate change mitigation and adaptation actions. Sustainable consumption is an intervention that has long been recognised in policy documents but rarely operationalised. While issues of sustainable forest product supply are dominant in policy discourse with respect to climate policy and forest management in South Africa, efficient and effective utilization of forest products through cascade use, recycle, and reuse of materials has received less attention (Crickmay *et al.* 2005, FES 2012). Nevertheless, the climate policy advocates the need for action and targets towards encouraging re-use, recycle and cascade use of forest products as a means of encouraging sustainable consumption and reducing pressure on forests through reduction of demand for woods.

In summary, Table 4 shows that behavioural change particularly relating to SC and MASWP, with respect to climate change mitigation and adaptation, are poorly integrated into broader forestry and climate policies in South Africa. The examined climate policy documents did not place any emphasis on the potential of behavioural change with respect to SC and MASWP in sustainable forest management.

Linking forest management discourses to forest-based climate change interventions

In this section, we examine how the identified forest management discourses may condition the actualization of forestry-related climate policy targets in South Africa. The South African climate policies acknowledged the potential of the forest sector to contribute to resilience building and management of climate change impacts on humans and ecosystems. However, the climate policy did not provide guidelines for adapting forest management in order to accommodate both conventional forest management objectives and climate protection objectives. We therefore expected that by drawing insights on how forest management discourses have shaped the outcome of forest management, plausible inferences can

be made on how forest management discourses will shape the outcome of forest-based climate change interventions in South Africa.

The differences in the manner and extent to which the identified forest management discourses were operationalized in forest management in South Africa contains important insights for forest-based climate change interventions in South Africa. For example, actions underlying the discourse on **preservation of forest integrity,** which is the most mentioned (with proposed action), have undergone a significant shift from exclusive conservation that restricted the rights of local people to access and use forest resources, to the integration of local people's needs in forest management. This changing trend therefore implies that any forest-based climate change intervention that places more emphasis on forest conservation for enhancement of carbon stock over people's needs for forest resources for livelihood will likely fail. The challenge, therefore, is to develop management approaches that can reduce the trade-off between forest management for climate protection and forest management for sustainable livelihoods, while taking advantage of the synergies. Similarly, the operationalization of the discourses on *social inclusiveness in forest management, equitable benefit sharing in forest management, and inclusive development of forests and forest-based communities* tends to focus mostly on satisfying human needs for income and livelihood over conservation of forests. The implementation of these forest management discourses entails considerations for the ecological resilience of the forest ecosystems to ensure that forests are not exploited at a rate faster than their ecological replenishment. The emphasis on human needs is a strong indication that conventional forest management in South Africa tends to prioritize human needs for livelihood over reduction of emission from forests and enhancement of forest carbon stocks, which are the key policy objectives of forest management for climate protection.

In this regard, fostering livelihood systems that reduce human pressure on forests by decoupling income-generating activities from overreliance on forest resources offers a prospect. Such livelihood strategies will be complementary to the **Sustainable consumption strategy-SC** (one of the six identified forest-based climate change interventions in South African climate policies). The SC strategy emphasises the efficient use of forest resources through reuse, recycle, and cascade use of materials thereby reducing demand for raw materials from intact forests. This approach can be adapted to facilitate the decoupling of rural livelihoods from overreliance on forest resources.

Yet SC is the least acknowledged in South African climate policy. Promoting SC strategy will require behavioural change among actors and the restructuring of the forest products value chain to encourage, reuse, recycle and cascade use of forest products. This situation mirrors the challenge of sustainable forest management programmes where attitudes towards resource exploitation remain a challenge in forest management (Ofoegbu and Ifejika Speranza 2017). Evidence from Scandinavian countries where cascaded use of wood has been promoted especially in the wood processing and furniture sector, suggests that this type of approach can significantly improve the forest sectors' contributions to climate change mitigation targets (Thonemann and Schumann 2018).

The discourse on **inclusive development of forests and forest-dependent communities** emphasises both the development of forests and communities adjacent to or hosting forests estates. Thus forestry projects that facilitate community development through capacity enhancement programmes such as education, and establishing forest-based industries e.g. sawmills, furniture and veneer board companies can decouple rural livelihoods from overexploitation of forest resources. Such an approach can create opportunities for implementing forest-based climate change interventions.

Although forest management can contribute to both climate protection and sustainable livelihoods objectives, the recognition and integration of forest-based interventions in climate policies in South Africa are generally skewed towards CS and LA approaches. Such skewness neglects other potential contributions of the forest sector to the national climate change mitigation and adaptation targets. For example, though it is recognised in the climate policies that forests can contribute to climate protection through the substitution of energy-intensive materials with wood products in constructions, and substitution of fossil fuels in energy generation e.g. co-firing of wood pellets with coal for bioelectricity production, there is currently little or no action to actualize these goals. The unintended consequence of this approach is the under-recognition of the forest sector potentials in South Africa's climate change response strategies.

Carbon sequestration and landscape approaches are the two main forest-based interventions currently advocated in the climate policy. However, the challenges for actions underpinning the forest management discourses of social inclusiveness, provision of equitable benefits, and inclusive development of forests and forest-based communities may jeopardise the success of the carbon sequestration and landscape approaches. For example, the implementation of social inclusiveness discourse is leading to changing ownership structures whereby forest plantations and industries are being transferred from corporate ownership to private individuals and sometimes groups of individuals (Tshidzumba *et al.* 2018, Chirwa *et al.* 2015). The forestry sector is yet to grapple with how this changing ownership structure may affect the economic outcomes of the forest industries. This will have significant implications for forest management for climate protection.

Further, weak institutional capacity has been widely cited as a driver of policy failure in forest management in South Africa (Shackleton *et al*. 2013, Irland 2008). While excellent regulations such as the 1998 Forest Act were promulgated and integrated subsistence and commercial use, the implementation of policies in the forestry and climate change arena remain challenging (Ofoegbu and Chirwa 2019, Obiri and Lawes 2008, DWAF 1998). Hence, implementing discourses, which are explicit in regulations, may be constrained in reality by inadequate actions, as has been reported for climate change responses in South Africa (Ofoegbu and Chirwa 2019, Ofoegbu and Ifejika Speranza 2017).

A critical question to be answered is whether private individuals will be interested in managing their forest for climate protection in the face of daunting socio-economic challenges. Under what conditions will private owners be motivated to engage in forest management for climate protection? Answering these questions will provide insights on sustainable pathways for forest management in the context of climate change in South Africa. This is largely because the effectiveness of integrated landscape management approaches is dependent on how well the perspectives, needs and interests of all stakeholders, including local communities and individual land users are represented in the decision-making process (Chazdon *et al*. 2015, Milder *et al*. 2010).

CONCLUSION

As is the case in other countries, the integration of forest management discourses into climate policy is becoming a key legislative and political target in South Africa. Globally, climate policy discussions have significantly steered agenda-setting for sustainable forest management. This study analyzing the discourses shaping forest management in South Africa has shed light on major trends in forest management that are likely to impact climate policy implementation.

The analysis of the discourses shaping forest management suggests that the success of any forest-based approach for both climate protection and sustainable livelihoods will depend on how the synergies and trade-offs are managed. Trade-offs can occur when a forest-based climate change intervention focuses exclusively on mitigation targets such as carbon sequestration through conservation, to the detriment of adaptation needs of forest-dependent people through access to forest ecosystem goods for livelihood resilience. There are, however, complementarities between conventional forest management and forest management for climate protection. For example, the promotion of equitable benefit sharing in forest management can provide a foundational framework for the implementation of forest-based climate interventions. This is because the distribution of benefits creates incentives for local stakeholders to engage with, and contribute to, forest-based climate interventions. To strengthen synergies between forestry and climate policies, there is a need for the explicit recognition of mutually supportive links between both policies.

To effectively integrate forest management discourses into climate policy, regulations and guidelines for implementing forestry-related targets in climate policies will have to be grounded in past experiences and lessons of forest policy implementation. Additionally, integrated forests and climate policy implementation will require coordination within and beyond the forest sector. Lack of coordination between competing interests of climate and forest sectors can be a threat to the sustainable management of forests. Similarly, regular monitoring and evaluation of the outcomes of implemented forest policy targets will be crucial to alert policy-makers to unintended effects.

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