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Eucalyptus monoculture in Kenya: a political ecology of knowledge, policy and public participation

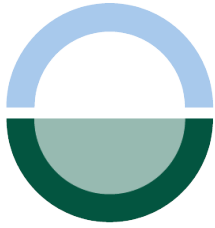
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Abstract

Eucalyptus trees can adversely affect their immediate environment. Scientists, citizens, and environmental authorities know this, not least in Kenya where monoculture woodlots are widespread. But regulatory interventions have failed and eucalyptus over-cultivation persists. In this working paper we examine why. Using a political ecology approach, we review how eucalyptus trees feature in Kenyan environmental governance, the kinds of evidence favoured in relevant policy-oriented research, and how knowledge has been mobilised in policymaking. We show that the endurance of eucalyptus over-cultivation stems less from underdeveloped policies or gaps in knowledge than from the socio-political dynamics that shape how evidence and policy are produced and interpreted. Eucalyptus-relevant policymaking remains top-down and technocratic, privileging narrowly defined scientific expertise while sidelining the experiential knowledge of citizens and local communities. Despite constitutional requirements for public participation in policymaking, citizens do not have a say over policy formulation let alone its implementation. Hence, regulatory initiatives to date have lacked legitimacy. Going forward, meaningful public participation that takes seriously the socio-economic significance of eucalypts in local livelihoods will be key. To this end, researchers and policymakers alike can relate to citizens and local communities as fellow knowledge holders and producers. Universities are well-placed to broker such interactions through, for example, participatory action research.



Introduction

Not all trees benefit the climate and their host ecologies. Eucalyptus¹ trees provide a stark reminder. In Kenya, as elsewhere, they dominate the flora, reflecting their significant socio-economic importance in local livelihoods. Most households in highland and agricultural areas cultivate eucalypts, often in monoculture woodlots. Yet eucalyptus over-cultivation has come with major environmental risks to biodiversity, agricultural output, soil fertility, and water security. This tension between the immediate economic benefits and long-term environmental costs associated with eucalyptus over-cultivation is well-documented. To mitigate environmental risks and maximise economic benefits, studies of eucalyptus cultivation have recommended careful consideration of the circumstantial outcomes in particular sites, rather than blanket bans (Daba 2016; Alemu 2016). Kenyan authorities have, by and large, heeded this recommendation and mandated that eucalyptus trees are not planted near water sources or in riparian and wetland areas. Nevertheless, eucalyptus monoculture endures unabated. Why?

To answer this question, we reviewed Kenya-centred scholarship on eucalyptus cultivation, which we identified primarily through the Web of Science and EBSCO databases. An explicit and exclusive focus on eucalyptus over-cultivation as an environmental policy problem in Kenya is relatively rare in this small body of work. Many works within it discuss eucalyptus over-cultivation as part of broader concerns with environmental change, forestry policy, or agroforestry practices. Cross-referencing articles on specific Kenyan sites helped us identify where eucalypts were implicitly discussed, even if not explicitly acknowledged as part of broader work on forestry conservation, reforestation, and afforestation. Although clustered mainly in environmental science journals, some of these works are indebted to social sciences such as economics or political ecology while yet other works are the products of interdisciplinary collaborations between natural and social scientists. To discuss this body of work, we referred to works focusing on eucalyptus cultivation in other settings (notably South and Southeast Asian contexts where international organisations controversially experimented with eucalyptus monoculture in the 1980s). We also reviewed current environmental policy frameworks in Kenya, identified via the Laws of Kenya database, county government websites, and journalistic work. To integrate and situate all these materials at the science-policy interface, we referred to knowledge mobilisation frameworks as well as broader historical and anthropological literature on development and conservation.

Our working understanding of why the problem of eucalyptus monoculture endures is multifaceted. Part of the problem stems from the lack of coherence and clarity in policy frameworks as well as the lack of a cross-sectoral policy framework that focuses on eucalyptus monoculture. These weaknesses undermine the

implementation of the consensus that crosscuts different policies: eucalyptus trees need to be removed from farmland and riparian areas. However, the bigger issue is the top-down way in which policies have been formulated. Institutional stakeholders such as national and county-level authorities designed policies without engaging citizens and communities in dialogues on the ecological risks of eucalyptus cultivation and economically viable alternatives to it. In effect, the policymaking process did not address the capability and motivations of ordinary citizens to comply. Without broad citizen buy-in, policy implementation has remained elusive.

The absence of genuine public participation in policy design is reflected in the ways in which different kinds of evidence are mobilised or otherwise downplayed and neglected in policy formulation and implementation. In interactions with ordinary citizens, authorities and officials have cited ideas of 'scientific evidence' in normative ways to invalidate expertise derived from everyday experience while obscuring the social and political aspects of evidence-informed policymaking. As a result, the regulation of eucalyptus monoculture remains wedded to paternalistic conceptions of an ignorant citizenry needing education on how eucalyptus damages local ecologies. Without genuinely and mutually respectful dialogues across socio-political divides, and without further research on policy implementation rather than simply research for policy formulation, the tension between the economic and the environmental affordances of eucalyptus monoculture will remain an intractable problem.

In what follows, we first outline the history of eucalyptus cultivation in colonial and postcolonial governance. We then review how and whether eucalypts feature in a variety of legislative frameworks, before detailing how some Kenyan environmental authorities and officials have mobilised 'scientific evidence' on eucalyptus cultivation in a peculiarly depoliticizing and paternalistic vein that has undermined both policy formulation as well as implementation. We then discuss how we might envision universities and higher education institutions as potentially effective knowledge and policy brokers at the science-policy interface. We end by drawing out the policy implications of our foregoing discussion, with a view to inform the activities of the Kenya-based Participatory Action Research (PAR) group currently undertaking research on evidence-based policymaking on eucalyptus monoculture in the Kisii region of Southwest Kenya. This group is one of two PAR groups working as part of a British-Academy-funded research project seeking to strengthen and expand knowledge ecologies and ecosystems for evidence-based policymaking on key environmental issues in Kenya and Tanzania.²

Eucalypts in colonial and post-colonial Kenya

Eucalypts are indigenous to Australia. Their attributes were shaped by and adapted to Australian ecologies. For Aboriginal peoples, eucalypts were elements of their healing practices and ceremonial life. In Kenya, however, eucalyptus cultivation bears the hallmarks of colonialism (Doughty 2000). British colonial officials introduced eucalypts alongside other exotic species as part of inter-related industrial, commercial and conservation policies. These policies recognised eucalyptus species as fast-growing hardwoods with multiple uses, not just as sources of timber for construction or firewood and charcoal, but also as windbreaks, soil-stabilisers, or boundary markers. Such properties and uses proved especially appealing when it became clear that the deforestation and land degradation caused by dispossessing indigenous populations of their land, hemming them in 'native labour reserves', and placing hitherto communal lands in the hands of private owners undermined the productivity of the early 20th century settler-economy (Cheboiwo et al. 2016). Hence, as part of the African Land Development Project (1946–56) and the Swynnerton Plan (1954), the colonial government promoted eucalyptus cultivation and distributed seedlings. As early as 1949, at least in the highland 'reserves' of present-day Kisii and Nyamira counties, eucalypts had become so widely popular that local Forest Department tree nurseries struggled to meet local demand.³

Following independence in 1963, eucalyptus cultivation expanded significantly. The Kenya Forestry Policy of 1968, which in many ways marked a continuation of colonial forestry policy, pursued reforestation and afforestation not just by establishing or extending large closed-canopy forests, but also by supporting small-holders in rural areas to plant trees on their farms. Subsequent records indicate significant country-wide gains in woody biomass, especially as a result of farm forestry (Luukkanen 1996). Neither old nor recent surveys (e.g., MENR 2016) disaggregate tree or forest cover on a species-by-species or genus-by-genus basis. Yet there is a broad if often muted recognition of eucalyptus species as dominant. This comes through in expressions of concern around 'biodiversity' and the fact that, much as small-holder farms typically feature a variety of trees, this variety is limited and often, particularly in highland agricultural areas, heavily skewed towards dominant eucalyptus species. Policy assessment and strategy reports code such species as 'commercial', reflecting their commercialisation over recent decades (Kenya Forest Service 2009).

However, the classification of species as 'commercial' in policy reports exemplifies a techno-scientific and economic valuation approach, which can sometimes overshadow other forms of

knowledge or values associated with those species. This resonates with the broader theme of how dominant knowledge systems, often rooted in colonial thinking, shape scientific and policy discourse. The 'coloniality of knowledge' often prioritises Western scientific perspectives, leading to the framing of resources in terms that align with economic exploitation rather than holistic ecological or cultural understanding (Mohtat and Khirfan 2023; Cummings et al. 2023; Pickering et al. 2023).

Sold as raw materials for electricity transmission poles to Kenya Power or as firewood to local tea factories, eucalyptus trees have indeed become significant sources of income. In settings where saving is difficult, not least as incomes are low and irregular, a decade-old eucalyptus woodlot could yield notable lump-sums, enough to pay for school and university fees or finance bridewealth payments and marriage costs. Yet many small-holder farmers have grown up tending to eucalyptus monoculture wood-plots that they would later convert into other forms of value and wealth, such as education credentials or indeed families and kinship. At the grassroots level, then, the history of eucalyptus commercialisation has been driven by motivations that are as much social and cultural as they are material and economic. Any policy initiative on eucalyptus cultivation ought to attend to the complexity of these motivations and, more broadly, the historical links between the commercialisation of eucalyptus and everyday projects of social reproduction. Yet such an initiative, let alone discussions about how best to address the problem of eucalyptus over-cultivation, has been slow-coming. This is despite ample evidence of the problems that eucalyptus cultivation can cause, trigger, or amplify.

Eucalypts in contemporary policies

While hardly unique to Kenya, the relative neglect of eucalyptus monoculture and dominance as a socio-ecological problem in local environmental policymaking is nevertheless striking, considering precedents elsewhere. Similar neglect, and a similar two-fold valuation of eucalypts as both ecologically and commercially valuable, has been seen in cross-cutting conservation and economic development policies and programmes pursued by international organisations in partnership with local governments elsewhere. Eucalyptus cultivation has taken pride of place in these programmes, which have proved highly controversial and galvanised what is now known as 'the great eucalyptus debate', as part of which the global evidence base on eucalyptus cultivation has expanded considerably.

In South and Southeast Asian contexts, many of the eucalyptus-centred social forestry programmes financed and promoted by the World Bank and the UN Food and Agriculture Organisation

(FAO) in the 1980s became lightning rods for protest and unrest. Subsequent ecological audits found that eucalypts use an excessive amount of water (especially when young), deplete soil nutrients (especially if harvested in short rotation), and can adversely affect nearby crops, including through the release of growth-inhibiting toxins (Poore and Fries 1985; Shiva and Bandyopadhyay 1987). Sociological and political-economic assessments of the impact of these eucalyptus-centred social forestry programmes found that they exclusively benefitted the better off and amplified popular immiseration, for example by reducing the availability of agricultural land for food production, choking the undergrowth and biodiversity that supports livestock, re-shaping local markets as sources of primary resources for larger and often external industrial users, or enabling transfers of public or common land to private corporations (Raintree 1996; Casson 1997).

In Kenya, environmental activists such as Nobel Prize laureate Wangari Maathai spotlighted similar ecological and socio-economic forms of evidence regarding the negative effects of eucalyptus over-cultivation (Maathai 2004). Yet the uptake of such evidence in environmental policymaking and management has been limited and contradictory, at best. One major obstacle has been the lack of coordination between Kenyan environmental governance structures, which have pursued discordant objectives at cross-purposes. Historically, the Ministry of Environment, Climate Change and Forestry and its implementation and enforcement arm, the National Environment Management Authority (NEMA) have discouraged eucalyptus cultivation, citing risks to water security, but without enforcing a long-standing legislative ban on planting eucalypts in riparian or wetland areas (Maina 2024). Similarly, the Kenya Forest Service cautions against eucalyptus cultivation alongside rivers and in water catchment areas. However, unlike NEMA, the KFS has downplayed public anxieties about broader risks to water security and encouraged eucalyptus cultivation, including judiciously situated monoculture plantations (Kenya Forest Service 2009). Much like the preceding colonial and early postcolonial Forest Department, the KFS—established under the Forest Act of 2005 as a semi-autonomous state authority with representation from multiple government ministries – has regarded eucalyptus cultivation as necessary to meet commercial timber demand and reforestation targets (cf. Himberg 2011: 121-22; Hohenthal et al. 2015: 232). Amid the resulting ambiguity and confusion, eucalyptus cultivation has continued unabated and unregulated.

Similar contradictions exist across legislative prescriptions meant to conserve riparian land by restricting farming, tree-planting, and construction near watercourses. Different laws prescribe different buffer widths—from as little as 2 meters to as much as 30 meters. In the absence of a unified standard and record-keeping (notably flood level and GIS data), developers and cultivators exploit legal loopholes, leading to widespread encroachment. Compounding the issue is the lack of coordination between relevant agencies such as NEMA, county governments, and the Water Resources Authority. This has

resulted in selective enforcement, stalled demolitions, and overdrawn legal battles. Riparian land conservation remains out of reach and, even in urban settings, eucalyptus over-cultivation and in many instances, monoculture is a major source of land degradation. In 2021, 29% of riparian areas in Kisii Town were covered by eucalyptus trees, marking a 4% increase since 2005 (Omollo and Ogendi 2023).

Such bureaucratic incoherence and administrative failure is emblematic of the state of play in Kenyan climate and environmental policymaking. Although commendable and path-breaking, Kenyan environmental and climate policies remain disjointed, partially if at all implemented, and silent on key issues (Nyerere et al. 2021). Eucalyptus over-cultivation and monoculture is one such issue. The national government failed to implement its policies, particularly those that explicitly seek to regulate eucalyptus cultivation. The county governments, since coming to effect in 2013 following the 2010 constitution, have adopted but have been unable to implement the national policies. Furthermore, some of these policies appear to overlook the risks of eucalyptus monoculture altogether. For example, there is no mention of eucalypts or genus- and species-specific planting guidance on private land in legislation that explicitly mandates reforestation and afforestation programmes (Forest Conservation and Management Act 2016) or that establishes grounds for such programmes to be understood as carbon sequestration and mitigation or adaptation measures in a changing climate (Climate Change Act 2016).

Other legislation empowers authorities with monitoring and enforcement prerogatives, but in underspecified ways that typically do not address the problem of eucalyptus over-cultivation head-on. For example, the main law that governs environmental conservation and management requires entities initiating a policy, project or programme to commission and submit an 'Environmental Impact Assessment' to NEMA for review (Environmental Management and Co-Ordination Act 2015). However, this only applies to large-scale initiatives that pose obvious risks. Smallholders are implicitly unaccounted for, despite the significant cumulative risks of their individual actions.

Other examples include authorities that can mark off particular areas and, in theory, control whether and how citizens engage with them. The Water Resources Authority may designate catchment, groundwater, or basin areas as 'protected', but its regulatory powers are unclear and limited when it comes to planting trees in proximity to water sources (Water Act 2016). Similarly, even though county governments can issue land preservation orders requiring the removal of vegetation or the control of afforestation, a theory of citizen compliance and how it may be achieved is underdeveloped (Agriculture and Food Authority Act 2013). These and other acts establish some scope for citizen participation in policy formulation and the management of natural resources, but the mechanisms through which public engagement and participation should translate to

policy compliance are not provided. Two problematic assumptions about compliance stand out:

1. that citizens will comply with policy simply because legislation requires them to do so;
2. that citizen compliance is not contingent on public participation.

An exception to the pervasive silence on eucalyptus over-cultivation is found in the Farm Forestry Rules (2009). This legislation does not stop at specifying that ‘the species or varieties of trees planted should not have adverse effects on water sources, crops, livestock, soil fertility and the neighbourhood and should not be of invasive nature’. In section 4(2), it goes on to say that ‘no agricultural landowner or occupier shall grow or maintain any Eucalyptus species in wetlands and riparian areas’. However, there is no further specification on how to address circumstances in which eucalypts *are* found to be growing in such areas. The most the act has to say about citizen compliance concerns another requirement entirely, that of a minimum 10% tree coverage on agricultural land, which authorised inspectors may enforce – the act stipulates – by serving farm owners a ‘farm forest establishment’ notice. Moreover, there is no specification on how to square the ban on eucalyptus species in proximity to water sources and catchment or wetland areas with afforestation targets. This leaves the door open to conflating eucalyptus species with other tree species, regardless of where they are planted, as long as a certain proportion of territory is under tree cover.

Such conflation is commonplace, not just in Kenyan national environmental policy frameworks but also at a global level as well. For example, The African Forest and Landscapes Restoration Initiative (AFR 100), launched at COP21, seeks to restore 100 million hectares of degraded and deforested land by 2030. In Kenya, the Presidency has been encouraging citizens to plant trees to achieve an ambitious 30% tree cover target by 2032. Neither of these initiatives highlight the risks and repercussions of eucalyptus cultivation. Indeed, they reflect a broader tendency in global environmental policy to sweep under the carpet inconvenient truths regarding the socio-ecological consequences of specific trees in specific contexts, and instead uphold the misleading assumption that more and any kind of trees anywhere in any ecological system always benefit local ecologies, livelihoods and the climate (German 2022).

The situation is different at county level, and especially in highland agricultural areas. Kisii and Nyamira counties, for example, as part of their prerogatives for environmental policymaking and policy implementation under the 2010 constitution and the subsequent transition to a devolved system of governance, have sought to clamp down on eucalyptus cultivation and impress upon citizens the importance of

restricting its cultivation to hilltops, well-away from valley springs, rivers and marshes. County officials representing previous and current regimes have repeatedly urged citizens to remove eucalyptus trees from riparian and wetland areas (Kisii County Government 2019; Nyamira County Government 2025). Campaigns to forcibly remove and implement local and national bans on eucalyptus trees in such areas have been underway, led by county governments in collaboration with local administration officials as well as NEMA and police officers. Yet despite the wide coverage of these campaigns via diverse media (including radio, television stations, and social media), these campaigns have proved by and large inconsequential. Why?

Some of the reasons shine through the sub-text of Kisii and Nyamira counties’ Climate Change Action Plans, developed as required under their respective Climate Change Acts (2021). In these documents, citizens are implicitly represented as ignorant and lacking awareness of the environmental risks associated with eucalyptus cultivation. Hence, ‘awareness creation’ campaigns (Kisii County 2023; Nyamira County 2023: 37) feature as critically important actions which can help deal with the problem of eucalyptus over-cultivation. Furthermore, such campaigns feature as the only concrete action (alongside underspecified invocations of ‘capacity building’), suggesting limited consideration of the complications associated with policy implementation. Citizens may be aware of the ecological risks associated with eucalyptus, but if they depend on these trees for significant lump-sums at critical moments in their lives then why would they uproot them? Are there any alternatives to eucalyptus trees which they could convert into similar if not greater incomes? Such questions are left unaddressed.

Overall, then, Kisii and Nyamira counties’ climate action plans evidence a top-down approach where citizens are viewed as needing education rather than as partners in environmental stewardship with experience and knowledge of their own. To be sure, public participation is – ostensibly – a feature of these action plans. They are the product of ‘multi-stakeholder participation’ including ward-level citizen consultation, and they establish local participatory governance structures such as ward-level climate change planning committees (Kisii County 2023; Nyamira County 2023). However, at least as regards the substantive issue of eucalyptus monoculture, citizens and communities at the grassroots have not had a meaningful say in policy formulation, nor in how extant policies ought to be implemented. This is contrary to the provisions of the Kenya Constitution 2010: Article 10 establishes public participation as a national value and principle of governance; and Article 232(1)(d) stipulates ‘the involvement of the people in the process of policy making’.



The politics of evidence and knowledge

The state of play in Kenyan environmental policy, therefore, contradicts legislative provisions for public participation and engagement. Existing national and county-level legislation formally recognises the role of local communities and traditional knowledge of ecological systems in environmental governance. Community Forest Associations (Forest Conservation and Management Act 2016), Water Resource User Associations (Water Act 2016), and other community groups (Kisii County 2023; Nyamira County 2023) should and can, in theory, participate in policy design and implementation. However, this process is historically fraught.

Provisions for public participation and engagement are undermined by entrenched bureaucratic structures and knowledge hierarchies that marginalize local voices. Decision-making power remains centralized and local ecological knowledge has been dismissed as anecdotal or unscientific. This asymmetry in knowledge recognition and power not only perpetuates historical injustices rooted in colonial land and resource appropriation but also obstructs meaningful dialogue and co-management. The result is a governance system that privileges economic objectives—such as commercial forestry—over environmental justice and the lived experiences of communities directly affected by resource degradation. Consider, for example, the following intervention from a Kenya Forest Service official responding to Taita Taveta community concerns around the water-depleting properties of eucalyptus trees:

I am not here to protect the eucalyptus trees. I want to give a scientific view on this issue. Eucalyptus does use a lot of water, that's the reality [...]. But one eucalyptus grows very fast, so if it grows so fast, it has to get enough water proportional to its growth rate, so the more water it takes, the faster it grows. [...] Therefore, I dismiss the myth that it uses more water, it only uses enough water to sustain its growth rate, but it does not use excess water. [laughter in the audience] It also transpires more water into the environment. So, it enhances the rainfall pattern. So, removal of eucalyptus should be gradual, the moment we clear all the eucalyptus, we shall have tampered with stemflow. Once we tamper with stemflow, then we have tampered with groundwater storage, because all the water will

go to seas and ocean. So, we need to remove the trees gradually, so that we shall have our recharging power. [...] We plant them for reason to get maximum returns. Eucalyptus were brought so as the Kenyan government could get timber at the shortest time possible, it was not our wish, the indigenous trees can't cover for the rate we're using timber. (District forest officer, Wundanyi workshop 2014, cited in Hohenthal et al. 2018: 11)

The officer's statement illustrates how Kenya Forest Service officials distanced themselves from local concerns. While claiming neutrality, he defended eucalyptus trees using official guidelines that emphasize water efficiency and economic value. This framing obscured the trees' high absolute water consumption and dismissed local experiential knowledge. It also neglected the fact that while eucalyptus trees perspire like other trees, the water vapour they generate may result in rainfall elsewhere. Such interventions justified inaction and perpetuated power asymmetries, marginalizing community voices. The officer's 'scientific view' thus masked deeper issues of environmental injustice, historical dispossession, and unequal benefit-sharing, reinforcing a governance system that weaponised the equivocality of technical and narrowly defined 'scientific' knowledge while sidelining grassroots understanding of local ecologies (Hohenthal et al. 2018).

Natural science research on eucalyptus cultivation features similar discursive appeals to 'scientific knowledge' and 'evidence' to legitimise specific policies that may be at odds with local community interests and perspectives. Take, for example, a positivist study that recommends that agriculture and forestry extension officers advise smallholders to intercrop eucalyptus trees with indigenous tree species, legumes, or other understory species. This recommendation stems from experimental evidence, which demonstrates that the negative implications which eucalyptus trees can have for biodiversity are not monolithic. Monoculture unequivocally smothers surrounding flora, while inter-cropping can obviate this outcome. However, an important assumption sneaks in the science-to-policy communication here. Because smallholders could derive material and economic benefits from understory vegetation, then surely they will think intercropping eucalypts will be 'economically and socially preferable' (Otuba 2012: 14). In effect, the study makes a policy recommendation on a thin evidence base, comprising a particular kind of experimental evidence about biological and ecological processes and an unsupported assumption about the social dynamics associated with smallholders' reception of the recommended policy.

By and large, the evidence base on eucalyptus cultivation is implicitly 'antipolitical' – not in the sense of an opposition to politics or governance, but rather in the sense of framing fundamentally social and political issues in the depoliticizing idioms of supposedly neutral technical expertise (Ferguson 1990). In other words, the implicit assumption is that scientific evidence straightforwardly translates to policy and desirable outcomes, without any mediation or negotiation across social divides and without addressing the fundamentally political questions (e.g. around inequality, resource distribution, trust in institutions) that such mediation or negotiation typically raises.

To be sure, environmental science research has produced highly valuable insights on the risks as well as the opportunities eucalypts introduce in surrounding ecologies and economies. Consider, as a further example, a study of 'push-pull' agroforestry techniques employed in western Kenyan farms. It found positive and mutually reinforcing associations between agricultural output and carbon sequestration only on cropland where eucalypts were not the dominant tree species, in line with knowledge about eucalyptus' allelopathic effects (Imbaya et al. 2024). Another study found that, provided they are established on already degraded land, well away from water sources, short-rotation eucalyptus monoculture plantations could provide renewable primary materials for a thriving Kenyan wood-pellet production industry, which creates economic value while promoting forestry conservation and the energy-efficient use of woody biomass in Kenyan households (Jacobson and Ciolkosz 2020). But how exactly might these findings guide policy formulation and implementation? How exactly will policies result in desirable outcomes? Desirable for whom? The literature is often silent on these questions.

Studies that do consider these questions are few and far between. A notable exception is a 2005-2006 research project which commendably sought to bring local communities in conversation with policymakers with a view to design evidence-based and consensually formulated forestry conservation policies in the Kenyan Taita Hills (Githiru et al. 2011). Moreover, it generated interdisciplinary primary evidence from ecological surveys as well as sociological surveys probing local communities' internally diverse views on conservation initiatives and human-forest interactions. One of the notable action points resulting from the project was the conversion of government-owned 'exotic' tree forests – including in areas known for eucalyptus monoculture plots (Omoro et al. 2013) – into indigenous species forests. Yet, despite a well-developed and a dialogically co-produced plan of action in the short-term, there is evidence to suggest that the project's medium to long-term ambitions remain elusive. A recent survey of Taita Hills forests based on satellite imagery dated 2003 to 2018 found an overall decrease in indigenous species forests, defying both conservation efforts as well as logging bans (Teucher et al. 2020). Why did this innovative and promising project fall short of reversing, or at the very least bucking, the trend of losing indigenous species forest to exotic species such as eucalypts?

Again, the tacit politicization of evidence and knowledge in 'anti-political' logic may be at fault. 'Several [community] respondents' cited 'poor law enforcement as a threat to the forests' but the authors dismissed such concerns based on personal observations regarding 'notable improvements in enforcement' following the restructuring of the Forest Department into the Kenya Forest Service along with the 'enactment of [a] new Forest Law' (Githiru et al. 2011: 265). While the reported concerns may have concerned illegal logging, it is nevertheless striking how easily the internal operations of local authorities fell by the wayside. The evidence of the commercial importance of eucalyptus plantations to KFS and other government authorities collected in 2014 and cited above (Hohenthal et al. 2018) indicates that more attention to the policy implementation apparatus would have been wise. What exactly are the institutional structures, constraints, and incentives within which local administrators and officials operate? How do they interact, cooperate or compete? How do they relate to citizens, researchers and local ecologies? These critical questions were not considered. In other words, the social relations and dynamics that mediate local governance and the science-policy interface remained obscured. 'The social', insofar as it constituted a known unknown, existed somewhere out there, beyond seminar rooms or public administration offices, within local communities to be consulted and surveyed. Ultimately, the point of these consultations and surveys was lending legitimacy to policy decisions primarily based on expert ecological modelling and technical forecasts of policy outcomes. In true 'anti-political' and technocratic fashion, the pathway from policy to outcome was underspecified, presumed asocial, apolitical, and likely – just because technical forecasts indicated it as such at a particular moment in time.

Knowledge borkerage

At a broad level, the foregoing case-studies highlight not just knowledge gaps on eucalyptus over-cultivation or on the mobilisation of evidence in policy implementation, but also the need for tighter and concertedly self-reflexive collaboration between researchers, policymakers and ordinary citizens. These issues are not unique to the eucalyptus-related science-policy interface. They feature in analyses of environmental and climate policymaking more broadly, not least in Kenya, and they also feature in literature on knowledge mobilisation and evidence-informed policymaking.

Recent scholarship on Kenyan environmental policies notes that building impact pathways requires the production and integration of multiple kinds of evidence, synthesised and made available in networks that criss-cross institutional and organisational boundaries (Bharwani et al. 2025). Scholars also recognise that knowledge syntheses and network building alone will not suffice. Three further mutually reinforcing agendas are critically important: (1) genuinely inclusive and democratic public

participation in policymaking; (2) multi-stakeholder engagement with authorities, organisations and institutions across different industry sectors and governance scales; and (3) probing the embeddedness of policy design as well as implementation in specific cultural and socio-political contexts (Courtney Mustaphi et al. 2019). The third agenda, as we have seen, remains the most elusive in policy formulation and implementation, especially as regards eucalyptus over-cultivation. This is despite an established body of research on public engagement, often highlighting the need to take indigenous knowledge seriously at the science-policy interface, and currently expanding in the wake of calls for the decolonization of environmental science and governance (Bharwani et al. 2025; Nyongesa et al. 2023; Mercy 2020). Recent work on the second agenda, the cross-sectoral and cross-scalar engagement of multiple stakeholder authorities and organisations, spotlights one element of a fresh idea on how to advance all three agendas: policy brokerage.

In political ecology and cognate fields, the concept of policy brokerage has re-emerged with the rise of the international climate finance market and, prior to this, 'Climate-Smart Agriculture' (CSA) – a policy agenda coined by the UN Food and Agriculture Organisation (FAO) in recognition of the inter-linkages between economic development, climate change, and food security. Officials representing institutions such as FAO, COMESA (Common Market for Eastern and Southern Africa), CGIAR (Consultative Group on International Agricultural Research) and the Climate Change Unit within the Kenyan Ministry of Agriculture have been organising policy design consultations and workshops with a range of stakeholders, from county governments to civil society organisations. Studies documenting these consultations and workshops have primarily discussed the different strategies that such officials pursue to broker or mediate the discordant objectives, competing interests, and mutual mistrust over agenda control between stakeholders (Faling 2019; Cramer et al. 2023). Less attention has been paid to the existence of different kinds of brokers, which are at present differentiated as supposedly non-partisan 'knowledge brokers' and 'policy entrepreneurs' with ideological commitments to (rather than business interests in) specific policies.

Scholarship on Kenyan environmental governance has not yet considered higher education institutions as policy brokers. This is despite multiple precedents of Kenyan universities taking climate action on and off campus (most notably through community outreach) and the widely and locally recognised potential of universities as facilitators of climate policy implementation and evidence-informed policy dialogues between citizens and state authorities (Nyerere et al. 2021, 2023). In part, this neglect reflects the relative dearth of research on how universities can contribute to environmental and climate policies, particularly in Global South settings (Nussey et al. 2023). The few cases of university-led policy brokerage thrown up by a systematic review of university responses to the global climate crisis highlight the importance of: reconceptualising the science-

policy interface beyond simplistic ideas of knowledge dissemination as a singular event and a foregone conclusion; holding space for multiple stakeholders to feel respected and heard for their diverse forms of expertise; attending to contextual political and policy factors as determinants of evidence uptake; and brokering trust across social and cultural divides through transparent communication (Nussey et al. 2023: 30-32). These general insights are eminently relevant for the problem of eucalyptus over-cultivation, even though this problem has not yet constituted the object of concerted climate action in Kenyan and other universities elsewhere.

To this end, universities and others interested in policy and/or knowledge brokerage may consult the expanding field of knowledge mobilisation for evidence-based policymaking. This field emerged from attempts to move beyond unidirectional and unilinear knowledge-to-policy ecosystems where researchers might either speak with or broadcast evidence to policymakers, and always at a remove from service users, ordinary citizens, and grassroots communities. While internally diverse, with early health research framing 'evidence' as a base for non-ideological decision-making (e.g., Cochrane 1972) and agriculture research highlighting community-engaged participatory knowledge structures as advancing agendas of social and political justice in international development (e.g., Chambers 1983), the field has since converged around a shared recognition of knowledge and policy ecosystems as entangled in broader social and political systems (Shaxson et al. 2012; Nduku et al. 2024; Sempé et al. 2025). In other words, efforts to share and mobilise knowledge for evidence-based policymaking are inherently value-laden and political rather than neutral and objective. They involve:

'Judgements about what knowledge to use and when, which are often fairly deeply embedded within assumptions about the validity of (different types of) knowledge, its interpretation in light of current events and the relative power of those producing and using it' (Jones et al. 2012: 130).

In this body of research, knowledge brokerage is conceptualised as a range of activities that facilitate agreement, dialogue, and engagement between multiple parties with different capabilities and potentially competing interests. These activities extend beyond enabling access to information and translating complex evidence into usable formats, to linking knowledge bearers, users and producers who would not otherwise meet, describing issues inclusively, formalizing collaborative engagement initiatives, and developing institutional mechanisms for incorporating emerging knowledge in policymaking. Crucially, knowledge brokering activities must be appropriate and responsive to their contexts: the differently positioned actors and institutions that make up or could strengthen knowledge-policy ecologies; conceptions of 'good' evidence and its patterned use in organisational and institutional cultures; the relative degrees of fragmentation, coherence, focus and consensus in the supply of and demand for knowledge. If tailored to their respective

contexts, knowledge brokerage can create the conditions of possibility for systemic change (Bielak et al. 2012: 11-21).

Where do we go from here?

The socio-economic significance and the environmental risks associated with eucalyptus cultivation appear no more reconcilable now than when globally recognised in the wake of the ‘great eucalyptus debate’ almost half a century ago. Multiple shortcomings in knowledge ecologies and policy environments explain why – at least in Kenya – this tension has remained unresolved.

In Kenyan environmental policies, eucalypts feature in patchy, fragmentary, often underspecified and sometimes contradictory ways. Moreover, there has been a paternalistic tendency to construe citizens as needing education on ‘scientific’ knowledge and evidence about eucalyptus cultivation while invalidating the expertise and knowledge that everyday experience yields. Relatedly, some authorities and officials have drawn on ‘scientific’ evidence on eucalyptus cultivation in anti-political or depoliticizing ways, partly to justify the state’s material interests in eucalyptus cultivation and partly to avoid discussion of the political questions inherent to both policy formulation and implementation.

However, these shortcomings are arguably symptomatic of the deeper problem here: the lack of meaningful public participation in policy formulation and implementation. True, ordinary citizens and publics have a growingly recognised albeit rarely realised part to play in policy formulation, especially following the 2010 constitution. However, in practice the understandings of how to formulate and implement policy – among government officials as well as environmental scientists alike – remain thoroughly technocratic and top-down. Formal knowledge derived through technical methods and expert approaches is assumed to constitute a sufficient basis for policymaking, and the resulting policies are assumed to generate change simply because they are official policies.

While serious, these shortcomings are far from intractable. One strategy for overcoming them is to reframe communities as ‘knowledge/skill holders’ instead of ‘stakeholders’. This reframing is crucial for achieving epistemic justice and decolonizing knowledge practices (Cummins et al. 2024; Weir et al. 2024). The term ‘stakeholder’ often implies a passive role, where communities are recipients of decisions or mere contributors of data, rather than active participants with inherent knowledge and agency. Instead, recognizing communities as knowledge holders acknowledges their ‘situated life experience and intergenerational heritage knowledge’ (O’Donoghue et al., 2019). Such knowledge provides deep historical baselines and practical insights often

missing from conventional scientific assessments. For example, in managing forest resources or sustainable land use, the practices and understandings of private forest owners (PFOs) or indigenous communities represent valuable resilience strategies and knowledge systems that need to be integrated into decision-making processes (Sanz-Hernández 2021; Löfmarck and Lidskog 2019; Stirling et al. 2023).

This perspective emphasizes ‘participatory knowledge’ and co-production models, where knowledge is generated through equitable partnerships between researchers and communities (Mohtat and Khirfan 2023). Such approaches move beyond merely consulting communities to genuinely involving them in research design, data interpretation, and decision-making, thereby validating diverse ways of knowing and sharing power. This is particularly vital in fields like environmental management and sustainable development, where the integration of traditional ecological knowledge (TEK) with scientific data leads to more robust, legitimate, and effective outcomes (Löfmarck and Lidskog 2019).

Knowledge ecologies and policy environments that genuinely include and listen to a variety of knowledge-holders – especially ordinary citizens and broad communities – can galvanise actual change on the ground. This, ultimately, is the aim of the recently established PAR group on eucalyptus monoculture. Based in Kisii and Nyamira counties, the group straddles the two local county governments, Kenyatta and Kisii universities, and national environmental authorities such as NEMA and KFS. To achieve its aim, the group is conducting research at two levels:

1. **publicly-engaged research on popular eucalyptus cultivation practices and citizen views on extant policies, their implementation, and policy alternatives;**
2. **meta-research on the group’s practices of internal collaboration and public engagement.**

Thus structured in a reflexive way, the PAR group’s activities are set to address the kinds of questions widely deemed as key to the brokerage of knowledge and innovative evidence-based policymaking. Later down the line, the group – alongside its partners and collaborators within and outside institutional settings – may explore whether and how to amend the legislation or institute appropriate implementation procedures.⁴ But regardless of the resulting plan of action and chosen pathway of change, its success will ultimately be contingent on the recognition that citizens and policy beneficiaries are not merely recipients of policy interventions but active participants whose behavioural responses shape implementation outcomes.



Endnotes

¹ The commonest eucalyptus trees in Kenya are *Eucalyptus saligna* (known as 'blue-gums') and *Eucalyptus globulus* along with *Eucalyptus camaldulensis* and *Eucalyptus grandis*. Distinguished as fast-growing hardwoods with high biomass yield, these species mark a small subset of the broader *Eucalyptus* genus which comprises hundreds of species of trees and shrubs with diverse rates of growth, wood density, oil content, and ecological impact.

² Details about the project are available at <https://www.climate-uni.com/research-projects>.

³ Kenya National Archives, AK/2/33, 1949 'Special Native Affairs Report, Nyanza Province'

⁴ Some potential legislative amendments to explore are less complex and could include: the establishment of species-specific planting guidelines, especially for afforestation and reforestation programs; the clarification of enforcement and implementation mechanisms across different state structures. Legislation that addresses eucalyptus monoculture may need a more ambitious, cross-sectoral and problem-specific rather than sector-specific or domain-specific legislative framework. The obvious domains to consider are water and land use, agriculture, and forestry. Emerging climate action strategies at national and county levels are already creating avenues for dialogues across these domains. But there are other non-obvious domains which have yet to be included in these dialogues. One which should be considered in eucalyptus-related debates in Kenya is the local manufacturing and industry. This would create opportunities to consider: 1) the changing role of eucalypts in timber markets. In 2024 over six million eucalypts have been cut and sold to businesses that process the timber and export it for sale in Chinese and Indian wood veneer markets (Ngana 2024; Yambo and Ngana 2024); 2) alternative entrepreneurial and industrial uses for eucalypts which would reduce incentives for monoculture while creating income opportunities. Eucalypts are known sources of tannins, oils and aromatic chemicals used in the manufacture of throat lozenges, mouthwashes, perfumes and soaps (Doughty 2000).

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