



# Limits of cultural and traditional mechanisms in tropical forest conservation

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## Abstract

The coastal forests of Kenya represent a global biodiversity hotspot. Most of the forest remnants are small fragments of sacred forest, known as Kaya forests, while there are also few larger protected areas. Historically, the Kaya forests were preserved through traditional taboos and rules. However, ecological, social and economic changes have made this traditional type of protection less effective. In a workshop conducted at the Pwani University in coastal Kenya, we discussed and analysed the multiple reasons why traditional conservation practices are increasingly becoming less effective. Cultural protection upheld by Kaya elders, the custodians of the sacred forests, is challenged by modern lifestyle. The elders are increasingly isolated from the community since the younger generation considers the traditional rules as outdated. In addition, nowadays, the governmental institutions officially responsible for forest conservation and land management, do not formally integrate the elders in their decision-making. However, to preserve sacred forests, strategies need to be adapted to these changing social circumstances, as was shown by our workshop discussions. Closer collaboration between Kaya elders and other stakeholders is essential to reconcile the varying economic and conservation interests. Governmental recognition of Kaya people and their livelihood needs, traditional knowledge and practices will be a basis for achieving the sustainable management and conservation of Kaya forests.

**Keywords** Biodiversity hotspot · Kaya forest · Forest conservation · Ecosystem services · Culture · Stakeholders · Elders · Network

## Introduction

In large parts of Africa, severe demographic pressure and economic interests have been leading to the large-scale destruction of natural habitats (Mather and Needle 2000). This particularly affects forest ecosystems, which have been degraded or transformed to other land uses over the past decades (Curtis et al. 2018). Last remnants of forest mostly occur

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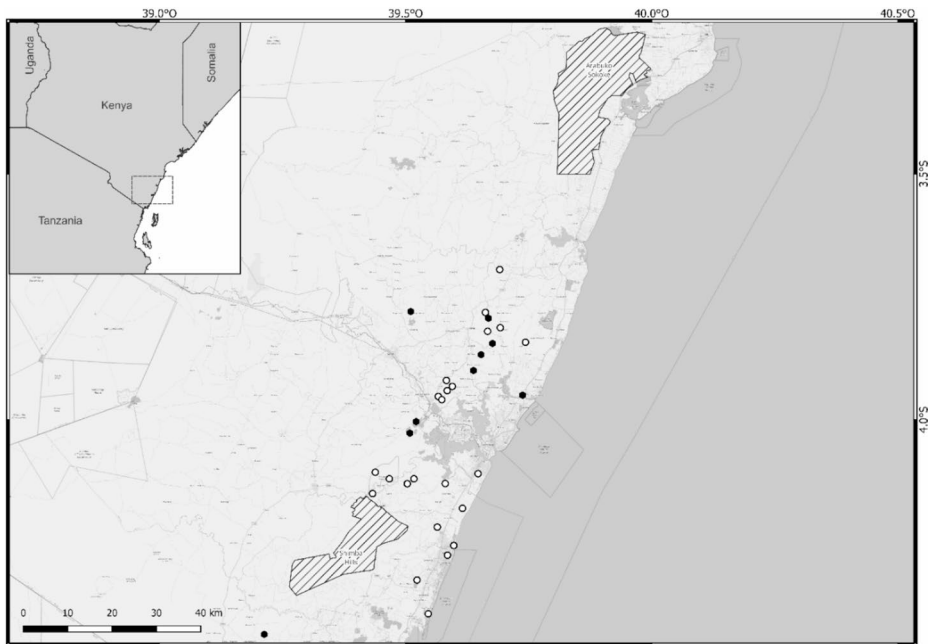
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in protected nature reserves, but also exist as forest islands that have been protected and thus preserved for cultural reasons (Metcalf et al. 2010). Culturally important ecosystems, such as the numerous sacred forests in East Africa, have survived due to rituals, taboos and ancient rules (Matiru 1999; Beltrán 2000). However, as these rules are lost or eroded over the past decades, the forests are under increasing pressure and suffer from habitat destruction. Modernity and cultural homogenisation, increasing demographic pressure, and short-term economic interests in combination with high poverty rates are some of the factors that undermine the cultural preservation of sacred forests (Brand et al. 2021; Splash 2021, Sutherland et al. 2023). In consequence, there is a gradual loss of habitats, biodiversity and functions, and a reduction in local traditional knowledge, cultures, rules and practices (e.g. see Lyver et al. 2019; Marchant Santiago et al. 2022; Levis et al. 2024).

In coastal Kenya, the East African dry coastal forests prevail in two large protected areas, the Shimba Hills National Reserve (19,242 ha, established in 1968) and the Arabuko Sokoke National Park (41,763 ha, established in 1932). In addition, there still exist many small forest patches (the majority less than 100 ha in size) scattered across coastal Kenya (Fungomeli et al. 2020a, b) (Fig. 1). These small forest fragments are sacred forests, which have been preserved by the Mijikenda people for generations (Shepherd-Walwyn 2014; Fungomeli et al. 2020a). ‘Kaya’ means ‘home’ in the Mijikenda language and oral traditions tell that their ancestors once lived in hidden forest villages as protection from hostile tribes (Spear 1978; Robertson 1986; Nyamweru et al. 2008).

As in other parts of the world (Sheil et al. 2015), the Kaya elders play an important role in preserving the Kaya forests, a nucleus of cultural identity and integrity. The elders organize



**Fig. 1** East African dry coastal forest patches, with Shimba Hills NP (in the south) and Arabuko Sokoke NP (in the north) and sacred Kaya forests (white and black dots) around the city of Mombasa. Black dots indicate Kaya forests from where elders took place in our workshop at Pwani University (located in Kilifi, south of Arabuko Sokoke Forest). Small inlet map shows the location in East Africa

cultural activities and manage the society. The elders council is regularly discussing social issues and has so far regulated the use of the forest resources, such as wood (Shepherd-Walwyn 2014). However, the relevance and impact of the Kaya elders are becoming increasingly undermined due to various reasons (Kibet and Nyamweru 2008; Habel et al. 2023).

Despite of small habitat size and frequent forest disturbance (Fungomeli et al. 2024), Kaya forests are important refuges for a large number of endangered plant and animal species until today, such as the Kola species (*Cola octoloboides*) and the Golden-rumped Elephant-shrew (*Rhynchocyon chrysopygus*) (Robertson and Luke 1993), and other organisms including insects (Fungomeli et al. 2020a, b; Habel et al. 2024; Schwarz et al. 2024). As these small forest patches are scattered along the coastal region, they are assumed to act as important corridors and stepping-stones for many forest species migrating through the landscape. This might support long-term persistence of biodiversity and ecosystem functioning (see Siqueira et al. 2021). Kaya forests also provide major ecosystem services and goods, such as water retention, microclimate stabilisation, timber, and medicinal plants (Glenday 2008; Habel and Ulrich 2020).

The Kayas are therefore of great cultural and ecological relevance and should be preserved for society and an intact landscape and environment. Obviously, there have been major changes both socially and in terms of legislation. For these reasons, we have brought together representatives of governmental organizations (7), non-governmental organizations (2), university researchers (3) and elders (22) from 11 different Kaya forests of Kilifi and Kwale counties in a three-days workshop at Pwani University (Kilifi, Kenya) in August 2024 (all participating organizations are named in the acknowledgement section). Both, the elders (who used to be responsible for Kaya forests) and the governmental institutions (who currently embody the main responsibility and the legislative power) were deliberately invited to this event. The scientists (university members) enabled a structured exchange and documentation of the results. Based on the workshop presentations, discussion and group work with the invited participants, we will elaborate on the following research questions: What are major challenges for the conservation of the sacred forests in coastal Kenya? And, how to transfer cultural tradition into effective forest conservation?

## History of sacred Kayas forests

Generally, cultural forests have several important functions. They represent a home for people and a valuable retreat. At the same time, they are important places to celebrate rituals and traditions, and are therefore of great social relevance. Thus, cultural forests often represent a social network and provide stability for the people living there (Kibet and Nyamweru 2008). And, they provide a large number of valuable resources on which the local population depends and lives. Thus, people living in and around these forests are often closely connected to these ecosystems, both, emotionally and in terms of resource provision (Githitho 2016; Hartel et al. 2023).

In Kenya, the Kaya forests have a very long tradition, and were once owned by the Mijikenda ('nine tribes') people (Githitho 2016; Mutoro 1987; Helm 2004). These villages gave protection from raids by the neighbouring Maasai and Oromo people (Krapf 1860; Johnstone 1902; Werner 1920) and were preserved by the Mijikenda people as the burial place of their ancestors and repository of the secrets and magic of the community. In the late 19th and early 20th century, the Mijikenda people settled in surrounding areas as conditions

became more secure when Kenya became a British colony (Werner 1920; Spear 1978). The forests remained important sanctuaries for the people, where local elders conducted traditional cultural activities and ceremonies and controlled the local use of forest resources (Nyamweru et al. 2008). The authority of the elders was rooted in the cultural recognition of their roles as well as fear and respect of cultural taboos. However, since the 1960s, population growth, migration into towns for employment, western education, and infrastructure programmes have contributed to alienating particularly the youth from traditional beliefs and customs (Habel et al. 2023). At the same time, the Kayas began to attract attention by the Kenyan state as examples of natural sites, which had been successfully protected by traditional beliefs (Robertson 1986; Robertson and Luke 1993). Currently, 43 of the more than 50 Kayas scattered along the Kenyan coast are legally protected as National Monuments and forest reserves, while around a quarter remains ungazetted, i.e. are not officially surveyed and protected (NMK CFCU Kaya forests status report 2022).

Gazettement does not completely take over the management and conservation of the Kayas. Rather it was intended to back-up ongoing activities by elders and community members and to intervene in cases of destruction. However, the large number of Kayas and the spatial distance between sites made state control increasingly challenging (Githitho 2024). This failure of effective protection prompted different NGO-led initiatives (particularly the World Wide Fund for Nature, WWF), campaigning for the preservation of Kaya forests and resulted in a variety of conservation activities on the ground (Githitho 2016). Consequently, ten Kayas were designated as UNESCO World Heritage Sites in 2008 (Githitho 2016). However, UNESCO designations do not come with long-term support such as financial support (Fungomeli et al. 2024). This results in countless activities and efforts to conserve the Kaya forests, but these are poorly coordinated. And, the essential basis for efficient and long-term protection would probably be the support and initiatives developed and supported by the local population.

## Status quo and major challenges

Recognizing the conservation history of the Kaya forests, the workshop participants highlighted that despite of the gazettement and forest conservation initiatives as well as designation by UNESCO (see Table 1), forest destruction has continued for multiple reasons such as timber and fuelwood harvesting, economic and infrastructural development and mining activities. Below we enumerate the most important threats stated by the participants (elders of Kayas, representatives of governmental and non-governmental organizations):

- 1) Kaya elders have been losing traditional recognition and respect in their communities, which undermines the acceptances of traditional forest conservation and has even led to severe violence against elders (Haki Yetu Organisation 2023). The elders stated that it becomes increasingly difficult to implement the traditional rules for the use of forest resources due to, e.g., night-time tree harvesting activities, or the lack of legal means to caution the trespassers.
- 2) The elders merely act as volunteers who dedicate their time to forest conservation by patrolling the forest, interacting with GOs and NGOs, and carrying out education activities (Shepherd 2014). In addition to their traditional role as elder, they need to earn their own living, which can affect their level of engagement.

**Table 1** Conservation activities being conducted in Kaya forests until today as recorded during the workshop at Pwani University, Kenya, in August 2024

Activity	Kaya forests	Organizations involved
<b>Education</b>		
Training on indigenous seeds	Ribe, Kambe, Fungo	BGCI
Training on nursery, peace building and cohesion	Kauma, Dzombo, Rabai, Melzi, Mwira, Mtsakara, Mrima, Gandini	CGKI, KEFRI, NMK, KFS
Intergenerational knowledge transfer, hosting schools in the Kayas	Kauma, Gandini, Dzombo, Ribe, Rabai, Kambe, Melzi, Mwira, Fungo, Mtsakara, Gandini, Mrimaall, Gandini, Kauma	UNESCO, WWF, CGKI, NMK, DACOFA, NMK
Training on herbal medicine awareness	Rabai, Jibana	BGCI, KFS, WWF, elders
<b>Preservation</b>		
Salaries for guards	Ribe, Kambe, Fungo, Sanelinus	UNESCO
Colobus project, restoration and management of the forest	Kwale, Diani, Mtswakara	KEMSFED, NMK, KFS, WWF
<b>Restoration</b>		
Seed collection for tree cultivation	Ribe, Kambe, Fungo	BGCI, DKF
Tree planting	Ribe, Kambe, Fungo, Rabai	DKF, ICE
<b>Alternative income</b>		
Eco-tourism, clearing of pathways/renovation of houses and huts	Ribe, Kambe, Fungo, Dzombo, Gandini	WWF, UNESCO, DKF, Darwin, Ukal, NMK
Bee-keeping	Rabai, Jibanaa, Rabai, Chonyi	ICE, PI
Farming tree nurseries and selling tree seedlings	Chonyi, Mtswakara	NMK, KFS, KEFRI, WWF
Eco-tourism, cultural village	Rabai	WWF
<b>Training and strategies</b>		
Governance leadership workshop	Jibana	ICE, CGK, BGCI, KFS, KEFRI
Workshop on the gazetttment and legislation	Jibana	NMK, CGK, BGCI, KFS
Workshop on governance and advocacy of Kayas	Various Kayas	NMK, CGK, BGCI, KFS

The list does not attempt to be comprehensive. Listed are activities, locations and the organizations that conducted the activities. Activities were assigned to general topics. Abbreviations of organizations involved in funding, administration and/or implementation of respective activities: BGCI=Botanical Gardens Conservation International, KEFRI=Kenya Forestry Research Institute, NMK=National Museums of Kenya, KFS=Kenya Forest Service, WWF=World Wildlife Fund for Nature, DACOFA=Dzombo Adjacent Community Forest Association, DKF=Dedan Kimathi Foundation, ICE=Institute for Culture and Ecology, UNESCO=United Nations Educational, Scientific and Cultural Organization, PI=Plant International

- While most Kaya forests were gazetted as National Monuments, most do not possess clear border demarcations. This facilitates illegal use of forest resources and fosters encroachment, e.g., also by mining and infrastructure projects (Abuva 2017). The lack of clear land tenure and use right allocation can cause the exploitation of natural resources, and the destruction of sensitive ecosystems, as shown for many regions across the world (see Ehrhardt-Martinez 1998).

- 4) Various NGO activities have had some short-term positive effects, but in the long run a large variety of actors can cause institutional confusion about rights, duties and responsibilities. However, clear responsibilities and long-term perspectives are the prerequisite for effective land management and the preservation of resources and ecosystems.
- 5) Poor governance structures favour the systematic exploitation of natural resources in and around Kaya forests. Similarly, also in the near-by Arabuko Sokoke forest, poor governance structures and the confusion of responsibilities among institutions creates the background for forest destruction and the exploitation of resources (Shepherd 2014, Habel et al. 2017).
- 6) Non-sustainable use of (forest) resources such as wood (the prime energy source) and timber (for house constructions). This negative trend is observable for many regions in the tropics (Kibet and Nyamweru 2008). This challenge will only be solved when considering a pluralistic and inclusive Kaya Forest conservation approach (as described below).
- 7) There is a lack of state funding to contribute to forest protection, e.g., through forest demarcation on the ground, education campaigns at schools and village meetings or more permanent patrols. In addition, external donation is limited and lacks the permanent perspective.

### Steps towards effective sacred forest conservation

Elders have been of key importance for Kaya protection throughout centuries. In the modern world, however, they lack the necessary traditional respect, legal authority and financial resources to achieve this goal. To ensure the preservation of the Kaya forests, their role needs to be re-affirmed. At the same time, we need to think of how cultural heritage can be still relevant in the modern world and can be maintained as an agent for environmental protection. Consequently, conservation initiatives need to consider existing traditional forest governance structures and include the elders in a bottom-up approach. Moreover, establishing a network of elders forming a common voice would be essential. In our workshop, we identified various fields for action, to strengthen the role of elders, but also to establish a solid management of Kaya forests, as provided below:

- 1) Site security with clear boundaries, revoke of land title deeds awarded for Kaya land, signage (with signposts) along Kaya boundaries.
- 2) Restoration of the forests with indigenous trees and establishing buffer zones around Kaya forests (e.g. cultivating tree plantations) to reduce the pressure on the forest.
- 3) Establishing a network of elders from different Kayas to harmonize perspectives and activities, and to generate a common voice. This will create a good basis when articulating their interests to state organizations;
- 4) Inclusion of Kaya elders in governmental functions, such as visits of Kaya elders to the different governmental organizations involved in Kaya protection;
- 5) Strengthening interactions between the elders and the community to ensure the continuity of cultural life and the protection of the forest and to increase the acceptance of forest preservation by the wider community. First steps in this direction are presentations of elders at state schools and the involvement of young people and women in Kaya forest conservation;

- 6) Establishing mechanisms whereby the country and national government, as well as conservationists recognize and empower local people to manage and protect their forests (e.g. see Sheil et al. 2015).

### Traditional conservation in a modern world?

The main problem for the conservation of the Kaya forests is that the traditional protection mechanisms no longer function optimally due to changed socio-economic conditions. This has also been observed and reported for various other regions in the world (Fischer et al. 2015; Abson et al. 2017; Santiago et al. 2023). In view of Kaya conservation, it is crucial to make cultural traditions more relevant again by bringing them more into the focus of the local population and the coastal society as a whole. This could be achieved by combining traditional and scientific perspectives on forest conservation, highlighting the Kaya forests as a national heritage as well as groves of biodiversity that provide crucial ecosystem services. State educational institutions such as schools and universities could play a central role here (Habel et al. 2025).

Many of the knowledgeable elders have died and traditional institutions are under great strain. However, there is a need to advocate the recognition of their cultural values and practices. A closer co-operation between state organizations and the elders as pointed out above could support to create a better situation for Kaya conservation. Our example on Kaya forests provide insights into how traditional forest governance mechanisms can be relevant for forest conservation in rapidly changing societies (Biermann 2021, Djenontin et al. 2024; Shumi et al. 2019, 2023, 2024).

Against the background of rapidly transforming societies in Kenya, especially also in view of changes in the role of women and the younger generation, forest protection must be reorganized. This is why global nature conservation organizations plea for a thematic assessment of the underlying causes of biodiversity loss and the determinants of transformative change and options for achieving the 2050 Vision for Biodiversity (transformative change assessment) (Ibisch et al. 2019; Spash 2021; Visseren-Hamakers et al. 2021). It is time to enhance political willingness to care for nature and more genuinely recognize local people and their livelihoods, knowledge and experiences.

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**Data availability** No datasets were generated or analysed during the current study.

## Declarations

**Competing interests** The authors declare no competing interests.

**Ethical approval** Not applicable.

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