



Harmonizing multi-stakeholder interests to improve forest conservation in Southern Kenya

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Abstract

The cloud forests of the Taita Hills are valuable refuges for numerous endemic and rare animal and plant species. They also provide various ecosystem services that support subsistence farming. Due to the large-scale destruction and conversion of these species-rich natural forests into subsistence agriculture and plantations of exotic tree species, most of the natural cloud forest habitats have disappeared and ecosystem services have been significantly diminished. Despite numerous conservation initiatives, the destruction of the Taita Hills forest ecosystem continues, which also lowers livelihood quality of the local people. During a workshop with representatives of GOs, NGOs, researchers and representatives of the local community we identified potential factors which are essential to reverse this negative trend. We found that governance structures urgently need to be strengthened, and that the traditional conservation system needs to get transformed and revitalised. The basic prerequisite is a vital communication among generations, especially between the youth and the elders, as well as and improved communication of scientific knowledge to policy makers and the society. Furthermore, it is essential to harmonize stakeholders' mandates, policies and actions to efficiently restore this unique forest biodiversity hotspot, and to secure livelihood needs for the local people.

Keywords Forest conservation · Communication · Multiple stakeholders · Policies · Tradition

Introduction

The Taita Hills in south-eastern Kenya are the northernmost part of the Eastern Arc Mountains and have been originally entirely covered by cloud forest (Newmark 1998). The early genesis of this mountain chain has led to a very long-lasting geographical isolation, which has been the prerequisite for the evolution of numerous endemic animal and plant species

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that can still be found exclusively in this mountain region today (Rogo and Oguge 2000). This large number of endemic species in combination with the rapid destruction of the pristine cloud forest habitats by humans led to the classification of this region as a global biodiversity hotspot - the Easter Afromontane biodiversity hotspot *sensu* Mittermeier et al. (2011).

The once species-rich cloud forests of Taita Hills have been largely converted into agricultural land and tree plantations during the past four decades (Pellikka et al. 2009, 2013). During the colonial period, species-rich cloud forests were transformed into tree plantations with fast-growing alien species (Omoro et al. 2010). This profound transformation of ecosystems affects biodiversity and ecosystem services. For example, the water balance of the mountain region has been severely lowered (Hohenthal et al. 2015). Human population growth and partly inappropriate land management practices (intensified by land consolidation which started in 1963, the beginning of Kenya's independence) increased the pressure on the last remaining cloud forest patches. In addition, natural resources are being used in an unsustainable and inefficient way, such as the excessive extraction of firewood (still the dominant source of energy for the local people) and timber such as poles mainly made out of young trees due to inefficient construction practices of houses. Furthermore, excessive use of chemical pesticides and artificial fertilizers causes the decrease of pollinators and subsequently reduced pollination rates (Mwinzi et al. 2020).

Presently, only about 2% of the original cloud forest cover is still in place (Pellikka et al. 2009). Thus, 12 forest remnants still exist, most of them are very restricted in size and geographically isolated, with negative effects on biodiversity (see Wekesa et al. 2018, 2020). Increasing forest habitat fragmentation causes negative edge effects from adjoining open agricultural fields, and subsequently a lowering in habitat quality (Wilder et al. 1998; Cousseau et al. 2020). In the meanwhile, most forest fragments are characterized by exotic woody species (mainly eucalyptus, pines and cypress), and intense collection of fire wood and illegal hunting of animals. All forest fragments are surrounded by a partly degraded landscape, characterized by soil erosion, disturbed hydrology, and the invasion of exotic plant species (Teucher et al. 2020). Studies show that many organisms persisting in these disturbed and small forest patches suffer under environmental stress, such as the bird species Taita apalis (*Apalis fuscigularis*) (Borghesio et al. 2010), Taita thrush (*Turdus helleri*) and Cabanis greenbul (*Phyllastrephus cabanisi*) (Lens et al. 1999; Cousseau et al. 2020).

Besides the ecosystems with their species, the local people also suffer from this development. A few decades ago, the human population density in the Taita Hills was much lower than today. In 2009 the population density for the entire Taita Taveta area was 16.66 (284,657 inhabitants) and in 2019 already 19.86 (340,671 inhabitants) and thus pressure on natural ecosystems and (forest) resources was less (KNBS 2023, <https://www.knbs.or.ke/publications/>). In addition, tradition and culture have undergone a fundamental transformation with the loss of traditional land use practices. With the conversion of natural forests into exotic plantations, not only biodiversity is vanishing, but also numerous services provided by nature occur in a much reduced form. Currently, for example, the hydrology of the entire Taita Hills mountain system is severely disturbed and a large proportion of the original water sources have dried up during the past decades (Hohenthal et al. 2015). With intense deforestation, erosion of the topsoil has increased significantly and affects subsistence farming negatively (Erdogan et al. 2011).

For many years, different interest groups have been working to protect the remaining cloud forest in order to preserve habitats for rare animal and plant species, and to rehabilitate ecosystem functions (e.g. rehabilitation of water springs for the local human population and to preserve the Taita Hills as important water catchment for the entire region, including the dry lowland savannahs that directly depend on water sources from Taita Hills) (Githiru and Lens 2007). However, most of these measures showed only little overall effects, and could not counteract ongoing destruction of natural forest and a reduction of the promotion of the planting of fast growing exotic trees (see also Maeda 2012). The question therefore arises as to which adjustments need to be made to preserve 'an intact forest ecosystem and other natural habitats for nature and humans' (general aim – see below).

During a workshop with members of GOs, NGOs, representatives of the local community, as well as people from various fields of research, we discussed and analysed the current status and elaborated improvements for better protection of the resources of the Taita Hills. Out of the 20 participants, there were 8 from GOs (National Museums of Kenya and Kenyan Forest Research Institute), 5 of NGOs (TERRA - Taita Environmental Research and Resource Arc, NAC – Natural Africa Concern), 3 representatives of the local community (elders, member of a community forest association), 2 members from the local university, and 2 teachers. During this workshop, we first defined our general aim (see above). We subsequently elaborated potential measures and actions, which can be taken in smaller working groups – for the fields of 'culture and tradition', 'education', 'governance' and 'economic independence'. We visualized all aspects as synergy map, following the leitmotif 'what and who needs to change to create a positive impact for a positive future state'. The outcome of this working process is compiled in Table 1. In the following, we will report and critically reflect current shortcomings, and potential strategies which might help to better preserve nature and ecosystem services in Taita Hills.

Lack of implementation

A key driver leading to the destruction of the remaining cloud forests is high demographic pressure and the comparatively high level of poverty of the local human population. This joint situation often accelerates unsustainable land use and the over-exploitation of natural resources. Wood is still prime energy source for the local people, and is also essential for the construction and maintenance of houses. Numerous technical and economic solutions already exist to increase the efficiency of the use of these resources. In addition, various campaigns are focusing on the generation of alternative income sources (such as bee keeping, butterfly farming). Despite these impulses, the destruction of the remaining forest fragments is progressing in Taita Hills (Teucher et al. 2020). Until today, fast growing exotic trees are recommended and cultivated by governmental organizations, and used as a rapidly renewable source for raw materials, although the negative effects on the functionality of ecosystems and the landscape are well known. There already exist various strategies towards more sustainable land use and a rehabilitation of the Taita Hills do exist (see Himberg 2006, Githiru & Lens 2007), but have not been implemented until today. This is particularly due to the lack of communication and coordination among the different actors (at national level, County level, local institutions and groups of interests on the ground). In addition, with the transformation of the society, traditional knowledge and customs, including the largely locally adapted land management practices have lost relevance (Himberg

Table 1 Overview of challenges, potential changes, and specific actions to improve the current situation in Taita Hills, as identified during the workshop in Wundanyi (September 22–23 2022). The overarching goal aims to the long-term preservation of an intact cloud forest ecosystem, for nature and people.

Challenges	Changes	Actions
Incongruencies in policies and governance	<ul style="list-style-type: none"> • Clarification of owner-rights and mandates; • Implementation of existing laws and policies; • Inclusion and enforcement of the preservation of nature and cultural diversity in policies. 	<ul style="list-style-type: none"> • Gazetting forests, water catchments, forest shrines; • Control the use of natural resources to avoid its overexploitation; • Improve governance structures, reduce corruption.
Lack of information and knowledge	<ul style="list-style-type: none"> • Implementation of research findings in practical land and resource management; • Mapping of forest shrines, and the forest borders. 	<ul style="list-style-type: none"> • Translation of findings from research into practice; • Implementation of research on practice-relevant issues; • Trans-disciplinary research on culture and livelihood needs; • Capacity building for community groups for the conservation of cultural- and bio-diversity.
Weak forest management and nature conservation	<ul style="list-style-type: none"> • Improvement of the indigenous forest cover; • Enhancement of practices that lead to sustainable utilization of forests for livelihood support; • Gazette all forests patches, place forests under identical protection status. 	<ul style="list-style-type: none"> • Immediate benefits for forest and nature conservation; • Clear and sustainable forest management rules.
Vanishing cultural traditions	<ul style="list-style-type: none"> • Revitalization of cultural traditions that aims at improving livelihoods; • Change of attitudes towards nature and cultural diversity in governmental organizations; • Re-establishing cultural norms and taboos which enhances biodiversity conservation. 	<ul style="list-style-type: none"> • Production of traditional crops; • Establishment of nature-based enterprises (bee keeping, butterfly farming, tree nurseries); • Creating markets.
Communication gaps	<ul style="list-style-type: none"> • Creation of awareness for women, men, and the youth; • Improvement of collaborations among institutions; • Strengthen trans-generational communications to bridge from past to future. 	<ul style="list-style-type: none"> • Inclusion of all stakeholder of relevance; • Creation of awareness towards forest conservation and ecosystem functions, in schools and community based organizations; • Sensitizing elected leaders about forest and cultural diversity. • Establishing wildlife clubs; • Curriculum change in schools to implement the relevance of forests as ecosystem service providers; • Creation of communication platforms between youth and elders; • Excursions into the forest to demonstrate its biodiversity and functions; • Biodiversity exhibitions at schools, establishing community centres.

2011). Therefore, it seems to be high time to present the critical situation against the backdrop of collapsing ecosystem services to all stakeholders. In the following, we will identify existing communication gaps that urgently needs to be closed to improve the conservation of nature and resources, and will identify the most relevant topics that should be placed at the centre of policy.

Cultural and modern life

Cultural life have provided a functional system to efficiently conserve natural resources and ecosystems, including species rich natural forests of Taita Hills (Himberg 2011). With the establishment of *fighis* (traditional homesteads) by the local people, forest islands or intact vegetation patches were preserved, which still extend over the Taita Hills. Traditional beliefs and culture include the long-term preservation of these forest patches and also the forest in general, as an important provider of valuable resources. With the transformation of people's lives and culture over the past decades, many behavioural patterns, attitudes and customs have been changed and lost, sometimes with negative effects on nature and resources. Therefore, it is essential to actively seek ways to make the traditional values known again and to translate their core messages for conservation into today's world (e.g., through communication forums). Hereby, it is not only making traditional values known, but mainly the revitalization of values, and keeping them alive.

Forest ecosystem services

The current use of natural resources in Taita Hills is aimed at covering the daily necessities of life, and for short-term benefits. This behaviour is driven by a comparatively high poverty level (see above) and the existence of only few alternative income sources (see Himberg et al. 2006, 2009). It is therefore all the more important that societal and governmental representatives (chiefs, employees of governmental organizations such as the Kenyan Forest Service) make the long-term value of intact ecosystems (such as cloud forests) clear to the local population, but also to the entire region (including the lowlands), and to present this information in a target-group specific way (*barazas*) that is easy to understand. The cloud forests of the Taita Hills is a water catchment area that is essential for the survival of the local human population, and provides fertile soils for agricultural cultivation. Furthermore, it must be made clear that the cultivation of exotic invasive tree species leads to the degradation of the entire mountain massif (but includes the adjoining lowland dry savannahs as well, which directly depend on the water sources from Taita Hills mountains). This information has to be addressed to various target groups, such as the local people, to different representatives of the administrative levels, and relevant organisations working in the field of nature conservation, resource and forest management. Training is essential for this. Besides disseminating knowledge on the relevance of forest ecosystem services based on very practical examples, such as soil fertility or availability of water, practicable alternatives (e.g. suitable fast growing tree species, alternatives materials for the construction of houses or for cooking) should be communicated and made available by the relevant leading person (e.g. chiefs). The fact that the surrounding lowlands strongly depend on the Taita Hills water-catchment (Hohenthal et al. 2017), and therefore it is not a purely local angling,

makes the preservation of these cloud forests a nation-wide subject, and thus a governmental and County-governmental issue.

Improved communication

The ecological relationships and strategies for effective protection of biodiversity, functionality of ecosystems and landscapes, and natural resources are understood and known. Nevertheless, potential strategies and changes are not implemented on a large scale. One of the main reasons is the fact that many different stakeholders and groups of interest have a share of responsibility, and that mandates are not always clear, overlap or leave gaps. This multi-stakeholder situation leads to a lot of confusion and prevents targeted and stringent work. A similar situation has been observed for other endangered forest ecosystems in Kenya, such as the Arabuko Sokoke Forest (a major part of the East African coastal forest biodiversity hotspot). There, a large number of different stakeholder groups feel responsible for the preservation of this forest block. However, this situation creates a state of stakeholder confusion, and even weakens the striking power, and thus an efficient protection of the forest (see Habel et al. 2017). Similarly, in Taita Hills, there is an urgent need to clarify responsibilities and align approaches and activities undertaken by different stakeholders. The overarching goals must be harmonised and should focus on the long-term conservation and restoration of the cloud forests. Recently, responsibility and management of forest remnants in Taita Hills is partly incumbent on different groups and depends on the respective protection status (Habel et al. 2020). For example, Ngangao forest fragment is strictly protected as forest reserve and under the management of Kenya Forest Service. In contrast, Chawia forest is a county government managed forest, with rather lax forest conservation, guided by the Community Forest Association. Studies on forest biodiversity revealed that these different conservation strategies frequently lead to contrasting habitat qualities: Ngangao is in a much better state than Chawia (Cousseau et al. 2020) due to its strict protection status. Also, the policies represented by the various stakeholders diverge significantly. In identical land plots and during the same time, employees of a governmental organization are planting tree seedlings of exotic tree species, while members of a conservation group are planting indigenous tree species to restore this indigenous forest patch. In all activities, which are developed and implemented by numerous actors, restoration and conservation of the cloud forest should be the central objective, and short-term economic interests should be neglected. In order to achieve this, a governmental organization responsible for forest preservation (e.g. Kenyan Forest Services) needs to take lead in initiating a multi-stakeholder dialogue, involving governmental organizations, the civil society and community actors. Such dialogues should be scientifically based, and focus on defining mandates, approaches, and division of labour among the various actors. All forest remnants should be urgently gazetted and protected as forest reserves by the Kenyan Forest Service. An overview of challenges, potential changes, and specific actions are compiled in Table 1.

Conclusions and lessons learnt

There is an urgent need to efficiently protect the last and small remnants of cloud forests of Taita Hills and to rehabilitate ecosystems for biodiversity and people. Endemic species, which today exist in small populations, will not sustain themselves in the long term in the

current habitat situation (Obunga et al. 2022). The forest remnants and the entire landscape will be further reduced in quality by the rapid spread of exotic tree species, and pushing back alien tree species (such as eucalyptus) will become increasingly difficult. As the spread of eucalyptus continues, it can be assumed that further water sources in the Taita Hills will dry up, with negative consequences for the local people as well as for the adjoining dry savannahs in the lowlands. The basic prerequisite for successful implementation of activities, however, is a general trust between people and organisations. It has already become clear in various activities that a bottom-up approach via cultural values is marked by success. In the Taita Hills, for example, cultural values have already been used very successfully to conserve threatened habitats and ecosystem functions (Mwamidi et al. 2023). This underlines that efficient resource conservation should come from the people.

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