



Towards a biocultural heritage territory in Rabai Cultural Landscape: exploring Mijikenda cultural values and practices for sustainable development

Case study for the project 'Indigenous biocultural
heritage for sustainable development'

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About the authors

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More on this case study

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Abbreviations and acronyms

BCHT	Biocultural heritage territory
CBO	Community-based organisation
FGD	Focus group discussion
FPIC	Free, prior and informed consent
ha	Hectare
ICCA	Indigenous community conserved area
IIED	International Institute for Environment and Development
KEFRI	Kenya Forestry Research Institute
KNBS	Kenya National Bureau of Statistics
NGO	Nongovernmental organisation
NMK	National Museums of Kenya
PAR	Participatory action research
RCL	Rabai Cultural Landscape
RCV	Rabai Cultural Village
RQ	Research question
SDG	Sustainable Development Goal [of the United Nations]
SIFOR	Smallholder Innovation for Resilience project
TK	Traditional knowledge
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization

Executive summary

Biocultural Heritage Territories (BCHTs) are mosaics of land uses, deeply linked to Indigenous knowledge systems embedded in cultural traditions. The Potato Park in Cusco, Peru is perhaps the best-known example of a BCHT, where Indigenous knowledge and practices effectively combine food production with sustainable development, biodiversity conservation and ecosystem protection.

This study was conducted as part of the ‘Indigenous Biocultural Heritage for Sustainable Development’ project (2018-2021), funded by the Sustainable Development Programme of the British Academy. The project explored how Indigenous Peoples’ worldviews, wellbeing concepts, cultural values and customary laws promote or hinder biodiversity conservation and sustainable development. Conducted with the Rabai sub-tribe of the Mijikenda Indigenous people in Kilifi County, coastal Kenya, this case study was coordinated by the Kenya Forestry Research Institute (KEFRI), working closely with the Rabai community. It examined the interconnections between culture and biodiversity, and how biocultural heritage contributes to Sustainable Development Goal 2 ‘End Hunger’. It also sought to contribute to the establishment of a collectively-governed BCHT in Rabai, and used the Potato Park’s decolonising action research approach where research is co-designed and facilitated by Indigenous community researchers.

It found that protecting Kaya forests is deeply entrenched in traditional Mijikenda culture. Rabai’s Kaya Elders’ Council protects the forests through a system of taboos and traditional rules that restrict access to specific areas and prohibit grazing and tree cutting. These values persist outside the Kayas, where, for example, cutting of coconut trees is forbidden and agro-ecological practices are encouraged. The Kaya elders’ worldview and understanding of wellbeing is founded on the Mudzini concept, which emphasizes the harmonious relationship between humans and nature. It recognizes sacred elements and symbols representing spirits, wild plants, humans and domesticated plants and animals, and their interactions within the landscape. Mijikenda cultural values include reciprocity (kufaana) and equilibrium (soyosoyo) between people and nature, solidarity (umwenga) among people with a common interest, and collectiveness (kushirikiana) among community members. These values support sustainable natural-resource management, social cohesion and preservation of traditional knowledge (TK) and practices.

Indigenous worldviews, values and customary laws also contribute to Sustainable Development Goal 2 ‘Zero Hunger’ by promoting conservation of agrobiodiversity, crop diversification and resilient farming systems. An increase in the growth of traditional crops and diversification is enhancing food security for the Rabai community, while the cultivation of wild fruit and medicinal trees on-farm ensures agrobiodiversity conservation and reduces pressure on Kaya forests. The Mijikenda worldview that considers ancestral land as sacred and forbids its sale to outsiders has traditionally safeguarded it from development. However, women cannot inherit land and this limits their role in decision making for agriculture and their ability to promote resilient traditional crops. The negative perception of traditional knowledge by the youth has resulted in a lack of knowledge transfer from older generations – exacerbated by out-migration to urban areas.

The study concluded that the Potato Park model can and should be adapted to the Rabai Cultural Landscape. Sensitisation and consensus-building among community members is required from village to landscape level. This will enhance community ‘buy in’ to ensure private land is used for conservation and sustainable livelihoods, in line with Rabai cultural values and customary laws that promote conservation and equity. This study recommends creating a new collective governance institution for RCL that includes women, youth, village elders and community researchers. Diverse stakeholders should come together to achieve a coordinated approach to resource management, creating policies that recognise and protect Indigenous Peoples’ rights, resources and practices, and support agrobiodiversity conservation.

The study also recommends ensuring that infrastructure development projects recognise Rabai as a protected biocultural landscape, and respect the customary rights of its Indigenous peoples. Finally, supporting community-led decolonising action research processes that enable communities to establish collective landscape governance, is vital for the successful establishment of a BCHT in the Rabai community.

1. Introduction and project objectives

Although Indigenous Peoples have been living sustainably for generations, few studies have explored the role of different elements of cultural heritage, and their links with biodiversity, in promoting sustainable development. This study was conducted as part of the project ‘Indigenous biocultural heritage for sustainable development’ (2018–2021), funded by the Sustainable Development Programme of the British Academy. The project involved case studies in China, India, Peru and Kenya, and had two main objectives:

- To catalyse the establishment of collectively managed biocultural heritage territories (BCHTs) for sustainable development, and
- To enhance understanding of the role of biocultural heritage in addressing the Sustainable Development Goals (SDGs) among policymakers, researchers and practitioners.

The project explored how Indigenous Peoples’ worldviews, wellbeing concepts, cultural values and customary laws promote or hinder sustainable development, and how these are perceived by different actors within communities. Using case studies of the Mijikenda in Kenya, Quechua in Peru, Naxi in China, and Lepcha and Limbu in India, the project examined how different elements of biological and cultural heritage are interconnected in landscapes, and how this contributes to sustainable development, including achieving Sustainable Development Goal 2, ‘End Hunger’. Through decolonising action research, the project sought to contribute to community-led processes to establish BCHTs, building on the Quechua Potato Park in Peru.

The study in Kenya was conducted with the Rabai sub-tribe of the Mijikenda Indigenous community in Kilifi County, coastal Kenya. It was coordinated by the Kenya Forestry Research Institute (KEFRI), working closely with the Rabai community.



Kaya Landscape. Credit: KEFRI

2. Community context and biocultural heritage

2.1 Community context

The Rabai community in Kilifi county is one of the nine Mijikenda sub-tribes. The other sub-tribes are the Giriama, Chonyi, Duruma, Digo, Kambe, Jibana, Kauma and Ribe. The population of the Rabai sub-county is 120,813 people, comprising of the Rabai community (96,650), and the Jibana and Ribe communities. The sub-county covers an area of 207.8 square kilometres (20,780 hectares), with a population density of 581 persons per km². Rabai has a total of ten villages. The number of households in the sub-county is 24,809 with an average number of persons per household of 4.9 (KNBS, 2019). About 71% of people living in Rabai live below the poverty line (Republic of Kenya, 2013). The Rabai community occupies a hilly area that has moderate rainfall of 1,300 millimetres per annum, and thus they practice mixed farming (both livestock keeping and crop farming). The rainfall is bimodal with two distinct wet seasons occurring in March–May and October–December. There have been considerable changes in rainfall patterns and amount since 1982; this has led to negative effects on crop yields, livestock production, water sources, forest resources and has increased the likelihood of climate-related hazards like drought, flooding, incidences of pests and diseases, and food insecurity (Republic of Kenya, 2018; Wekesa et al., 2017).

The main traditional crops grown in Rabai include coconut, maize, cassava, cowpeas, bananas, sweet potatoes, millet, sorghum wheat, pumpkins and green grams, of which cowpeas, millet and sorghum are indigenous to Africa. The cash crop varieties comprise cashew nuts, beans, vegetables such as kale and tomatoes, and grafted improved fruit varieties such as mangoes, oranges and avocados (Ongugo et al., 2014). The main livestock kept in the Rabai community include poultry, goats, sheep and cattle (both local and hybrid varieties). Others include donkeys, ducks, guinea fowl, rabbits and pigeons. Apiculture is a significant economic activity among households in the community although in the last few years, honey production has been negatively affected by persistent drought (Republic of Kenya, 2018). Agroforestry is also practised by smallholder farmers to support the livelihoods of the Mijikenda communities, mitigate soil erosion and enhance soil fertility. Common fruit trees intercropped with agricultural crops are citrus, cashew nuts, coconuts and mangoes.

The Rabai Cultural Landscape (RCL), declared as such by the National Museums of Kenya (NMK), covers the whole Rabai landscape. It includes sacred *Kaya* forests which are rich in endemic flora and fauna, traditional farmlands, rivers, wetlands, small hills, scared groves, and a cultural village. It also includes sites of historical importance dating back to the slave trade period such as the Rabai museum and first Christian missionary church to be established in Kenya. This, and the fact that Rabai forms part of a global biodiversity hotspot and UNESCO World Heritage site, makes it a unique tourism destination.

The community is endowed with diverse biocultural resources such as sacred *Kaya* forests, rivers, hills and swamps. Natural resource use and management practices are guided to some extent by customary rules, centred on the sacred *Kaya* forests culture, although the degree of influence and acceptance varies across different villages. Challenges facing sustainable management and conservation of natural resources include population pressure, weakly enforced conservation policies and legislation, weakening traditional governance systems, the development of infrastructure-like roads to access *Kaya* forests which lead to the encroachment of forested areas, and urbanisation.

In the Mijikenda community, the spiritual values associated with *Kaya* forests and their species are important in the conservation of the landscape. The culture and the spiritual significance of rivers, hills, forests, or individual tree or animal species has led to their veneration and recognition as sacred, leading to their conservation (National Museums of Kenya, 2020). Consequently, the Mijikenda cultural values, religious beliefs, and Indigenous worldviews play a key role in the conservation of *Kaya* forests and associated natural resources within the landscape (NMK, 2020). The protection of the Mijikenda *Kaya* forests and associated landscape is traditionally guided by a holistic and integrated approach based on both natural and cultural values, and the recognition of their sacredness, which is premised on the Rabai community concept of *Mudzini*, meaning ‘holistic wellbeing’.

A combination of formal and traditional governance systems are recognised in the community. The formal governance system is a hybrid of national and county government management structures, with

the lowest local administrative units being the assistant chief and ward administrator for the national and county governments, respectively. The local administrators are mandated with implementation of government policies, arbitration of conflicts and enforcement of laws and regulations. The traditional governance system involves the *Kaya* Elders' Council which is key in supporting the management of natural resources within the RCL and the preservation of traditional knowledge-based practices and innovations. The local rules and regulations of *Kaya* elders help to preserve and promote the community's cultural practices and traditional knowledge.

2.2 Biocultural heritage — main components, trends, and drivers of change

The main components of biocultural heritage¹ in the RCL are sacred *Kaya* forests, agricultural farmlands, traditional crop varieties, rivers, wild and domesticated species, traditional rituals, festivals and ceremonies, traditional beliefs, traditional knowledge, the Rabai Museum, Mijikenda language and the *Kaya* Elders' Council.

The *Kaya* forests are small, isolated forest patches ranging in size from two to 200 hectares (Kibet and Nyamweru, 2008). *Kaya* means homestead in the Mijikenda language. Historically, these forest patches sheltered small, fortified villages (*Kayas*) that were set up by the Mijikenda people when they first settled in the region in the 16th century after fleeing their enemies in the north (Githitho, 2005). As security improved in the last century, the Mijikenda groups moved out and settled in the surrounding areas, but the *Kaya* forests were preserved as sacred places where prayers, rituals, sacrifices, and burials took place (Githitho, 2005; Kibet and Nyamweru, 2008). The RCL is composed of four *Kayas*: Bomu, Fimboni, Mudzi Muvya and Mudzi Mwiru, with a total area of 612 hectares. The area covered by *Kaya* forests has been declining as a result of a disregard for traditional knowledge systems, overexploitation, population pressure and unsustainable land-use practices.

The current average farm size per household is 0.84ha or 2.1 acres, down from 0.95ha or 2.4 acres in 2010. The main crops grown include landraces like maize, cassava, coconut, cashew nut, sweet potatoes, bananas, wheat, pumpkins and green grams, as well as indigenous crops such as cowpeas, millet and sorghum. These food crops were previously mainly obtained from the farms but the trend has changed and the main source of food has become markets and shops. This trend has been attributed to reduced farm sizes due to a population increase of 1.25% annually, industrialisation, urbanisation, high costs of inputs and effects of climate change that have all resulted in low productivity.

The Rabai community grows traditional crop varieties for their resilience to climate change. The staple foods grown are maize, cassava and cowpeas. Traditional maize varieties cultivated are *Mwangongo*, *Katamani* and *Mungindo*. *Munyenze* and *Simpemutu* are the cowpeas varieties grown; while cassava varieties include: *Chibanda meno* (*Katite* and *Mbomu*). The period between 1980–2010 was characterised by crop variety loss due to culture erosion, weakening community governance systems, and a high number of introduced hybrids and improved crop varieties, promoted by extension services. Many indigenous varieties of millet and sorghum were lost during this period. From 2011–present, the loss of traditional crop varieties has slowed, mainly because hybrid and introduced varieties became susceptible to pests and diseases, could not tolerate recurrent droughts, and need high levels of inputs for production which the community could not afford (Wekesa et al., 2017). Farmers started growing more traditional varieties again, because these are more resistant to pests and diseases and tolerant to drought.

Cultivation of wild plants on-farm is a common traditional knowledge-based practice among the Rabai community. This is largely driven by the need to diversify community incomes due to massive crop failure, as well as by the increased incidences of crop pests and diseases that necessitate the development of local remedies. Wild plants like *Lilium orientale*, *Tamarindus indica*, *Ancylobotrys petersiana*, *Ladonpholia kirkii* and *Sisyphus mauritiana* are domesticated for their fruits, which are usually sold for income. These plants can tolerate prolonged dry periods, ensuring farmers have a

¹ Knowledge and practices of Indigenous people and their biological resources, from the genetic varieties of crops they develop, to the landscapes they create (<https://biocultural.iied.org/>).

source of income in case of crop failure due to perennial droughts. Plants like *Monanthes fornicate*, *Oldfieldia somalensis*, *Fernandoa magnificia*, *Acacia melifera* and *Salvadora persica* are domesticated by herbalists because of their medicinal value. Cultivation on-farm is becoming increasingly common among households due to restricted access to the *Kaya* forests where most of these wild plants are found. Domesticating these plants on the farms relieves pressure on the forests and contributes to biodiversity conservation (Wekesa and Ndalilo, 2018).

The Rabai community also collects wild plants from *Kaya* forests for various uses. *Strychnos mombasae*, *Mdzaja*, *Mbambara*, *Oldfieldia somalensis*, *Manilkara sulkata*, *Mtunguja*, *Azadirachta indica*, *Azadirachta indica*, *Kibohoya*, *Thambia*, *Chitingiri* and *Polyalthia stuhlmannii* are some of the common plants harvested in the forests for their timber and fruits and for herbal medicine to treat and prevent many human, animal and crop diseases and conditions. Some of these plant species commonly collected from the forests are becoming rare due to over-exploitation, for example *Polyalthia stuhlmannii* and *Mwerekera*, important timber and medicinal species, respectively.

Mijikenda rituals, festivals, ceremonies and beliefs related to the conservation of forests, seeds and traditional farming practices are important elements of the biocultural heritage of the Rabai community. Some of these traditional rituals, ceremonies, festivals, beliefs and knowledge have been lost. Others have reduced in frequency or are performed differently with no or very little emphasis on the important traditional practices that were previously undertaken during the festivals. Or they have lost their relevance due to the emergence of modern religions and modernisation. The Mijikenda language is also being eroded by modern education that puts emphasis on English as the language of instruction.

Protection of the RCL is deeply entrenched in traditional Mijikenda culture. The *Kaya* Elders' Council is the main traditional governance institution, and plays an important role in sustaining traditional knowledge and related agrobiodiversity. The *Kaya* Elders' Council is fully engaged in governing and managing the RCL, including the *Kaya* forests, according to the community rights, knowledge, capacities and institutions, and the benefits arising from the landscape are equitably shared. The *Kaya* Elders' Council has rules and regulations that restrict activities that impact negatively on the RCL and its associated natural resources. Enforcement of rules is performed mainly through a system of taboos, curses, and other spiritual sanctions that have a powerful effect in the Rabai community. Besides the rules governing the physical and natural environment, there are other rules that protect the spiritual and ritual sanctity of the traditional landscape, for instance the prohibition of the uprooting of crops/plants planted on anyone's farm. These local rules and regulations help to preserve the communities' cultural practices and traditional knowledge and safeguard the landscape and its associated biodiversity. *Kaya* forests occurring within the RCL have also been gazetted as UNESCO World Heritage Sites and this has strengthened the protection of the landscape.

The unique landscape, rich biodiversity in *Kayas* and adjacent farmlands, strong cultural beliefs and practices, along with the *Kaya* Elders' Council traditional collective governance system provide an opportunity to establish a biocultural heritage territory² (BCHT) in Rabai. This BCHT is being established to create a community-led collective management structure in Rabai that will promote the integrated management of biological and cultural resources in the landscape, with active participation of village elders, traditional farmers, youth and women, as this is currently lacking under the RCL.

² Biocultural heritage territories have been defined as "Land use mosaics encompassing indigenous and traditional land tenure, production and exchange systems, cultural identity, community organization and simultaneous goals of endogenous development and biodiversity conservation" (Argumedo and Swiderska, 2014).

3. Objectives of the Kenya study

The overall objective of the study was to develop a roadmap towards establishing a collectively managed BCHT in the Rabai community. The Rabai community was inspired to establish a BCHT following a visit by a *Kaya* elder to the Potato Park BCHT in Peru. The specific objectives of the study were:

1. To explore the relationship between biocultural heritage and sustainable development in the Rabai community
2. To identify the main elements of biological and cultural heritage in the Rabai Cultural Landscape and their contribution to environmental conservation and livelihoods
3. To strengthen Rabai's traditional governance institutions for integrated landscape management and support the establishment of a BCHT, and
4. To enhance the understanding of policymakers on the role of biocultural systems in addressing the SDGs.

By establishing a BCHT, the Rabai community hopes to address a number of threats facing its biocultural heritage and to promote sustainable and equitable development. The main threats include:

- Infrastructure development, such as road constructions and expansion of urban settlements
- Sand harvesting and the extraction of wood products from *Kaya* forests
- Encroachment on forest areas for settlement
- Overgrazing
- Erosion of cultural values
- Proximity to Mombasa city
- Out migration of the youth to urban areas in search of employment, and
- Lack of intergenerational traditional knowledge transfer from the elderly to the youth.

The effects of climate change further exacerbate the situation, reducing the capacity of the landscape to sustain and improve local livelihoods, conserve biodiversity, and that of the community to adapt. The challenges affecting the sustainable management of the RCL include a weakening of the *Kaya* Elders' Council, uncoordinated management of the landscape, private land tenure (individual land ownership) and the association of traditional knowledge with witchcraft.

The study and the process to establish a BCHT builds on previous work by several institutions, including KEFRI, NMK, the county government of Kilifi and Bioversity International, to help address these threats and challenges. They also worked to enhance recognition of traditional knowledge, cultural practices, beliefs and traditional governance systems and their role in conservation of biocultural resources. In the last decade, these institutions have been engaging with the Rabai community on the need to adopt an integrated landscape management approach. KEFRI, through the International Institute for Environment and Development's (IIED's) SIFOR project (Smallholder Innovation for Resilience), supported the establishment of the Rabai Cultural Village (RCV) that has brought the community together and enabled it to diversify and increase income sources through biocultural tourism. The RCV has a community seed bank that preserves self-saved seeds of traditional crop varieties for planting in the next season, thus conserving agrobiodiversity. A community tree nursery has been established in the village with the capacity of raising 60,000 seedlings annually. The nursery raises native tree species endemic to *Kaya* forests that are used to restore degraded areas within them.

Bioversity International has documented the diversity of food and health-related tree species in and around the *Kayas* and associated Indigenous knowledge and cultural practices, providing the basis for developing robust conservation initiatives in the landscape. NMK and KEFRI have been working

together to strengthen the *Kaya* Elders' Council, which is a key institution for sustaining cultural values and practices, and promoting integrated landscape management premised on Indigenous knowledge systems. In addition, 60 beehives have been installed in the *Kaya* forests through support from KEFRI and NMK for honey production and as an alternative income-generating activity. The existing initiatives by KEFRI, NMK and other stakeholders, coupled by enhanced awareness levels among community members, provide a good foundation for establishing a BCHT in the Rabai community.



Traditional Mijikenda House. Credit: KEFRI



KEFRI team and community researchers in the cultural village. Credit: KEFRI

4. Research approach, methods and tools

The study explored six key research questions (RQs) developed with project partners at a project inception workshop in London (January 2019). Each of the six questions represent a key component of a BCHT:

1. **Ethnicity:** How are particular ethnic groups connected to the landscape historically?
2. **Worldviews, cultural values, wellbeing:**
 - 2.1 How do Indigenous worldviews about wellbeing, cultural values and customary laws promote or hinder sustainable and equitable development?
 - 2.2 To what extent are these recognised or applied by different generations and genders, or ethnic, religious, class/caste and economic groups? Which drivers are influencing cultural change (for example, religion, education)?
3. **Governance:** What kind of traditional governance system exists? How can it be strengthened for sustainable management of the local landscape?
4. **Biocultural systems:** What are the main elements of the biocultural system and how are they interconnected and inter-related?
5. **Livelihoods:** How does the local biocultural system influence the local livelihoods system? How to shape/strengthen a biocultural economy?
6. **Biocultural heritage and SDG 2:** How does the biocultural system (ie heritage agriculture) contribute to achieving the SDG 2 objectives, re-interpreted through holistic wellbeing — maintaining genetic diversity, ensuring sustainability and resilience, ending hunger and malnutrition, and doubling productivity?

The overall study approach used was participatory action research (PAR), in order to actively engage the Rabai community in generating the knowledge. It was evidence-based to guide the design and establishment of the BCHT, and to foster strong local ownership and strengthen community research capacity through the process (Figure 1). Prior to undertaking the research, the project team convened a meeting to conduct a free, prior and informed consent (FPIC) process with the community through their representatives including the *Kaya* elders, village elders and selected community members rich in traditional knowledge.



Figure 1: Participatory action research framework. Diagram created by authors based on information in Baum et al. (2006)

A review of both English and Swahili literature was conducted on the biocultural heritage systems and biocultural diversity of the Mijikenda. The main areas of focus were: holistic worldviews and wellbeing concepts; cultural values and customary laws; spiritual values and beliefs; Indigenous knowledge, epistemology, innovations and practices; Indigenous languages; customary institutions and festivals; biodiversity (domesticated and wild); landscapes and sacred sites.

The project addressed each research question using a range of qualitative PAR methods — particularly community meetings, stakeholder workshops, focus group discussions (FGDs), key informant interviews, or storytelling with elders, as well as transect walks and field observation. The community meetings and FGDs each involved 15–20 participants — youth, women, *Kaya* elders, village elders, community researchers, Indigenous farmers, local elites and unsustainable resource users. Separate FGDs were conducted with women to ensure their active participation for optimal contribution of their views. Two community meetings and one FGD were held in each village. One community meeting was held before the interviews to share the objectives of the proposed project, seek community consent (FPIC) for the study and build consensus on the research approach. FGDs and community meetings were also held after the interviews to share the preliminary findings, validate them and fill the gaps.

Semi-structured interviews were conducted with 150 households in the ten villages, 15 in each village. The participants interviewed were 60% male and 40% female and included both male and female household heads. The majority of those interviewed were traditional farmers with more than 20 years of experience, followed by the elderly with rich traditional knowledge. Conventional farmers were the least interviewed (Figure 2). The households were selected to include a range of actors as per the graph below.

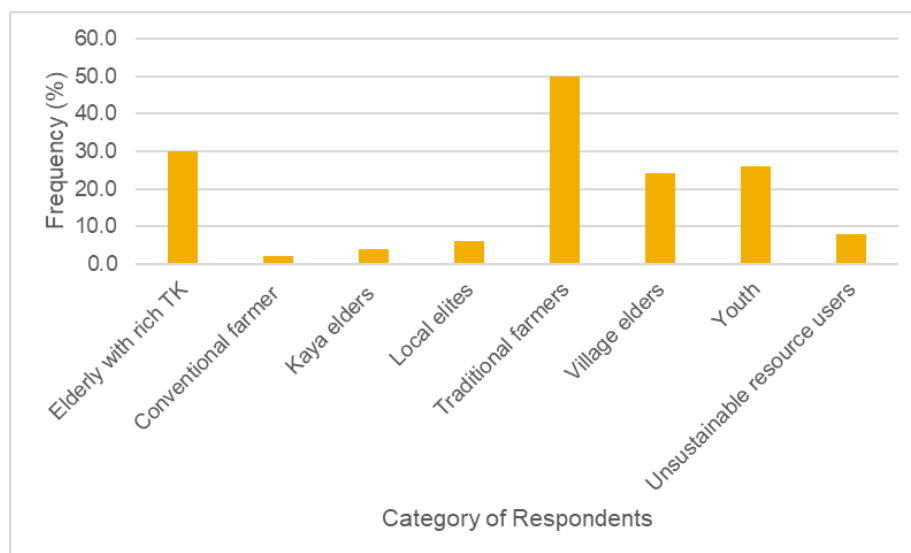


Figure 2: Socioeconomic profile of respondents

Most of the people interviewed were Christians (61%) followed by traditionalists (ie Mijikenda beliefs) (21%) and lastly Muslims (18%). The majority of Christians in Rabai practise duality, while the non-Rabai villages included in the study were purely Christian. The RCL is dominated by the Indigenous Rabai community (96%) with a few immigrants mainly from the Kamba community (4%). About 69% of the respondents were middle-income earners, 28% were poor while only 3% were rich.

The Potato Park's decolonising action research approach, that has been vital to the success and sustainability of the Potato Park BCHAT, was adapted to the local Rabai context. The research process was led by Rabai community researchers using local languages, including Swahili and Rabai.

Kaya elders and village elders selected community researchers with rich traditional knowledge. The project team held a training and co-design workshop with community researchers to explore decolonising PAR methods that integrate Indigenous worldviews, cultural values and practices and strengthen Indigenous knowledge systems for the management of the landscape. The community researchers from Rabai were actively involved in identifying and co-designing the research methods, adapting the research questions to the local context and needs, conducting the research, compiling the information collected, analysing the findings and drawing conclusions. The research questions were simplified to conform to the local context and where necessary translated into local Rabai language for ease of understanding. Each village had one community researcher working closely with a *Kaya* elder and a village elder (so the project involved ten community researchers in total).

The study was anchored in the traditional concept of the Rabai community '*Mudzini*'. This recognises the interaction among sacred elements and symbols representing spirits, wild plants, and domesticated plants and animals and humans/members of the community in the landscape, that contributes to the livelihoods of the local community, and must be in harmony with each other for sustainability. The '*Mudzini*' concept was identified through meetings with *Kaya* elders, community researchers, representatives of the Rabai Cultural Village (RCV) and village elders from the ten villages of the Rabai community. This concept helped to identify the main biological and cultural heritage elements found in the landscape, their interconnectedness, their contribution to sustainable and resilient farming systems and their associated impact on the environment, biodiversity conservation and livelihoods. This study sought to strengthen the concept of '*Mudzini*' as a foundation for establishing a BCHAT, which aims to enhance traditional knowledge transmission and to contribute towards achieving SDG 2. This includes maintaining genetic diversity, ensuring resilience and sustainability in farming systems for enhanced agricultural productivity and income for the Rabai community.

Three stakeholder workshops were held in Rabai, bringing together the different villages and other key stakeholders: an inception workshop was held to introduce the study, seek community consent and build consensus with the community. Another workshop was held to share findings and make inputs to

the report. The last workshop shared the findings of the report for validation. The workshops brought together participants from key institutions involved in the management of natural resources, including national government agencies (KEFRI, NMG, Ministry of Agriculture, Ministry of Environment and Forestry), county government (departments of gender, youth social services and culture, environment and natural resources and agriculture), CBOs, *Kaya* elders, village elders, chiefs, assistant chiefs and Indigenous farmers. The number of participants in the workshops was between 30 and 40.



Focus group discussion. Credit: KEFRI

5. Results

5.1 Contribution of cultural values and Indigenous worldviews to sustainable development (RQs 1 and 2)

The Rabai community is one of the nine Bantu-speaking Mijikenda communities. The Mijikenda migrated from Shungwaya, a region in southern Somalia in the 17th century and settled along the coastal hinterlands in fortified villages called *Kayas*. The Rabai community has cultural values, customary laws and Indigenous worldviews about wellbeing that have guided their interaction with mother nature for generations. These were found to contribute to sustainable development in almost equal measure in all the villages. First, cultural values of solidarity (*Umwenga*), reciprocity (*Kufaana*), equilibrium (*Soyosoyo*) and collectiveness (*Kushirikiana/Kuumbana Bumba*) — with nature and in society — promote the growing of traditional crop varieties, the diversification of traditional crops grown, wild tree cultivation on farmlands for medicinal purposes, and venues for cultural meetings and ceremonies. With regard to the cultural value of collectiveness (*Kushirikiana/Kuumbana Bumba*), women are involved in collective activities such as seed exchange, which promotes the growing of traditional crop varieties. Moreover, cultivation of wild medicinal and food plants is entrenched in the cultural values of equilibrium (*Soyosoyo*) and reciprocity (*Kufaana*) that support the conservation of wild plants by re-establishing them in the landscape. Traditional ceremonies associated with biocultural resources, and which promote cultural values of solidarity (*Umwenga*) and collectiveness (*Kushirikiana/Kuumbana Bumba*) help in conserving agrobiodiversity — for example, traditional prayers and sacrifices aimed at appeasing the spiritual world, the use of grains of indigenous crops and landraces such as millet, sorghum and maize, and indigenous animal breeds such as cattle, sheep and chicken. The significance of these varieties in traditional ceremonies has led to their conservation by the community. Most traditional healing ceremonies use various parts of domesticated plants.

Customary laws such as those restricting access to *Kaya* forests, or prohibiting the cutting of coconut trees and promoting the use of indigenous grains in conducting rituals, contribute to agro-biodiversity conservation. For instance, restricted access to *Kaya* forests reduces over-exploitation of medicinal and food plants, hence providing planting materials in form of seeds and wildings for domestication. Prohibited cutting of coconut trees ensures continued availability of products derived from the tree, including palm oil and wine, which are commonly used in traditional rituals and ceremonies. The use of indigenous grains in conducting rituals promotes the preservation of indigenous seeds and cultivation of traditional crop varieties.

Many traditional crop varieties are tolerant to the impacts of climate change, such as increased incidences of pests and diseases and prolonged drought (Ongugo et al., 2014). Crop diversification provides a safety net for food security by ensuring that in case of crop failure, farmers are assured of yield from other crop varieties that are more resilient. Thus, the use of hardy traditional varieties that are well adapted to local conditions and of traditional diversified cropping methods has enhanced food security for the Rabai community, contributing to SDG 2 on zero hunger.

Moreover, traditional crops are grown using organic fertilisers and are chemical free, and therefore provide healthy food for the community. Traditional seeds are self-saved for future planting and this ensures availability of seeds for planting at the onset of the rain. Local experience has shown that planting at the onset of rains results in higher yields, thus availability of seeds in readiness for planting is important for community food security. Traditional crops are preserved for a long time using local methods such as *Uchaga*³ that are more cost effective than modern preservation methods using chemicals. Traditional farming practices that are guided by the cultural value of equilibrium (*Soyosoyo*) and worldviews such as prohibiting the use of inorganic fertilisers and promoting contouring, are also widely practised to prevent soil erosion and maintain high soil fertility for increased crop yields. Most (if not all) people in the Rabai community are against the use of chemical fertilisers, which are believed to contaminate the soils.

Wild tree cultivation on farmland helps in biodiversity conservation by reducing the loss of rare plants in *Kaya* forests that communities depend on for survival in terms of herbal medicine, food and rituals.

³ Preservation of grains using smoke from the fireplace.

Agrobiodiversity is important for community adaptation to climate change, and food and nutrition security. The trees planted on farmlands have both medicinal and nutritional values; medicinal products made from some of the trees are used to treat livestock diseases and control and manage crop pests, thus enhancing food security for the community. By acting as venues for cultural meetings and ceremonies, domesticated trees contribute to the preservation of traditional knowledge for posterity. Traditional knowledge is important because it is strongly intertwined with agrobiodiversity conservation and related climate change adaptation strategies, which are key for achieving sustainable development. Besides medicinal products and provision of venues/shade for cultural meetings and ceremonies, native trees planted on-farm can sequester substantial amounts of carbon, thus contributing to global efforts to reduce greenhouse gas emissions responsible for global warming. The trees also have spiritual and sacred values; some trees such as *Adansonia digitata* provide sacred places for traditional prayers and rituals.

Traditional ceremonies are used as avenues for passing important information to the community. For instance, information (both traditional and modern) on preventive measures for pandemics such as COVID-19, or infectious diseases such as cholera and diarrhoea, as well as information on child immunisation, is passed on to safeguard the health of the population based on cultural values of solidarity (*Umwenga*) and collectiveness (*Kushirikiana/Kuumbana Bumba*). In addition, these ceremonies are used as platforms for mentoring the youth on good morals based on cultural values of equilibrium (*Soyosoyo*), solidarity (*Umwenga*) and collectiveness (*Kushirikiana/Kuumbana Bumba*), and providing information to the community on traditional food recipes for healthy and holistic living. The ceremonies also provide avenues for intergenerational knowledge transfer on cultural values and practices from the older to the younger generation. Generally, traditional ceremonies empower community through information sharing on health, good morals, traditional knowledge and farming systems, and are therefore important in sustaining knowledge. Traditional ceremonies such as weddings, Rabai New Year festival and those for circumcision promote cultural tourism which is a source of income to the community, thus contributing to poverty reduction. These ceremonies also sustain traditional cultural values and promote traditional knowledge. Some ceremonies like traditional prayers and sacrifices form part of traditional religious practices. *Sayo* and *Njuga* rituals performed during Rabai New Year celebrations are practised to promote adequate rainfall, which enhances agricultural production. Closely associated with traditional ceremonies are traditional songs and dances, which are performed during the day and help in promoting good moral behaviour, and also enhance social cohesion and socioeconomic development. Traditional attire is worn during the songs and dances to bring out the uniqueness of the Rabai culture and this preserves the cultural heritage of the community, further enhancing cultural tourism.

Sacred sites (*Mizimu*) in *Kaya* forests have restricted access. These sites are preserved through spiritual beliefs related to the forests that hinder access to the specified sacred areas by the community; only *Kaya* elders are permitted to access these areas. The restricted access to these areas conserves biodiversity and helps keep *Kaya* forests in pristine condition. There are other sacred areas outside *Kaya* forests called *Vichuguu* and *Vichaka vya Bahasi*, whose access is also restricted to the *Kaya* elders and traditional healers. *Vichuguu* and *Vichaka vya Bahasi* are preserved mainly for healing purposes; those who are seriously sick and have sought interventions in hospital and services of herbalists without success are taken to *Vichuguu* and *Vichaka vya Bahasi* for healing rituals. This is a win-win situation for nature and community because *Vichuguu*,⁴ *Vichaka vya Bahasi*⁵ and *Mizimu*⁶ have a rich diversity of plants that communities depend on to support their livelihoods. As they are conserved for sacred purposes, the biodiversity therein is also conserved and this in turn preserves the genetic resources for the community.

The Indigenous worldview of the Rabai community of the Mijikenda tribe also contributes to sustainable development. Ancestral land is traditionally considered sacred and cannot be sold to a non-Mijikenda; this safeguards the land from unsustainable land-use practices often associated with modern infrastructure developments. As a result, community land is retained for sustainable agricultural production and agrobiodiversity conservation, which are important in sustaining traditional knowledge and associated practices. The coconut tree is revered for its importance in providing products such as

⁴ Small hills found within farmlands which are used for conducting rituals.

⁵ Small forests found adjacent to homesteads which are used for conducting healing rituals.

⁶ Sacred groves in *Kaya* forests.

palm wine, which is used in traditional ceremonies and rituals, and palm leaves (*Makuti*) used to construct traditional houses both in homesteads and in sacred sites within *Kayas*. The traditional houses in the sacred sites are used for healing and cleansing rituals and the appeasing of ancestors. The coconut trees are managed under collective custodianship rather than private ownership, and are viewed by the Rabai community as living beings like humans and therefore cutting a tree is equated to killing a member of the community. Use of firewood from the tree for cooking is forbidden, and is viewed as a taboo in order to protect it. To cut a coconut tree, rituals must be conducted to avert any disaster, for example, diseases. These views — coupled with the many uses of the coconut tree — have contributed to its preservation and even more planting. The products from the tree like wine, fruits and leaves are harvested and sold to generate income for the community, hence sustaining the local livelihoods. Moreover, wine tapping is an important cultural practice. It is an offence to add water to palm wine as this has consequences including sickness and in the extreme, the death of the culprit. A person must be cleansed by *Kaya* elders to avert consequences associated with adding water to palm wine. This ensures that the quality of the palm wine is not compromised and can therefore fetch good market prices, thereby contributing to socioeconomic development. In addition, the health benefits are optimal.

Traditional marriage rituals are highly valued in the community because of their importance in enhancing family stability and social cohesion. The good morals imparted to the young couples promote responsible behaviour anchored in the cultural norms and practices of the Rabai community. The morals emphasise maintaining cultural values, namely solidarity (*Umwenga*), reciprocity (*Kufaana*), equilibrium (*Soyosoyo*) and collectiveness (*Kushirikiana/Kuumbana Bumba*) (Ongugo et al., 2012). Solidarity (*Umwenga*) refers to the togetherness or unity among people with a common interest, while reciprocity (*Kufaana*) is the harmonious exchange or mutual cooperation between people and nature. Equilibrium (*Soyosoyo*) is a state of balance between people and nature, while collectiveness (*Kushirikiana/Kuumbana Bumba*) is defined as the state of togetherness among members of the community. These cultural values or principles are important in enhancing the sustainable management of natural resources, social cohesion and preservation of traditional knowledge and related practices, all of which are critical in sustainable and equitable community development (Ongugo et al., 2012). The values were identified through the literature review which built significantly on Andean cultural values (ANDES, 2016) and were also known by the *Kaya* elders.

The *Kaya* Elders' Council is considered a very important institution by the local community. Protection of the *Kaya* forests is deeply entrenched in traditional Mijikenda culture and their integrity and sanctity are safeguarded by a council of *Kaya* elders, who employ a system of taboos and traditional rules to protect the land and associated natural resources. The *Kaya* elders perform prayers (*Alombi a Kaya*) and conduct rituals to avert disasters. For instance, they conduct prayers for the rains, against diseases and pests, for peace, thanksgiving after a bounty harvest, and for health and success in life. Rainmaking ceremonies are performed by *Kaya* elders mainly in the *Kaya* forests and they are often characterised by offering prayers and sacrifices in the form of livestock. The local rules and regulations — such as restricted access to specific areas within *Kaya* forests, and rules and requirements for the rituals used by *Kaya* elders to govern — help to preserve the communities' cultural practices and promote sustainable development. The *Kaya* elders' worldview and understanding of wellbeing is founded on the '*Mudzini*' concept that emphasises the harmonious relationship between humans and nature, and at the same time recognises the sacred elements and symbols representing spirits, wild plants, domesticated plants, animals and humans, and their interactions within the landscape. *Kaya* elders hold the view that the elements of the '*Mudzini*' concept should be balanced to promote holistic wellbeing and sustainable development in the Rabai community. This concept is to some extent similar to the '*Ubuntu*' concept (I am because we are).

5.2 Cultural practices as a hinderance to sustainable development (RQ 2)

Although most cultural values and practices play a key role in sustaining livelihoods, and conserving the environment and biodiversity of the Rabai community, the study identified one cultural practice that hinders sustainable and equitable development. Only men are allowed to inherit land, which prevents the active participation of women in farming and sustainable land management practices. Women have little influence over decisions on which crop varieties to grow and when to grow them because they do

not own land. This is despite the fact that women are the ones who work on the farms and carry out planting and weeding, and implement all other decisions made by men regarding crop farming. This encumbers the diversification of traditional crops, thus compromising food security, as men often prefer growing less-resilient improved and hybrid crop varieties at the expense of resilient traditional crop varieties.

The misconception that traditional knowledge and practices equate to witchcraft contributes to disagreements in the community and hinders TK transmission. This misconception is usually created and perpetuated by youth who wish to kill elders in order to access *Kaya* forests and inherit the land to use for the illegal extraction of materials and intensive crop farming. Elderly people with white hair are regarded as witches, and therefore the young generation are not willing to learn from them. This leads to a lack of knowledge transfer and the erosion of important cultural practices and traditional knowledge for sustainable development. Recently, elderly people have been targeted for killing under the pretext that they are witches, often leading to the weakening of the *Kaya* council of elders, which comprises mainly elderly men. This has led to weak enforcement of the traditional rules and regulations that govern the management of natural resources and hence degradation and deforestation, with ripple effects on agrobiodiversity conservation. Degradation and the declining area covered by *Kaya* forests threatens the existence of naturalised wild tomatoes (*Tindi hoho*) (originally from Latin America), wild cowpeas and other wild indigenous vegetables, which communities have been domesticating on farmlands to diversify crop varieties and preserve genetic resources. Consequently, the diversity of traditional crops on farmlands is also declining, affecting food security and community capacity to adapt to climate change. If this trend is not addressed, the Rabai community will not have sources of wild crop relatives that are of cultural, economic and social value for cultivation and genetic improvement in farmlands to enhance productivity and cushion the community from climate variabilities.

The community saves seeds for next season's planting after harvesting. However, the cultural practices attached to self-saved seeds can hinder agricultural productivity. For instance, self-saved seeds cannot be planted in the case of the death of a household member, or that of domestic animals within the household. Ideally, this means the household will have to seek alternative seeds for planting for that particular season; this promotes seed exchange and hence crop diversification. However, given the limited availability of self-saved seeds in other households, the affected households often plant hybrid crop varieties that are less resilient, resulting in poor yields and hence affecting food and nutrition security.

5.3 Recognition of traditional knowledge by different community actors (RQ 2)

The project evaluated the level of recognition of traditional knowledge and associated practices by different groups within the community — including women, men, elders, youth, and different ethnic, religious and economic groups. The findings clearly demonstrate that many youths do not recognise traditional knowledge and associated practices (Table 1). Modern education is responsible for low recognition of traditional knowledge and associated cultural practices, and Indigenous worldviews, cultural values and customary laws; children spend most of their time in school and have limited interaction with elders. Furthermore, adoption of mainstream religions and modernisation have made young people abandon cultural practices and customary laws in favour of modern practices that are heavily influenced by religion, mainly Christianity and Islam. However, there are a few youth (15% of the 23 youth interviewed) who recognise traditional knowledge and associated cultural practices, worldviews, cultural values and customary laws. Modernisation and out-migration to urban areas has also played a key role in eroding cultural values. This is due to external influences, especially from tourists from Western countries and non-Mijikenda people residing in urban areas in neighbouring Mombasa City. As earlier mentioned, youth associate traditional knowledge with witchcraft and are no longer being taught cultural practices as was the norm before.

A substantial proportion of middle-aged people interviewed (30%) recognise traditional knowledge and associated practices. Of particular interest to this group are the Rabai sub-tribe marriage rituals and burial rites, which are strictly observed. The majority of the elderly (85% of those interviewed) adhere to traditional knowledge and related cultural practices, and Indigenous worldviews about wellbeing,

cultural values and customary laws (Table 1). This is because they are custodians of traditional knowledge and culture and form a good percentage of the *Kaya* Elders' Council. For instance, the male elders tap wine and make decisions regarding crop cultivation, while female elders undertake weaving and basketry. Both male and female elders oversee cultural ceremonies such as marriage and burial rites in the community.

Table 1: Overall recognition of traditional knowledge (TK) by different age groups

Age group	Age range (Years)	Recognition of TK (%)
Youth	<35	15
Middle aged	35–55	30
Elderly	>55	85

The application of traditional knowledge by different **economic groups** was assessed. The study revealed that poor people apply traditional knowledge more than middle-income earners and the rich (Figure 3). This was attributed to greater reliance of the poor people on natural resources to support their livelihoods. Traditional knowledge is widely applied in the sustainable management of natural resources in the Rabai community.

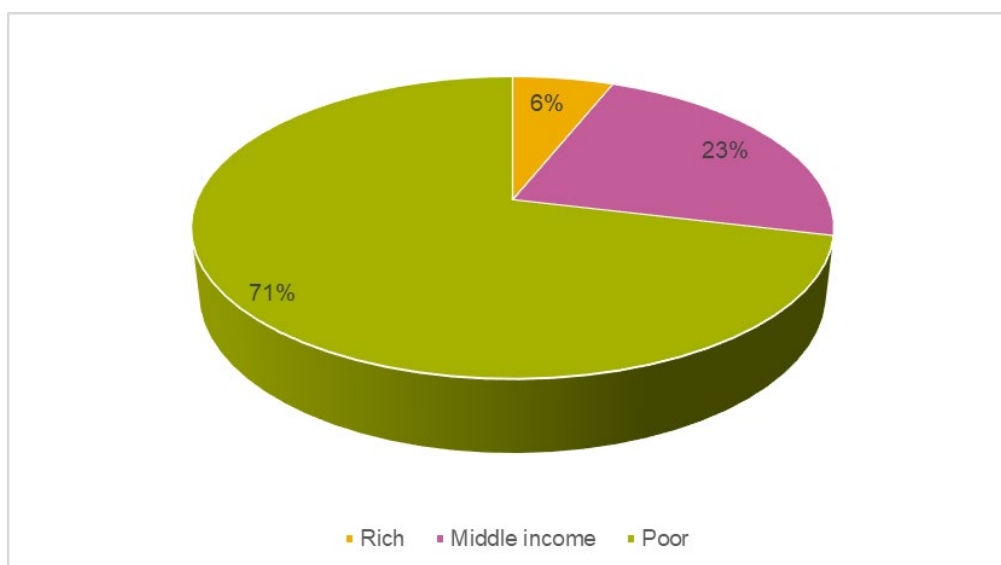


Figure 3: Application of traditional knowledge and associated practices by different economic groups

Economic status was determined not on the basis of income, but rather assets more relevant to the Rabai community. The rich individuals were defined as those who had a permanent home, owned more than two acres of land with at least one acre under coconut trees, and four or more livestock animals. Middle-income individuals included those who had a semi-permanent home, owned one to two acres of land with at least 0.25 acre under coconut trees, and one to four livestock animals. Poor individuals included those who lived in *Makuti* (palm leaf thatched) homes, owned less than one acre of land, did not have a single coconut tree on their land, and did not own livestock. The level of recognition and application of traditional knowledge and associated practices, and Indigenous worldviews about wellbeing, cultural values and customary laws were different among the various economic classes. Traditional knowledge and associated practices, as well as Indigenous worldviews, cultural values and customary laws were more recognised by the poor compared to the rich and middle-income earners (Figure 4). In Jimba and Miyuni villages, only the poor recognised them. Traditional knowledge and associated practices, Indigenous worldviews about wellbeing, cultural values and customary laws were recognised by the rich in only three of the ten villages (Mwele, Mleji and Bwagamoyo). The high recognition of traditional knowledge, practices, worldviews about wellbeing, cultural values and customary laws among the rich in Mwele and Bwagamoyo was attributed to their proximity to the four *Kaya* forests in the Rabai community, as well as the presence of many *Kaya* elders whose influence in the community is highly respected. In Mleji, there are many small sacred groves that play similar roles

to *Kayas* (*Vichuguu* and *Vichaka vya Bahasi*). The majority of community members including poor, middle-income and rich use the sacred groves as places of worship and healing places. This may have influenced recognition of traditional knowledge across all the economic groups. The middle-income economic class recognised traditional knowledge and associated practices, and Indigenous worldviews about wellbeing, cultural values and customary laws in most of the villages apart from Miyuni and Jimba. Jimba and Miyuni are neighbouring villages located in drier parts of Rabai where community involvement in traditional farming practices and natural resource management is hindered by climatic variability, hence low recognition and application of traditional knowledge. Moreover, the two villages are mainly inhabited by non-Rabai community members, the majority of whom fall within the middle-income economic group and work and stay in urban areas. They are therefore out of touch with the village and associated traditional knowledge and practices, and Indigenous worldviews about wellbeing, cultural values and customary laws. The two villages are far away from *Kayas* and other sacred groves, hence the low recognition reported in this study.

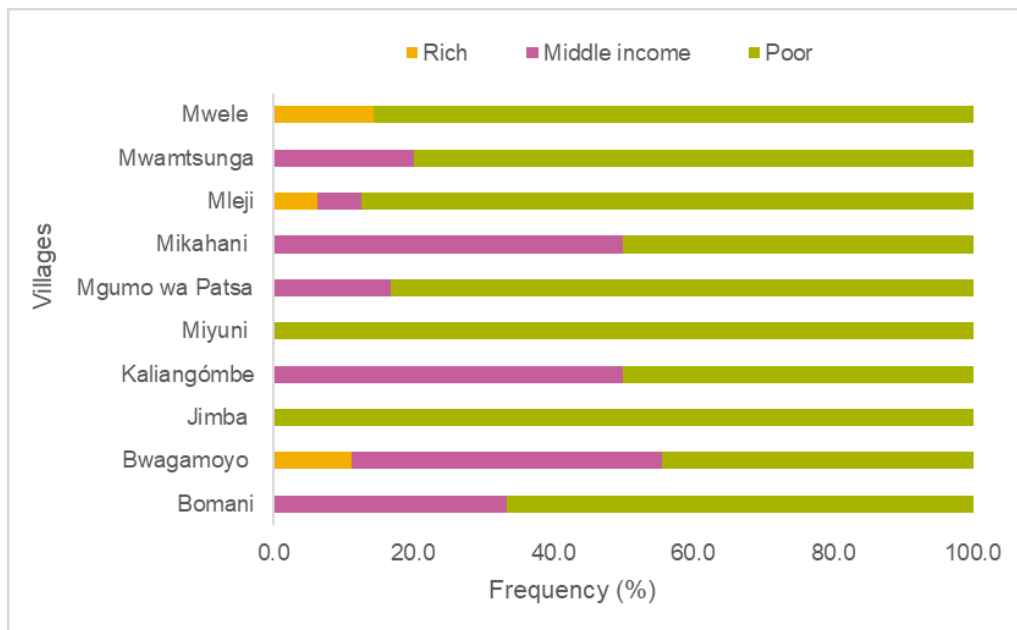


Figure 4: Recognition of traditional knowledge and associated practices by different economic classes

The level of recognition of traditional knowledge and associated practices varied among different age groups and villages (Figure 5). Generally, traditional knowledge and associated practices were more recognised by the elderly followed by the middle aged. The youth had the least recognition of traditional knowledge and associated practices. Miyuni, Mleji and Bomani had the highest number of the elderly who recognised traditional knowledge and associated practices. Mleji has a high number of sacred groves where the elderly lead prayers for community members. Similarly, Bomani is very close to the RCV in *Kaya Mudzi Muvya*, whose membership is also composed of *Kaya* elders and other elderly members of the community with rich traditional knowledge. This probably explains why members in these two villages recognise and apply traditional knowledge and Indigenous worldviews. While the youth and middle aged in Miyuni have migrated to urban areas in search of employment opportunities, the elderly people have remained in the village where they practise traditional farming. Traditional farming is deeply connected to the culture of the people. As a result, the elderly in Miyuni recognise and apply traditional knowledge. In Miyuni, Jimba and Kaliangómbe, there was no recognition of traditional knowledge and associated practices by the youth. The middle aged in Bomani did not recognise the traditional knowledge and associated practices. Miyuni and Jimba, which are neighbours, have experienced mass migration of the youth to urban areas, mainly Mombasa, Mariakani and Mazeras. The interaction of the youth with non-Mijikenda ethnic communities in urban areas has led to cultural erosion and low recognition and application of traditional knowledge and cultural practices by the youth. A substantial area of Kaliangómbe is covered by Mazeras town, a cosmopolitan area where the Rabai community is mixed with other non-Mijikenda communities. The cosmopolitan nature of this village

seems to be responsible for the low recognition and application of traditional knowledge and associated practices, and Indigenous worldviews about wellbeing, cultural values and customary laws.

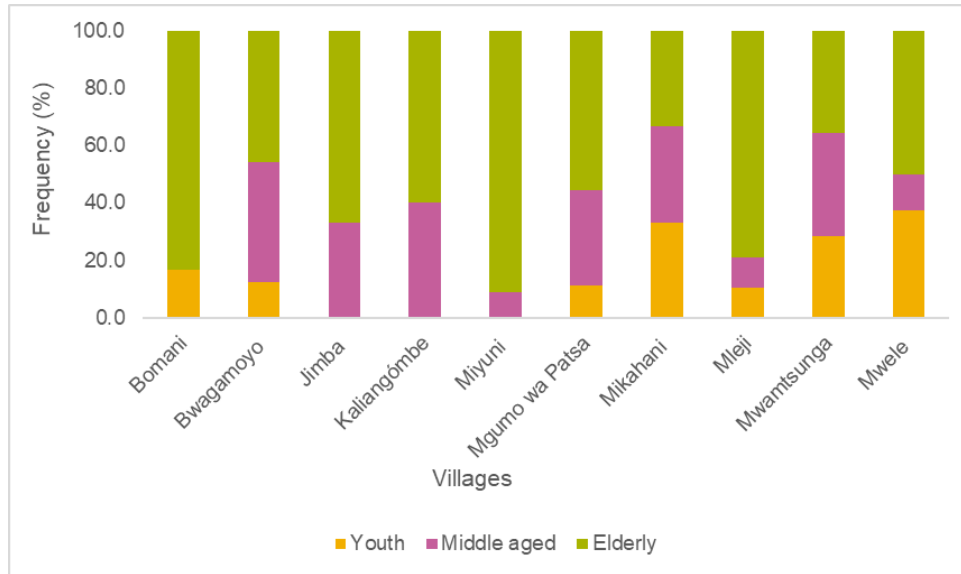


Figure 5: Recognition of traditional knowledge and associated practices by different age groups

Generally, men recognise traditional knowledge more than women (Figure 6). However, women are more involved in the application of traditional knowledge-based practices. These include traditional farming systems such as self-saving seeds, crop diversification and conservation tillage — all common practices in the Rabai community. Moreover, women participate more in traditional songs and dances as well as cultural festivals; they are custodians of these cultural practices; hence they are active agents in the transmission of traditional knowledge and related cultural practices. Recognition of traditional knowledge was highest in Mwele, Mwamtsunga and Kaliangombe, a scenario that is attributed to the proximity of these villages to the RCV. The majority of women in the three villages are members of the RCV and actively participate in traditional dances, songs and ceremonies that are often showcased in the cultural village. Women also recognise traditional worldviews, values and customary laws that promote ecological sustainability and equity. Moreover, the RCV hosts a community seed bank that helps in the preservation of landrace seeds for the next planting season, and members are sensitised on the importance of traditional farming practices including the planting of landrace crop varieties. Recognition of traditional knowledge by women was lowest in Mikahani and was higher for men. The low recognition of traditional knowledge by women was attributed to the distant location of Mikahani village from the RCV, thus limiting women's participation and awareness of cultural values, rituals and ceremonies. Women's participation in traditional knowledge-based practices was limited to traditional farming practices. The high level of recognition of traditional knowledge by men was attributed to the fact that the village has the highest number of *Kaya* elders comprising of elderly males. *Kaya* elders are custodians of cultural values and beliefs of the Rabai community; thus, they widely apply traditional knowledge.

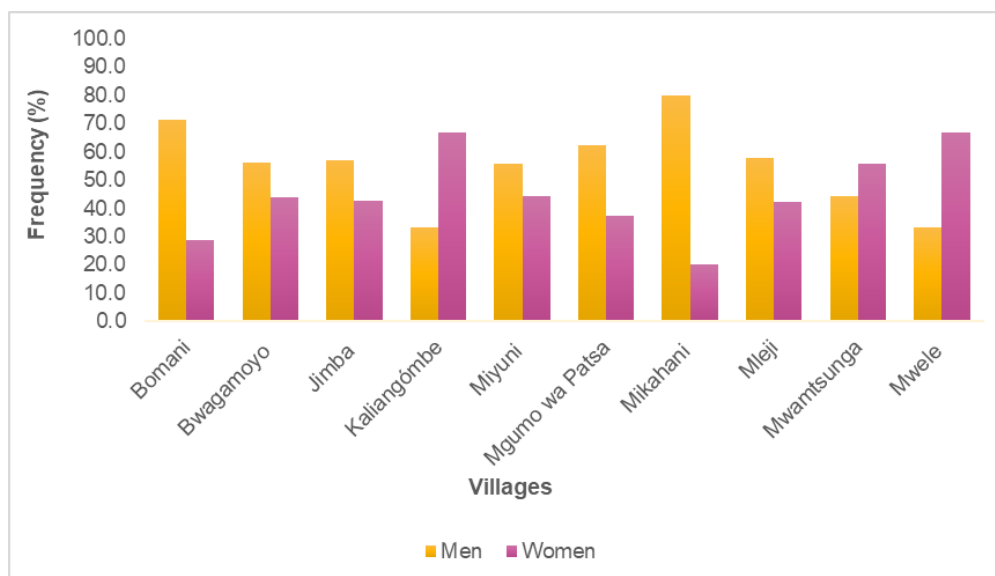


Figure 6: Recognition of traditional knowledge and associated practices by gender

As expected, the Rabai community adheres to their traditional knowledge more than the immigrants, who are mainly from the Kamba community. However, the immigrant communities participate in traditional festivals, ceremonies and events that bind the community such as burial and marriage rites as well as the Rabai New Year festival.

The common festivals, rituals, ceremonies, as well as beliefs are outlined below (Table 2).

Table 2: Traditional festivals, rituals, ceremonies and beliefs of the Rabai community

Festivals/rituals/ceremonies	Customary rules/taboo
a) <i>Mwaka mpya wa Kirabai</i> (Rabai New Year)	a) Incest not allowed
b) <i>Kasi</i> (dowry negotiation)	b) Adulterating food to make it bad for use is not allowed
c) <i>Maloz</i> (dowry payment)	c) Jealousy is not allowed
d) <i>Nyambura</i> (wedding)	d) Making love with an animal is prohibited
e) <i>Sadaka Kumbukumbu</i> (commemoration) for the dead	e) Harming livestock is bad
f) <i>Narriri</i> (thanksgiving for achievement made)	f) Mixing honey with lemon juice is bad
g) <i>Muranga</i> (cleansing of curses)	g) Cassava peels should not be eaten by livestock
h) <i>Chaka</i> (handshake to bring peace among family members)	h) Destroying one's house is bad
i) <i>Chivalau</i> (rituals to appease the dead)	i) Grave cannot sleep empty once dug (put in a stick/ <i>Boma</i>)
j) <i>Dzaya Kiapo</i> (oath taking)	j) Vandalising three cooking stones put by another person is not allowed
k) <i>Chitarila</i> (undoing an oath)	k) Throwing out belongings of people you have been staying with is bad
l) <i>Kutoa Mtoto nje</i> (celebration of childbirth)	l) Uprooting crop/plants even if someone has planted in your farm is bad
m) <i>Matanga</i> (funeral)	m) Adding water/milk into wine is bad
n) <i>Lwembe</i> (circumcision)	n) Crushed maize should not be eaten by goats
	o) Pouring honey on maize for livestock to feed on is bad
	p) Bedroom for parents restricted from mature/married children

5.4 Contribution of biocultural system to SDG 2 objectives

Increasing agricultural productivity and sustainable food production are crucial in helping to alleviate the perils of hunger, thus contributing to SDG 2. Biocultural systems can play an important role in sustaining genetic diversity and promoting resilient farming systems for increased agriculture productivity that ensures food and nutrition security. The Rabai Cultural Landscape (RCL), which has a high diversity of traditional food crops resilient to climate change and widely grown by the local community, has the potential to become a model BCHT. This would build on its collective *Kaya* forest governance system that includes Indigenous leaders from different villages and promotes conservation of biodiversity as well as Rabai culture. The crops grown in the RCL range from indigenous vegetables to landraces of cereals and stem tubers. The crops vary from village to village depending on the biophysical environmental characteristics. The variability in these characteristics places the landscape into various agro-ecological zones that include high-potential hilly areas (Mikahani, Bomani and parts of Mwele and Bwagamoyo), wetlands (Kaliangómbe), high-potential lowlands (Mleji, Mwamtsunga, Mgumo wa Patsa), and the drier lowlands (Jimba and Miyuni). The rainfall patterns and amount, soil characteristics, topography and temperatures vary among the various clusters of the villages as indicated above, and this also manifests in the crops that can be grown in the different areas within the landscape.

Several indigenous vegetables occur in the landscape. These include *Thalakushe*, *Mnavu*, *Mtsunga*, *Chitsambare*, *Mrenda*, *Phombo*, *Chikosho*, *Mwambalu*, *Mwangani*, *Logatsi*, *Chimwaga*, *Mazia*, *Chisonya*, *Chifuga*, *Tsafe mbale* (wild cowpeas), *Mchemche*, *Demu*, *Hoho*, *Tindihoho* and *Madonge*. These vegetable species are wild and grow naturally in farmlands, and communities perceive them to have high nutritional value. Besides, they have medicinal value and are therefore preferred by local communities because of the multiple benefits and their ability to thrive under diverse climatic conditions. The landscape also has diverse landraces of cereals, with maize being the most common. The landrace maize varieties grown include *Mngindo*, *Mdzihana*, *Mwangongo* and *Kanjerenjere*. Other crops grown include pulses such as cowpeas, green grams and beans. The cowpea was a wild crop but is now cultivated on-farm; the three main varieties cultivated are *Mbomu*, *Mtite* and *Matso ga paka*. Cassava and sweet potatoes are also important food crops in Rabai. The main landraces of cassava grown are *Chibandameno*, *Kaleso* and *Chikokote* while sweet potato landraces *Mjivu*, *Mkaroti* and *Mweruphe* are the main varieties grown by the community.

The RCL is also endowed with four sacred *Kaya* forests. These forests harbour diverse species of wild food plants⁷ that the community depend on to supplement what is cultivated and domesticated in farmlands. The species among others include *Vibohoya*, *Magwagwe*, *Shomoni*, *Jomoko*, *Pera*, *Majaje tsikitsi*, *Tudukula*, *Koma*, *Mzambarau*, *Fudu*, *Tula*, *Nyenze*, *Mezugarisa*, *Dzala*, *Bokwe*, *Tsetetse*, *Hohe*, *Kone*, *Mabuyu*, *Kwaju*, *Kungu*, *Kunazi*, *Fenesi* and *Nanazi*. Some of the species from the *Kaya* forests have been domesticated in farmlands, including *Mkungu*, *Mzambarau*, *Mnyaze*, *Nanazi*, *Mkwaju*, *Mtomoko* and *Mpera*. The food diversity in the landscape includes more than 59 species: indigenous vegetables (21), wild fruits (25), cereals (three), sweet potatoes (three), cassava (three), cowpeas (three), and green grams (one). With this rich diversity, the RCL serves as a source of genetic resources for agriculture, food, and forestry. The rich wild resources conserved in the landscape mitigate the loss of plant genetic resources on farmlands, hence averting food insecurity in the community by supporting local livelihoods. The conservation and sustainable use of plant genetic resources ensure the survival of the local community and promote biodiversity conservation.

The community's capacity to adapt to climate change is also supported by the rich biodiversity of the RCL. The rich plant diversity provides opportunities for improvements in crop cultivars and varieties by harnessing genes from wild species and known varieties. For instance, the domesticated cowpea (*Mbomu* variety) — a high-yielding, pest- and disease-resistant and drought-tolerant variety — has been developed by Indigenous farmers in the Rabai community by combining genes for drought tolerance and high yield from different varieties of wild cowpeas. Thus, wild food plants occurring in the landscape are used by local communities to improve the yield and nutritional quality of food crops. Wild food plants have high nutritional content that enhances human health. Unique genetic characteristics of wild food plants such as resistance to pests and diseases and tolerance to drought have ensured there

⁷ Wild food plants include wild fruits and vegetables.

are high yields even when the weather conditions are not favorable and has ensured that the Rabai community is food secure. The rich biodiversity observed in the RCL is a natural reservoir of plant genetic characteristics in crop cultivars and traditional landraces that are important in improving agricultural production in the landscape.

Most indigenous tree species found in *Kaya* forests have medicinal value. Medicinal plants such as *Monanthotaxis fornicata*, *O. somalensis*, *Fernandoa magnificia*, *Acacia mellifera*, and *Salvadora persica* are used by the local community to develop traditional formulations sprayed on crops to prevent, control and manage incidences of crop pests and diseases. Moreover, herbal products developed from these species are used for treating livestock diseases. Failure to manage the pests and diseases in both crops and livestock result in heavy yield and productivity losses. Therefore, the medicinal plants play a key role in the agricultural production enhancement for food security of the Rabai community because they are more affordable, environmentally friendly and readily available. Cultural values of collectiveness (*Kushirikiana/Kuumbana Bumba*), reciprocity (*Kufaana*) and solidarity (*Umwenga*) promote cultivation of traditional crops by the Rabai community. Moreover, the values ensure diversification of traditional crops and mitigate against risk of failure in case of sharp changes in weather conditions during the cropping season. The growing of traditional crops that are drought-tolerant, pest- and disease-resistant, coupled with high crop diversification ensures the community obtain substantial yield despite frequent climatic changes that have occurred every year since 1982. This ensures there is sufficient food for subsistence use, hence incidences of hunger are rarely reported in the Rabai community. In this regard, cultural values play a significant role towards achieving SDG 2.

5.5 Impacts of the research process

The research process was community-led by community researchers. The community researchers were involved in reviewing the questions and adapting them to the local context, including translation into local Rabai language. They were also involved in identifying key participants, including *Kaya* elders, traditional farmers, village elders, youth, unsustainable resource users, conventional farmers, elders with rich traditional knowledge and local elites. They also helped to prepare data collection schedules, identify meeting venues, facilitate research activities (meetings, workshops and FGDs), undertake data analysis and draw conclusions. Community researchers comprised of *Kaya* and village elders and youth with rich traditional knowledge. The research process was participatory using PAR tools and methods that included stakeholder workshops, community meetings, FGDs, key informant interviews, as well as transect walks and field observations conducted by community researchers.

The rigorous research process sensitised the community researchers, *Kaya* elders, NMK, county government officials and members of the Rabai community on the concept of a BCHT and how it could be implemented in the local context. This enhanced the capacity of the key players to be involved in the actual establishment of the BCHT. For instance, community researchers, *Kaya* elders and village elders were involved in the selection of the villages for the BCHT and identification of unique biocultural elements within the landscape. This has enhanced their understanding of the natural resources available, management challenges and opportunities for improving sustainable utilisation, and how to manage and conserve agrobiodiversity and improve community livelihoods. The community researchers have been technically empowered to spearhead the process of forming village management committees and establishing the BCHT. They have also been empowered to promote the protection of the rights of the Rabai community over their land and resources therein. The process strengthened awareness of the importance of biocultural heritage among different actors (national government, county government of Kilifi, *Kaya* elders, village elders, agricultural officers, local farmers, community members, women and youth). It has also strengthened the links between the ten villages as well as local governance institutions (*Kaya* elders and village elders).

The village authorities were involved in the research process through village elders. During field interviews, community researchers were paired with village and *Kaya* elders in their respective villages. Moreover, the village elders were actively involved in planning and fully participated in all community meetings, FGDs and local workshops, including validation of the research findings. In the context of the Rabai community, BCHT refers to putting the RCL under a collective governance management

structure with diverse representatives (*Kaya* elders, village elders, youth and women) from the ten villages.

Rabai's *Kaya* Elders' Council has been expanded to include women and youth as a result of SIFOR project capacity-building initiatives. This has been cemented by the current project. The inclusion of youth in the council is important in ensuring that traditional knowledge and cultural practices, Indigenous worldviews, cultural values and customary laws of the Rabai community are not lost but rather transmitted to the younger generation. Traditional knowledge and cultural practices, worldviews, values and customary laws underpin sustainable management of natural resources and agrobiodiversity conservation in the landscape. Women are custodians of traditional knowledge-based farming practices that put emphasis on landraces as opposed to hybrids. Their inclusion in the *Kaya* Elders' Council is therefore important in sustaining traditional agricultural knowledge and practices in the long term. The structure of *Kaya* Elders' Council has therefore been strengthened to address diverse landscape management issues effectively because of balanced representation. Strong traditional resource governance institutions are key to the successful establishment of Indigenous biocultural territories and Indigenous community conserved areas (ICCAs), using an integrated landscape approach. The strengthened and all-inclusive *Kaya* Elders' Council is an important institution in promoting cultural values such as solidarity (*Umwenga*), collectiveness (*Kushirikiana/Kuumbana Bumba*) and reciprocity (*Kufaana*) which are critical in ensuring harmony and equilibrium (*Soyosoyo*) between nature and people. Moreover, the research process strengthened the '*Mudzini*' concept on which the traditional knowledge and cultural values for the Rabai community are premised — therefore, by strengthening the '*Mudzini*' concept, the research by extension strengthened the traditional knowledge and cultural values for sustainable development.

There is improved understanding of the benefits of establishing a BCHT for stakeholders (national government, county government of Kilifi, *Kaya* elders, village elders, agricultural officers, local farmers, community members, women and youth). Thus, the project enhanced their commitment to participate in the process of BCHT establishment. The community-led process can be supported through restructuring the local governance system to include village elders, women and youth in the management of the landscape and strengthening it for enhanced management effectiveness. In addition, investing in the development of biocultural products and micro-enterprises like traditional basketry, coconut oil processing and herbal products by various stakeholders, as well as capacity building on various aspects of landscape management and governance, could also support a strongly community-led process. Community commitment and ownership of the process of BCHT establishment ensures sustainability of conservation and livelihood improvement initiatives.

The research process secured the commitment of village elders and *Kaya* council of elders, as well as relevant government agencies namely, local government administration (local chiefs), NMK, County government of Kilifi and KEFRI towards the establishment of BCHT, and this is instrumental in actualising the initiative. Typically, support from the government institutions is important in providing technical guidance and influencing enabling policies that support community-led initiatives.

6. Analysis of the findings

6.1 Similarities and differences between different villages and actors

Although the Rabai Cultural Landscape exhibits variability in environmental conditions (rainfall, temperatures and soils) and physical features (topography, natural features and ecosystems), there are a number of similarities in traditional knowledge, practices, worldviews, cultural values and customary laws among the different villages. The use of herbal medicine is a common practice in all the villages. The species used to prevent, treat and heal human and livestock diseases and to control crop pests and diseases are similar across the landscape. Although *Kaya* forests — the main source of herbal products — are only found in a few villages, planting medicinal plants on farmland is a common practice in the entire landscape. This ensures ease of access to raw materials for making herbal products and relieves exploitation pressure from the *Kaya* forests, hence conserving biodiversity.

Traditional festivals, ceremonies and rituals are also similar in the landscape. This is because the community is largely ethnically homogenous and is guided by similar cultural values and customary laws under the stewardship of *Kaya* elders.

The staple foods grown by the Rabai community are similar in the ten villages and include both landraces and improved varieties of maize and cassava. Traditional farming systems and crops grown are similar in different villages. Of these, cowpeas (indigenous to Africa) and cassava — a drought-tolerant crop that provides an alternative source of food during prolonged droughts, that are usually characterised by crop failure — could be the emblematic crops for establishing a BCHT that acts as a genetic reserve. The different villages place equal emphasis on traditional and modern farming systems, but do not place equal emphasis on traditional and modern culture, as this varies with proximity to *Kaya* forests and urban centres.

The cultural values and customary laws/rules of the Rabai community are uniformly applied in the landscape but the degree of application varies among villages and households depending on economic status, age, and proximity to *Kaya* forests and urban centres. The values of solidarity (*Umwenga*), reciprocity (*Kufaana*), equilibrium (*Soyosoyo*) and collectiveness (*Kushirikiana/Kuumbana Bumba*) practised by the community across the landscape play an important role in binding the community. This helps to ensure harmonious co-existence among community members, and between the community and their landscape. On the other hand, customary laws promote good morals among community members, including moral responsibility towards protecting and conserving the landscape from anthropogenic-driven degradation. Moreover, the laws promote equity in accessing and sharing the benefits emanating from the landscape. The elites (urbanised), the rich and the majority of the youth in the community perceive cultural values and customary laws as old fashioned, hence they don't embrace them. Moreover, community members living in villages close to urban centres have low regard towards cultural values and customary laws due to external influences from non-Mijikenda ethnic communities. On the other hand, villages close to *Kaya* forests have high recognition of cultural values and customary laws due to their deep interaction with the forests and *Kaya* elders.

The main elements of biological heritage, namely forests, domesticated plants, rivers, hills and wild plants, were assessed in the ten villages (Table 3, Table 4; Figure 7). Mwele had the highest number of forests, comprising three *Kaya* forests and seven small forests, followed by Bomani which has three *Kaya* forests and one small forest. As expected, these two villages recorded the highest number of wild plants used by villagers. This is because forests are important sources of plant genetic resources and rich sources of wild plants. Mwamtsunga village had the highest number of wild plants cultivated on-farm because of its proximity to *Kaya* forests, hence easy access to wild plant materials, followed by Mgumo wa Patsa. Jimba, Kaliangómbé and Miyuni had no cultivated wild plants. Jimba, Kaliangómbé and Miyuni are semi-arid in nature, hence the challenge of cultivating wild plants on their farms. This is further aggravated by the lack of rivers offering alternative sources of water in the three villages. Mwele has the highest number of rivers — attributed to the high number of forests which act as catchment areas for both permanent and seasonal rivers. These water resources could support the cultivation of wild plants in the village to reduce pressure on forests — Mwele has the highest number of wild plants that the community relies on as sources of food and medicine. Hills are mostly found in Mwamtsunga, followed by Kaliangómbé and Mwele, while Bwagamoyo and Miyuni have no hills. The hills commonly

referred to as *Vichaka vya Bahasi* and *Vichuguu* are sites for conducting healing rituals to treat chronic illnesses. These hills are rich in medicinal plants that help to sustain traditional knowledge for cultivation on-farm. The wild plants were cultivated on-farm by the current generation of elders with rich traditional knowledge. Both the rivers and wild plants have cultural significance since they are used in traditional rituals and ceremonies. Forests, hills, and rivers provide sacred sites for rituals and prayers. They are also used for traditional ceremonies. Seeds of wild and domesticated plants are used in rituals and ceremonies.

Table 3: Number of biological elements in the landscape per village

Village	Forests	Domesticated plants	Rivers	Hills	Wild plants
Bomani	4	2	2	2	5
Bwagamoyo	2	2	3	0	0
Jimba	0	0	0	3	0
Kaliang'ombe	2	0	0	5	1
Miyuni	2	0	0	0	6
Mgumo wa patsa	3	6	4	1	3
Mikahani	2	3	3	4	2
Mleji	0	4	1	0	0
Mwamtsunga	3	7	1	8	8
Mwele	10	2	7	5	9
Total	28	26	21	28	34

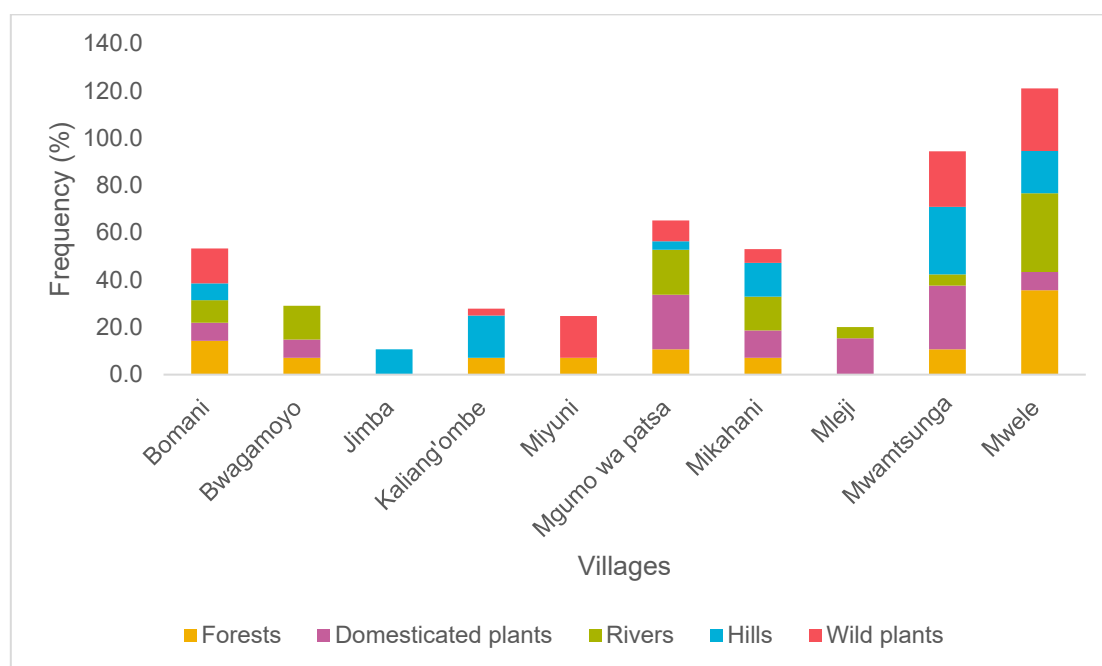


Figure 7: Comparison of biological elements in the landscape by village

Table 4: Biological elements in the ten project villages

Village	Forests	Hills	Domesticated/Cultivated wild plants	Rivers	Wild
Bomani	Kaya Mudzi Mwiru, Mudzi Muvya, Bomu, Fimboni	Ngwadu, Shehi, wa virogoni, Mokonde	Mdzala, Viboya	Chidzibwe, shehi	Fudu, Vibohoya, Majaje, Kunazi, Manyenze
Bwagamoyo	Msizima, Chikabikali		Mangoes, Coconut	Kombeni, Mwawesa, Tsalu	
Jimba		Mwarai, Mwachula, Chulu			
Kaliangómbé	Chidzimbule, Ngamani forest	Galuka ni Iole, Chinzungu, Mbaa, Karima, Shehi			Cassava
Miyuni	Kaya Bomu, Kaya Fimboni				Ngonyo, Vombo, Chikosho, Tsatsatsa, Hako ra Mzee, Mwambalu
Mgumo wa Patsa	Kaya Mudzi Muvya, Kaya Fimboni, Kaya Mudzi Mwiru	Boyani	Mango, Coconut, Cashew nuts, Kunde, Green grams, wild cassava (landrace that became wild)	Mwauchi, Makobeni, Kombeni	Mkarabai, Vitoria, Kunde
Mikahani	Bedida forest bordering Kaya Ribe, Kitsaka cha Nyoka	Ndunduni, Chimbarani, Kitsaka cha Nyoka, Bedida	Mnavu, Mchicha, Tsafe	Mleji, Bedida, Ngamani	Mabohoya, Madzala
Mleji			Coconut, Cashew nuts, Kunde, Wild cassava	Mleji	Chitsungu Tsungu, Chiduga Nguo, Chitsambae, Tindi Lubando (hoho), Mafa
Mwamtsunga	Bomu, Kaya Mudzi Muvya, Mudzi Mwiru	Mrimachonyi, Komboni, Kaya Bomu, Choni, Mudei Wa Jomvu, Mji Wa Jomvu, Chonyi Hill, Vidziweni	Mkanju, Mwembe, Mchungwa Mkapu, Mware, Nanasi, Mkwaju	Kombeni	Mabohoga, Mabokwe, Mibavubavu, Mkarabai, Mabohaya, Majaje, Makwakwa, Madzala
Mwele	Phoketra, Mwanyanga, Chiroroni, Chitibuini, Mwachula, Kaya Bomu, Fimboni, Mudzi Mwiru, Mudzi Muvya	Shehi, Mwachula, Moro wa Nyani, Chira cha Mulungu	Sweet potato, Kunde	Moro wa ndani, Midua Kuchi, Boramare, Kombeni, Memvuya, Mwanyanga, Sheli	Mwambalu, Mwangani, Logatsi, Chimwaga, Mazia, Mchicha, Chifuga, Tsafe mbale (wild cow peas), Mchemche

6.2 Lessons for establishing a BCHT in Rabai

6.2.1 Scaling out the Potato Park model to the local Rabai context

The Potato Park model can be scaled out to the RCL because of the many similarities in the Rabai and Quechua communities. To begin with, the majority of people in the Rabai community have an intrinsic relationship with mother nature and widely apply their traditional knowledge in the sustainable management of the landscapes. The *Mudzini* worldview of the Rabai community, which recognises harmonious co-existence and balance among the sacred, wild, domesticated and humans for achievement of wellbeing, is closely related to the *Ayllu* holistic wellbeing concept of Quechua communities in the Potato Park. *Ayllu* recognises the harmonious co-existence among three *Ayllus* (or communities/realms) as necessary for the wellbeing of humans and all realms: i) the natural world (wild animals, plants, lakes, streams and all elements outside human control), ii) the human realm including domesticated plants and animals, and iii) the sacred and the ancestors. The harmonious co-existence of the three elements underpins the values and principles upon which traditional knowledge is constructed, and through which the benefits that people derive from nature are valued. Moreover, in the RCL the main source of livelihood is farming of traditional crop varieties, mainly cowpeas and other indigenous vegetables, and landraces of cassava, maize and sweet potatoes as well as indigenous breeds of livestock. Both the RCL and the Potato Park practise traditional farming systems that sustain rich agrobiodiversity and ecosystem services like water and soil erosion prevention. These two communities recognise and adhere to their respective cultural values and customary laws, which are anchored in strong traditional governance institutions.

However, there are also some differences. In the RCL, communities grow a mixture of traditional crops and hybrids for both subsistence and markets, while the Potato Park communities cultivate native potatoes, maize and other Andean crops and livestock mainly for subsistence use. In the Potato Park, almost everyone adheres to the cultural values and customary laws, while in the RCL it is mainly the elders and traditional women farmers who adhere to traditional values and laws. There is also high population density in Rabai, which means smaller landholdings and higher pressure on natural resources, and a greater degree of industrialisation (for example, a sand mine) and influence from urbanisation due to its fairly close proximity to a major city (Mombasa). Unlike the Potato Park, the Rabai community does not have legally recognised collective land rights over its territory, and its traditional governance system is currently limited to the sustainable management of *Kaya* forests, rather than covering the entire landscape. These differences could be addressed through community learning exchanges with the Potato Park as well as awareness raising, in order to successfully establish a BCHT in Rabai. The Potato Park model can also be modified to address the unique character and challenges in Rabai.

To address land tenure issues for the successful establishment of a BCHT in the Rabai community, sensitisation and consensus building among community members is required from village level to landscape level. This will enhance community 'buy-in' to set aside land for the conservation and livelihoods initiatives associated with the territory. Establishing a BCHT will also require the establishment of a collective governance institution with representatives from each village to collectively govern the landscape. The *Kaya* council of elders has been reformed to include women. However, a new institution could be created which includes *Kaya* elders, village elders, women and community researchers for balanced representation and equal participation in decision making regarding the management of the landscape and associated natural resources.

6.2.2 Adapting the Potato Park model and its 'decolonising' methodology to the local context

Key components necessary for the successful establishment of a BCHT in the Rabai community include community sensitisation, empowerment of community researchers, reforming traditional governance structures and strengthening existing landscape management approaches. Community sensitisation and awareness on the multiple benefits associated with the establishment of a BCHT — including agrobiodiversity conservation, enhanced capacity of the community to adapt to climate change, improved income, preservation of cultural heritage, improved health, and improved food and nutrition security — is needed to enhance community engagement. Besides, the community researchers should

be empowered to collect and generate information that can guide timely development of management interventions that promote sustainable landscape management and biocultural heritage. In this way, community researchers can act as change agents and help to identify challenges and opportunities for improved landscape management based on traditional practices. They therefore act as a bridge between the community and technical experts from relevant government institutions and NGOs involved in the management of the RCL.

To adapt the Potato Park's 'decolonising' methodology to the local context, community researchers and the Rabai population should be sensitised about their rights as Indigenous Peoples under international and national law to start establishing a movement for the assertion of these rights. This requires more literature and field research on Indigenous concepts and research methods and tools of the Rabai-Mijikenda-Bantu groups; and greater support for decolonising action research processes that revive these Indigenous concepts/worldviews, methods and tools, and support decision making by Indigenous organisations (*Kaya* elders, village authorities, community researchers).

Moreover, the traditional governance structure (the *Kaya* Elders' Council), which focuses on the conservation of *Kaya* forests and whose representation is not all-inclusive, should be reformed. It should include women, youth, village elders and community researchers, and should expand its mandate to cover the entire landscape and ensure the decision-making process takes into consideration the diverse views of all stakeholders. Present management approaches operate in a 'siloed' culture where different biological elements of the landscape like forests, rivers, hills and agricultural land are all managed by different external institutions. For instance, *Kaya* forests are under the management of NMK, rivers are under Water Resources Management Authority (WRMA), and agricultural land is under the Ministry of Agriculture, Livestock, Fisheries and Cooperatives. Consequently, there is uncoordinated management of the various biological elements within the landscape, and this threatens the rich biodiversity and local livelihoods as well as local culture, because traditional institutions like the *Kaya* Elders' Council and Nyumba Kumi⁸ are not fully involved in decision making. Embracing an integrated landscape management approach that creates synergy among stakeholders offers a clear and coordinated management framework for the successful establishment of a BCHT in the Rabai community.

6.2.3 Enabling factors for establishing a BCHT

A BCHT in Rabai has a high chance of success due to several enabling factors:

- The Rabai Cultural Village brings together different villages and links traditional products to markets
- A strong *Kaya* Elders' Council
- The largely ethnic homogeneity of the community
- A largely dual religion, maintaining traditional beliefs
- A devolved governance system
- Rich biodiversity in the landscape
- Strategic location in the Kenyan tourism circuit.

The cultural village situated in *Kaya* Mudzi Muvya, which was established in 2013 and plays an important role in the preservation of culture and agrobiodiversity, provides a good foundation to leverage on its activities and membership to establish the BCHT. The cultural village has more than 1,500 members drawn from the ten villages that form the RCL. It also provides a platform for sharing information on traditional knowledge-based practices and agrobiodiversity conservation, hence strengthening the community's cultural values of solidarity (*Umwenga*) and collectiveness *Kushirikiana/Kuumbana Bumba* — key for integrated landscape management approaches.

⁸ Small administrative unit within the villages that brings together ten households under an elder.

The *Kaya* Elders' Council is the highest decision-making organ in the Rabai community, and is recognised by the Kenyan constitution. Therefore, any decisions made by the council on behalf of the community are binding. As such, the Elders' Council has rules and regulations that govern the management of the landscape, with special focus on the *Kaya* forests. The rules and regulations help to preserve the community's cultural practices and promote traditional knowledge-based practices that have governed the sustainable management of the RCL and natural resources for generations. The council of elders is a key enabling factor in the establishment of a BCHT in the Rabai community.

The RCL is mainly inhabited by the Rabai community (96%); the largely ethnically homogenous nature of the community and their associated cultural practices makes it easier to build consensus on the establishment of a BCHT. The RCL also has rich biodiversity, including crop wild relatives (cowpeas, coffee). This provides a robust justification for the establishment of a BCHT: to protect and conserve threatened diverse plant and animal genetic resources that support local livelihoods. Moreover, the strategic location of the RCL within Kenya's coastal tourism circuit (near Mombasa) presents an opportunity for the community to generate alternative income from ecologically and culturally friendly tourism. This is because the unique nature of *Kaya* forests and the associated cultural heritage are key attractions to both domestic and international tourists.

The devolved governance system brought about by the Kenyan Constitution of 2010 has delegated the functions of agriculture, forest extension services and culture to the county governments. These services have been moved closer to the local communities. Hence the establishment of a BCHT will tap into the Kilifi county government departments of agriculture, environment, natural resources and culture, working on the ground to provide technical support and advisory services for effective conservation of agrobiodiversity and preservation of culture. The technical personnel from the county also act as a link between the community and the policymakers, offering opportunities for inclusion of local community in the policymaking process. There is also growing recognition of Indigenous Peoples by Kenya's government institutions and legal framework.

6.2.4 Constraints to establishment of a BCHT in Rabai

There are constraints that hinder the process of establishing a BCHT in the Rabai community. First, infrastructure development taking place within the vicinity of the RCL is reducing land under crop farming as well as negatively impacting agrobiodiversity conservation. Land-use planning that recognises the importance of BCHTs in sustaining local economies should be adopted to guide development in such sensitive agro-ecosystems. The proximity of the RCL to Mombasa city threatens the existence of traditional knowledge-based practices and associated cultural values due to the influence of modernity and the migration of the youth and middle-aged people to the city in search of employment. An integrated landscape management approach that creates alternative sustainable income streams for the local population can mitigate this challenge. This re-emphasises the need to establish a BCHT that encompasses traditional agro-industries at cottage level.

The rapid loss of traditional knowledge, practices and cultural values constrains the establishment of a BCHT in the Rabai community. Traditional knowledge, practices and cultural values are not being transferred from older generations to the youth due to modernisation, mainstream religions (which are growing as the population increases), and out-migration to urban areas. The loss is further exacerbated by the association of traditional knowledge with witchcraft, making traditional knowledge unattractive to the youth. Awareness creation among the youth and middle aged, together with the revival of spiritual values and worldviews and strengthening of economic incentives and biocultural enterprises, could go a long way in changing their perception and attitudes towards appreciating the value of traditional knowledge, practices and cultural values.

Private land tenure, where land is owned by individuals, poses a challenge to collective agreement to set aside the whole Rabai landscape for conservation and livelihoods initiatives. Establishing a BCHT should help to prevent the widespread sale of land that may threaten the sustainability of conservation and livelihood initiatives in the landscape.

7. Conclusions and recommendations

7.1 Conclusions

Indigenous worldviews about wellbeing, cultural values and customary laws are contributing to sustainable development through conservation of agrobiodiversity, crop diversification and resilient farming systems. Moreover, the cultural values of solidarity (*Umwenga*), reciprocity (*Kufaana*), equilibrium (*Soyosoyo*) and collectiveness (*Kushirikiana/Kuumbana Bumba*) help to bind the community (promote social cohesion) to take a common approach in development matters. Traditional crop varieties, resilient to the impacts of climate change, such as increased incidences of pests and diseases and prolonged drought, are increasingly being grown by most members of the Rabai community to obtain high crop yields. Diversification of crops ensures availability of food in case of the failure of particular crops, thus enhancing food security for the Rabai community. Cultivation of wild fruit and medicinal trees on farmland by herbal practitioners and farmers with rich traditional knowledge contributes to biodiversity conservation by reducing the loss of rare plants that the community depends on for survival. Fruits are shared among community members in the spirit of solidarity (*umwenga*). The trees planted on farmland have medicinal value and are used to make medicinal products to treat livestock diseases and control and manage crop pests, thus enhancing food security for the whole community. Cultivation on-farm also ensures the conservation of agrobiodiversity, which is very important for community adaptation to climate change, and food and nutrition security.

The Indigenous worldview of the Rabai community also contributes to sustainable development by considering ancestral land as sacred and prohibiting its sale to outsiders. This has helped to safeguard the land from unsustainable practices often associated with modern infrastructure development. Moreover, taboos and beliefs that prohibit the destruction and unsustainable use of coconut trees and their associated products have ensured that the tree is highly revered by the community as a sacred tree whose destruction is equated to killing a human being. The tree is also preserved for its multiple benefits to the community. Similarly, traditional religious beliefs and customary laws protect *Kaya* forests from logging and grazing.

However, the study identified one cultural practice that hinders gender equality and sustainable and equitable development. Only men can inherit land and this prevents the active participation of women in farming decisions. Since women conduct many farming activities, and promote resilient traditional crops, limiting their role in decision making regarding land use can compromise food security and sustainability. The association of traditional knowledge with witchcraft has led to disagreements over inheritance of land between youth and elders and the killing of elderly *Kaya* elders by the youth. The negative perception of traditional knowledge has further resulted in a lack of traditional knowledge transfer from older generations to the youth.

There were observed differences in the level of application of traditional knowledge among the elderly, middle aged and youth. The elderly (85%) recognise and apply traditional knowledge, followed by the middle aged (30%) while youth's recognition of traditional knowledge was the least (15%). The low recognition of traditional knowledge by youth was attributed to modernisation, out-migration to urban areas in search of employment and the resulting limited interaction with the elderly, which therefore hinders traditional knowledge transfer. Villages with *Kaya* forests were found to be richer in wild food and medicinal plants due to the rich biodiversity found in the forests, while those located near urban centres such as Bomani, Kaliangómbe and Mgumo wa Patsa have been negatively impacted by infrastructure development such as road construction, establishment of industries, mining and commercial building construction. This leads to a low number of wild plants as well as low recognition of traditional knowledge. The low recognition of traditional knowledge by members residing in villages near urban areas was attributed to the influence of modernity. Both poor men and women were found to apply traditional knowledge more than middle-income earners and the rich due to their greater reliance on natural resources to support their livelihoods. Due to duality, religion was found not to affect the recognition and application of traditional knowledge in the Rabai community.

The number of biodiversity-rich ecosystems such as rivers, hills and forests in each village also influenced the level of agrobiodiversity conservation and recognition of traditional knowledge. This is because biodiversity-rich areas such as forests, hills and rivers provide venues for performing cultural

rituals that are key to sustaining traditional knowledge, and are considered sacred. There is an intrinsic relationship between biodiversity and cultural values; prohibited access to *Kaya* forests, Mizimu, Vichaka vya Bahasi and Vichuguu, which are used for performing cultural rituals and ceremonies, helps to ensure that the biodiversity therein is preserved. Seeds of indigenous crops such as maize, millet and sorghum, and livestock (black chicken, black sheep and cows) have also been preserved for their use in performing cultural rituals that entail the offering of grains and slaughtering of animals to appease ancestors. Medicinal plants are also preserved for their use in healing rituals. Moreover, the cultural values of reciprocity (*Kufaana*), equilibrium (*Soyosoyo*), collectiveness (*Kushirikiana/Kuumbana Bumba*) and solidarity (*Umwenga*) are important for enhancing the sustainable management of natural resources, social cohesion and preservation of traditional knowledge and related practices. Equity was not found to be a cultural value as such but is encapsulated in the values of equilibrium (balance with nature and in society), and solidarity (helping those in need).

The Potato Park model is an effective model that has been successfully applied in the conservation of agrobiodiversity by the *Quechua* community in the Peruvian Andes. This model should be adapted to the local context to address the uniqueness of the Rabai Cultural Landscape. This includes unique crop varieties (for example cowpeas and other indigenous vegetables), private land ownership and a traditional governance system (the *Kaya* Elders' Council) which is limited to the sustainable management of *Kaya* forests and not the entire landscape. Successful adoption of the Potato Park model to the local context requires:

- Community sensitisation and revitalisation of traditional knowledge and spiritual values
- Empowerment of community researchers
- Reform of traditional governance structures to be all inclusive and have a landscape management mandate
- Developing biocultural enterprises
- Refocusing existing landscape management approaches to encompass integrated landscape management.

To address land tenure issues for the successful establishment of a BCHT in the Rabai community, sensitisation and consensus-building among members of the community is required from village level to landscape level. This will enhance community 'buy-in' to ensure private land is used for conservation and sustainable livelihoods, in line with Rabai cultural values and customary laws that promote conservation and equity. Regarding the traditional governance system, the *Kaya* Elders' Council should either be reformed to include women and representatives from each village authority, or a new institution could be created which includes *Kaya* elders, village elders, women and community researchers for balanced representation and equal participation in decision making regarding the management of the landscape and associated natural resources.

7.2 Recommendations

The study recommends the following:

1. Creation of a new governance institution that includes women, youth, village elders and community researchers. It should expand its mandate to cover the entire landscape and ensure that the decision-making process takes into consideration the diverse views of all stakeholders. Because the current institution of *Kaya* Elders' Council is limited to conservation of *Kaya* forests, it leaves out the farmlands and its representation is not all-inclusive.
2. Ensuring the landscape is managed in an integrated and sustainable manner by moving from a siloed culture to a coordinated approach to resource management. This will be achieved by bringing together diverse stakeholders involved in the management of different aspects of the landscape including *Kaya* elders, community members, CBOs, NGOs and different government agencies (Ministries of Agriculture, Environment and Culture; National Museums of Kenya; Kenya Forest Service; KEFRI; local administration).

3. Formulating enabling policies that recognise and protect Indigenous Peoples, their rights, governance system, biocultural resources, and traditional farming practices, and support informal seed systems for agrobiodiversity conservation, in order to support the successful establishment of a BCHT in the Rabai community.
4. Ensuring that infrastructure development projects recognise Rabai as a protected biocultural landscape and community conserved area, and respect the customary rights of Indigenous communities over their ancestral landscape. This includes through the application of free, prior and informed consent with the *Kaya Elders' Council* and the implementation of the UN Declaration on the Rights of Indigenous Peoples.
5. Supporting community-led decolonising action research processes that enable communities to establish collective landscape governance systems (including agreement on key cultural values/principles and customary laws). Create biocultural micro-enterprises, while promoting the revitalisation of Rabai cultural identity and spiritual beliefs, enhancing engagement and ownership of different actors (including village leaders and youth), and enhancing community capacity for research, collective action and policy engagement. This process can be supported by appropriate flexible funding, bottom-up facilitation, technical support, and horizontal learning exchanges with the Potato Park.

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