OGIEK PEOPLES' DEVELOPMENT PROGRAM

NATIONAL MUSEUMS OF KENYA

WHERE HERITAGE LIVES ON

Indigenous and Local Knowledge Practices for Pollinator Conservation and Sustainable Land Management in Eburu Ecosystem, Kenya

OGIEK PEOPLES' DEVELOPMENT PROGRAM

NATIONAL MUSEUMS OF KENYA

WHERE HERITAGE LIVES ON

Indigenous and Local Knowledge Practices for Pollinator Conservation and Sustainable Land Management in Eburu Ecosystem, Kenya

Published in 2024 by the National Museums of Kenya,
P.O. Box 40658-00100, Nairobi,
Museum Hill Road, Kipande/Ngara Road Junction.

ISBN: 9966-955-21-6

Disclaimer

The contents of this publication do not necessarily reflect the views or opinions of the BES-Net consortium partners of UNESCO and UNDP, nor their supporting partner, the Government of Germany. The designations employed and the presentation of material throughout this publication do not imply the expression of any opinion whatsoever on the part of UNESCO, UNDP or contributory organisations concerning the legal status of any country, territory, city or area or its authorities, or concerning the delineation of its frontiers or boundaries. UNESCO and UNDP are not responsible for errors, omissions or discrepancies in data and content presented. The mention of a commercial entity or product in this publication does not imply endorsement by UNESCO or UNDP.

This book should be cited as

Kenya National Trialogue and Eburu Communities (2024). *Indigenous and Local Knowledge Practices for Pollinator Conservation and Sustainable Land Management in Eburu Ecosystem, Kenya*. National Museums of Kenya, Nairobi.

Authors

John Samorai Lengoisa
Peris Mweru Kariuki

Editors

Joseph Muiruri Karanja
Marlyn Omondi

Proofreader

Francisca Kilonzi

Design and Layout

Epic Enterprises (Kenya)

Photos

Cover photo © KNT

In partnership with:

BESNet Biodiversity and Ecosystem Services Network

unesco

UNDP

Supported by:

Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection

based on a decision of the German Bundestag

IKI INTERNATIONAL CLIMATE INITIATIVE

Foreword

Inspired by the two interlinked IPBES thematic assessment reports on *Pollinators, Pollination and Food Production* (2016) and *Land Degradation and Restoration* (2018) that underscored the critical role of Indigenous and local knowledge in conserving pollinator species and land management and restoration efforts, this publication highlights the invaluable contributions of Indigenous Peoples and local communities in fostering sustainable practices of biodiversity conservation through a detailed case study of the Eburu ecosystem. The case study explored how these communities play an essential role in conserving pollinators and the Eburu landscape.

The collaborative efforts of the Ogiek Peoples' Development Program and the National Museums of Kenya, facilitated under the framework of the Kenya National Trialogue and in partnership with the Biodiversity and Ecosystem Services Network as well as the Indigenous and local knowledge holders at Eburu, have culminated in the documentation of Indigenous and local knowledge and practices promoting pollinator conservation and sustainable land management in the Eburu ecosystem.

By bridging Indigenous and local knowledge with scientific evidence, this booklet presents feasible practices for advancing land degradation neutrality and pollinator conservation for enhanced food productivity and security. These efforts align with the goals set forth in the Kunming-Montreal Global Biodiversity Framework, which aims to halt biodiversity loss and enhance the sustainable use of biodiversity and ecosystem services. In line with this Framework, this publication showcases how community-led initiatives informed by their Indigenous and local knowledge could contribute to the achievement of national biodiversity targets.

I hope this booklet will serve as an inspirational model for promoting ecosystem resilience and cultural preservation, demonstrating the value of diverse knowledge systems in developing sustainable and culturally compatible solutions to contemporary environmental challenges.

Nigel Crawhall,

Chief of Section,
Indigenous and Local Knowledge Section, UNESCO.

Preface

In an era where modernity and technological advancement prevail, Indigenous and local knowledge systems face the risk of being marginalised. This publication seeks to bridge this gap by connecting Indigenous, local, and scientific knowledge with policy making and implementation. This publication is not merely a compilation of practices but a testament to the harmonious coexistence between humanity and nature overtime.

Meticulously crafted, this booklet gathers, preserves, and disseminates invaluable Indigenous and local knowledge on pollinator conservation and agroecosystem management. Its primary purpose is to safeguard this knowledge for posterity, ensuring that future generations can learn from and build upon it.

This booklet transcends documentation, blending traditional and scientific practices for effective, sustainable environmental stewardship. Targeting farmers, beekeepers, teachers, agricultural extension workers, scientists, conservationists, and policymakers, it offers tools and knowledge to enhance interactions with nature, improve conservation practices, and upscale local sustainable initiatives while preserving the integrity of the ecosystem. This significant work is as a result of collaboration between Indigenous Peoples and local communities of Eburu, government institutions, and civil society groups, all dedicated toward enhancing policy evidence for sustainable biodiversity conservation.

We extend our heartfelt gratitude to the diverse Eburu communities, including Eburu Ogiek, Kamba, Kikuyu, Kisii, Luhya and Luos for their contributions. We also acknowledge external invited knowledge holders of the Mau-Ogiek, Kamba, and Tharaka communities. Their insights have enriched this booklet, making it a practical guide and a living document reflecting Kenya's diverse wisdom.

It is our hope that this booklet will serve as a guiding light, illuminating the path towards a future where traditional wisdom and scientific innovation converge to foster a sustainable and balanced relationship with our natural world.

Mr. Daniel Kobei,
Director,
Ogiek Peoples Development Program.

Prof. Mary Gikungu,
Director General,
National Museums of Kenya.

Acknowledgments

The Kenya National Trialogue (KNT) organisations spearheading the Indigenous and local knowledge (ILK) workstream, Ogiek Peoples' Development Program (OPDP), and the National Museums of Kenya (NMK), extend their appreciation and recognition of the ILK technical and capacity building support provided by the Biodiversity and Ecosystem Services Network (BES-Net) ILK Support Unit, led by the Local and Indigenous Knowledge Systems (LINKS) Programme at the United Nations Educational, Scientific and Cultural Organization (UNESCO).

Their invaluable ILK guidance and on the ground support were instrumental in the development of this booklet. We also express our gratitude for the invaluable knowledge-sharing and contributions provided by the Indigenous and local communities in Eburu, such as the Eburu Ogiek, Kikuyu, Kisii, Luhya, among other local Eburu communities. Their valuable inputs, including participation in follow-up data collection, community feedback sessions, and validation processes, has been instrumental in the creation of this booklet.

Additionally, we extend our thanks to the invited external ILK holders from the Indigenous and local communities of the Mau-Ogiek, the Kamba community representative from Kitui, and the Tharaka community representative from the Society for Alternative Learning and Transformation (SALT) organisation.

We acknowledge the support of the KNT team, led by Mr. Washington Ayiemba of United Nations Development Programme (UNDP) for assistance in organising and preparing the logistics for the walking-workshop. Additionally, we extend our heartfelt gratitude to the KNT team members from OPDP, NMK, the Kenya Forestry Research Institute (KEFRI), and UNDP Kenya country office, for supporting the workshop.

Our heartfelt appreciation also goes to our BES-Net consortium partners, UNDP and UNESCO, for their technical support in the implementation of KNT's BES Solution Fund work plan. Our gratitude extends as well to our BES-Net focal points, Ms. Marlyn Omondi from UNDP and Dr. Joseph Karanja from UNESCO, for their guidance and valuable insights, including during the walking workshop as well as reviewing this booklet. Finally, we extend our sincere gratitude to the International Climate Initiative (IKI) under the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection of the Government of Germany for their generous financial support through the BES-Net initiative.

By the Authors

Table of Contents

Acronyms

ADC	Agricultural Development Corporation
BES-Net	Biodiversity and Ecosystem Services Network
CFA	Community Forest Association
ILK	Indigenous and local knowledge
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
KALRO	Kenya Agricultural and Livestock Research Organization
KEFRI	Kenya Forestry Research Institute
KenGen	Kenya Electricity Generating Company
KES	Kenya Shillings
KFS	Kenya Forest Service
KNT	Kenya National Trialogue
LDN	Land Degradation Neutrality
LINKS	Local and Indigenous Knowledge Systems
NEMA	National Environment Management Authority
NGOs	Non-Governmental Organisations
NMK	National Museums of Kenya
OPDP	Ogiek Peoples' Development Program
PELIS	Plantation Establishment and Livelihood Improvement Scheme
SDGs	Sustainable Development Goals
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation

Target Audience

While the booklet is designed to be accessible to a general audience, it specifically targets community members such as farmers and beekeepers. Its goal is to prompt readers to reflect on the importance of Indigenous and local knowledge alongside scientific and technical knowledge, emphasising the complementarity of these knowledge systems in daily life. By fostering an appreciation of diverse knowledge systems, the booklet aims to promote their cross fertilisation for improved livelihoods, cultural preservation and environmental conservation.

This resource is designed as a practical and inspirational guide, equipping the users with essential information to manage their interactions with nature more effectively, adopt/enhance their sustainable practices, and learn new techniques for upscaling their efforts. Furthermore, the publication will serve as a valuable tool to teachers, agricultural extension workers, conservationists, and policymakers at both the national and county levels in blending Indigenous and scientific knowledge to enhance the conservation of pollinators and ecosystems. By offering a blend of text and visual content, the booklet is intended to be engaging and easily understandable, making it a useful resource for daily use and long-term reference.

Executive Summary

The booklet has been developed to showcase the Indigenous and local knowledge and practices of pollinator conservation and farmland management techniques practised by diverse ethnic communities in the Eburu landscape. Eburu is an important ecosystem for biodiversity conservation and provides habitat to threatened and endangered bird and animal species, such as the critically endangered mountain Bongo (Tragelaphus eurycerus isaaci). Eburu is also home to the Indigenous Ogiek/Ndorobo community, which has now integrated well with local farming communities. These communities actively exchange knowledge and practices on environmental management and farming techniques that prioritise water, soil, and land conservation.

This case study emphasises the need for strengthened collaboration between relevant government agencies and Indigenous and local communities, not only to promote pollinator conservation and land restoration, but also ensure the preservation and intergenerational transfer of Indigenous and local knowledge. Furthermore, connecting scientific research with traditional ecological knowledge builds robust evidence for resilient ecosystems and empowers communities to enhance biodiversity and their cultural heritage.

Eburu communities are working together through the participatory forest management approach to co-manage the Eburu forest. The community has been organised into community forest associations with various forest user groups, including beekeepers, tree nursery propagators, and tourism operators and guides, all working together for the wellbeing of both the community and the ecosystem.

The booklet reveals that the Indigenous and local communities often coexist harmoniously with nature, achieving a blend of biological and cultural diversity. It highlights lessons on Indigenous and local knowledge, innovations, and practices that ultimately promote food production through pollination conservation and eco-friendly farming techniques, such as fallow farming, mixed cropping, agroforestry, rotational farming, and use of foliar fertilisers and organic pesticides.

It is designed for practitioners, scientists and policy makers, while also serving as a learning tool for local farmers and community members to draw lessons and learn from each other on pollinator conservation and sustainable agricultural practices rooted in Indigenous and local wisdom. This interface provides an opportunity for scientific investigation and knowledge exchange across diverse knowledge systems, enabling evidence-based decision making and practical guidance for farmers and policymakers, thereby strengthening efforts in pollinator conservation and land restoration.

Indeed, innovation, technologies, practices, co-produced knowledge, and lessons acquired from both science and Indigenous and local knowledge could lead to better informed

policies on land management, pollinator conservation, and biodiversity conservation. These advancements are essential for accelerating the achievements of national land degradation neutrality targets, Kunming-Montreal Global Biodiversity Framework targets, and Kenya's National Biodiversity Strategy and Action Plan.

We hope the lessons from the booklet will go a long way to promote co-production of knowledge by leveraging diverse knowledge systems, including scientific, Indigenous and local knowledge, ensuring that biodiversity and agricultural policies and actions are informed by all available knowledge and information.

©KNT

©KNT

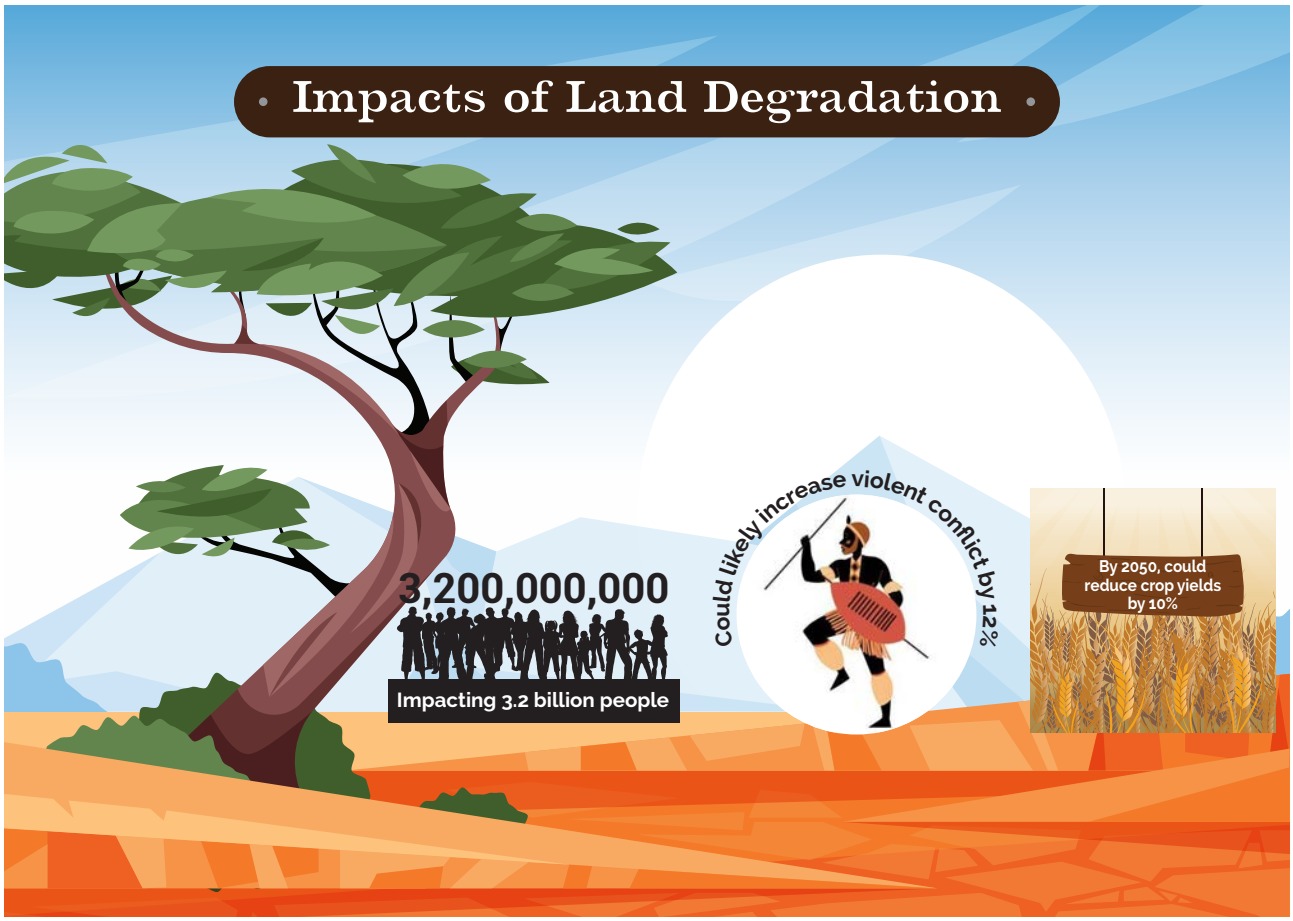
Chapter I:

1. Background

1.1 Introduction

According to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2019) global assessment, 75% of the Earth's land surface has been significantly altered by multiple human drivers. The IPBES (2018) Land and Restoration Assessment further revealed that human induced land degradation is negatively impacting the well-being of at least 3.2 billion people globally. It is also leading to extinction of species and costing more than 10% of the annual global gross products in loss of biodiversity and ecosystem services.

Moreover, land degradation increases the likelihood of violent conflict by 12% and could force between 50 to 700 million people to migrate by 2050. The implications for food security are severe. By 2050, land degradation and climate change are projected to reduce crop yields by an average of 10% globally (IPBES, 2018).



Additionally, land degradation and poor land management practices contribute to the decline of pollinators, which are critical to land productivity and food production (IPBES, 2016; IPBES, 2018). The IPBES (2016) Pollinators, Pollination and Food Production Assessment estimated that pollinator-dependent crops contribute about 35% of global production volume. While there is evidence of declining pollinator diversity and occurrence, data on species identity, distribution, and abundance remains limited in Africa (IPBES, 2016).

Acknowledging the environmental and societal risks posed by land degradation and pollinator decline, there is an urgent priority to combat land degradation, restore degraded land, and conserve pollinators to enhance food and water security and ensure the sustainable conservation of biodiversity and ecosystem services. Partly in response to these challenges, two of the three Rio Conventions have introduced frameworks and targets aimed at promoting and enabling land and ecosystem restoration and conservation, which include: Land Degradation Neutrality set by the United Nations Convention to Combat Desertification, and the Kunming-Montreal Global Biodiversity Framework of the UN Convention on Biological Diversity. Furthermore, the UN Decade on Ecosystem Restoration (2021-2030) seeks to prevent, halt and reverse the degradation of ecosystems globally.

The two interlinked IPBES thematic assessments on Pollinators, Pollination and Food Production (2016) and Land Degradation and Restoration (2018) revealed that diverse knowledge systems, including scientific, Indigenous and local knowledge offer credible evidence and valuable insights for informed decision-making. Land management practices based on Indigenous and local knowledge and community-based natural resource management systems have been cited as effective in avoiding and reversing land degradation in many regions (IPBES, 2018). Furthermore, there is well established evidence that diverse knowledge systems, including science and Indigenous and local knowledge, contribute to understanding of pollinators and pollination, and their economic, environmental and socio-cultural significance. For instance, cultural practices based on Indigenous and local knowledge contribute to pollinator abundance and diversity, while also maintaining biocultural diversity (IPBES, 2016).

In this context, Indigenous and local knowledge systems are increasingly recognized as essential components of sustainable land management and pollinator conservation (Hill et al., 2020). However, as highlighted by IPBES assessments (IPBES, 2016; IPBES, 2018), much of this knowledge and practices remain undocumented. To help bridge this gap, this publication examines the contributions of Indigenous Peoples and local communities in fostering sustainable practices of biodiversity and land conservation through a case study of the Eburu ecosystem in Kenya. The Eburu ecosystem was chosen both for its significance as a target site under Kenya's land degradation neutrality targets and for the diverse landscapes and ethnic communities present in the area. This case study sought to explore how Kenya can leverage Indigenous and local knowledge to advance pollinator conservation and land restoration, supporting ongoing efforts in food security and ecosystem restoration.

1.2 Establishment of the Kenya National Trialogue

Kenya was one of the six Anglophone African countries targeted for the third Regional Trialogue (three-way dialogues to promote the science-policy-practice interface) conducted by the Biodiversity and Ecosystem Services Network (BES-Net) initiative which works to promote the uptake of IPBES assessments by enhancing dialogue, engagement, and coordination among science, policy and practice communities to foster collaborative biodiversity action on the ground. The event, held in Nairobi from 28-30 May 2019, aimed to raise awareness on the key messages of the two inter-linked IPBES thematic assessments on Pollinators, Pollination and Food Production (2016), and Land Degradation and Restoration (2018). Additionally, the Trialogue aimed at promoting policy-science-practice interface for the uptake of the IPBES assessment key findings and recommendations in line with the ongoing efforts toward land degradation neutrality and related sustainable development goals (SDGs) targets.

Following the Trialogue, the Kenya National Trialogue (KNT) was established in 2019 as a multi-stakeholder coordination platform focused on strengthening the implementation of IPBES assessments and advancing biodiversity conservation. KNT is anticipated to be domiciled at the Ministry of Environment, Climate Change and Forestry as part of formalising its engagement. Its operations are largely supported by the UN Development Programme (UNDP). The KNT membership secretariat consists of the National Museums of Kenya (NMK), Kenya Forestry Research Institute (KEFRI), the Ogiek Peoples Development Program (OPDP), Kenya Plant Health Inspectorate Service (KEPHIS), and National Environment Management Authority (NEMA).

KNT acknowledges the value of working with multiple knowledge systems and disciplines to promote land restoration and pollinator conservation. The role of the OPDP, with the support of NMK and in coordination with the UN Educational, Scientific and Cultural Organization (UNESCO), is to ensure meaningful engagement of Indigenous Peoples and local communities in KNT activities, recognizing them as critical knowledge holders and rights-holders in land restoration and pollinator conservation efforts.

KNT has been conducting national and county multi-stakeholder dialogue events for science, policy and practice communities, thereby providing a platform for the cross exchange of knowledge and best practices on pollinator conservation and land restoration. The initial event primarily focused on expanding the KNT network by mobilising additional stakeholders including knowledge holders and the rights-holders from policy and practice communities to foster enriched learning. These dialogues have played a vital role in linking research, policy making and practice in the case study of Eburu, helping to identify the concerns and opportunities for the conservation of the Eburu ecosystem.

Inspired by the IPBES thematic assessments on Pollinators, Pollination and Food Production and Land Degradation and Restoration, since 2020, KNT has undertaken a project in the

Eburu ecosystem seeking to leverage Indigenous and local knowledge to promote pollinator conservation and land restoration.

1.3 Project Objectives

This community participatory project had research, knowledge sharing, and peer-to-peer capacity building objectives, which were:

- To explore and document Indigenous and local knowledge and cultural practices supporting pollinator conservation, abundance and diversity in the Eburu ecosystem.
- To document Indigenous and local knowledge-based land management and restoration approaches and practices in the Eburu ecosystem.
- To provide a platform for cross exchange of knowledge and best practices on pollinator conservation and land restoration among the Eburu communities.
- To create awareness on the importance of preserving cultural heritage and ensuring that valuable knowledge is passed down to future generations, thereby strengthening community resilience and environmental stewardship.

In nutshell, by interweaving traditional ecological knowledge and practices with modern conservation techniques, the project sought to promote sustainable solutions that benefit both the environment and local communities. It is anticipated that the Eburu case study will serve as a model case study and that this publication will act as a valuable record for posterity, ensuring that these practices are documented for continued use and potential upscaling within the wider community.

Chapter II:

2. Implementation of Community Participatory Research and Knowledge Sharing in Eburu.

2.1 Methodology

2.1.1 Study Site: Eburu Forest Ecosystem

The research was conducted in the Eburu forest ecosystem, selected for its rich biocultural diversity and its designation as a key priority site for Kenya's land degradation and neutrality targets. Located in the mountainous regions of Kenya's Great Rift Valley, west of Lake Naivasha, the Eburu forest ecosystem is renowned for the conservation of the critically endangered mountain bongo antelope (Tragelaphus eurycerus isaaci) (Rhino Ark Kenya Charitable Trust, 2017; McLeish, 2020).

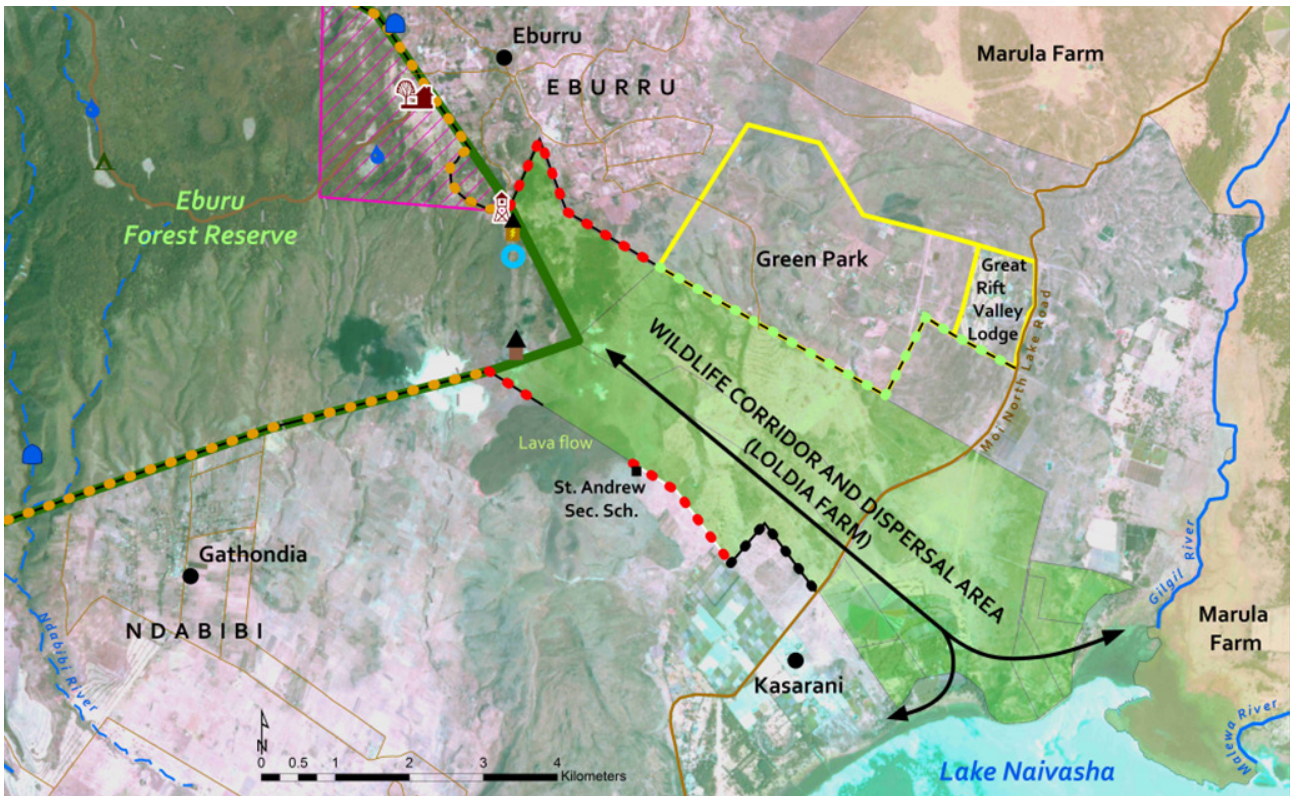


Figure. 2.1. Eburu Forest Ecosystem (McLeish, 2020)

Eburu also is a home to the minority Indigenous group of Ogiek, who have intrinsic connection with the ecosystem, relying on it for beekeeping, grazing, and forest conservation (McLeish, 2020). It also boasts of hosting a diversity of cultures and ethnic communities, including Kamba, Kikuyu, Luhya, Meru and Turkana, whose livelihoods of farming and pastoralism have blended and integrated into the local area. In most cases, the diverse cultural practices and cross knowledge exchange among the Indigenous and local communities of Eburu were observed to support and enhance pollinator abundance and diversity and land restoration.

Guided by the provisions of the Kenya Forest Conservation and Management Act (2016), the Eburu community is organised into a community forest association (CFA) to facilitate forest co-management between the government lead agency in forest conservation, Kenya Forest Service (KFS), and resource users and right-holders, who are the Indigenous and local communities of Eburu. The communities in Eburu CFA interact with the ecosystem in their various user rights groups such as grazing, eco-tourism, beekeeping, seed harvesting and tree nursery projects.

The Eburu ecosystem is classified into two distinct sides: the Eastward and the Leeward. The Eastward, located on the windward side, is fairly green and quite productive. While the Leeward (Ol Sirwa), on the westward side, is quite bare and degraded with huge visible erosion activities marked by gullies and lack of permanent vegetation. Rain-fed crop farming provides seasonal vegetation on this side, but it remains vulnerable. This dichotomy within the Eburu ecosystem presents a good learning opportunity on ecosystem degradation and restoration. The Eastward side showcases effective local pollinator conservation and land management practices, while the Leeward side highlights the impacts of land degradation and pollinators' decline. Together, these contrasting case studies provide essential lessons for boosting ecosystem restoration through community participatory processes and practices.

2.1.2 Data collection

This research adopted a multiple evidence-based approach and citizen science approach combined with community-led and participatory data collection methods to gather Indigenous and local knowledge. Through the citizen science approach, Eburu communities were engaged, as knowledge holders and right-holders, in the entire research cycle. Figure 2.2 illustrates the entire participatory research process that was adopted in this study.

To conceptualise and co-design the research, consultation and preparatory meetings for data collection were conducted with the Eburu communities at least one week prior to the commencement of actual data collection activities. During the meetings, community members were tasked to identify suitable sites, select key knowledge holders, and determine knowledge and practices they desired to be documented in relation to pollinator conservation and land management. During the actual data collection, community members largely led and guided data collection activities through their designated knowledge holders.

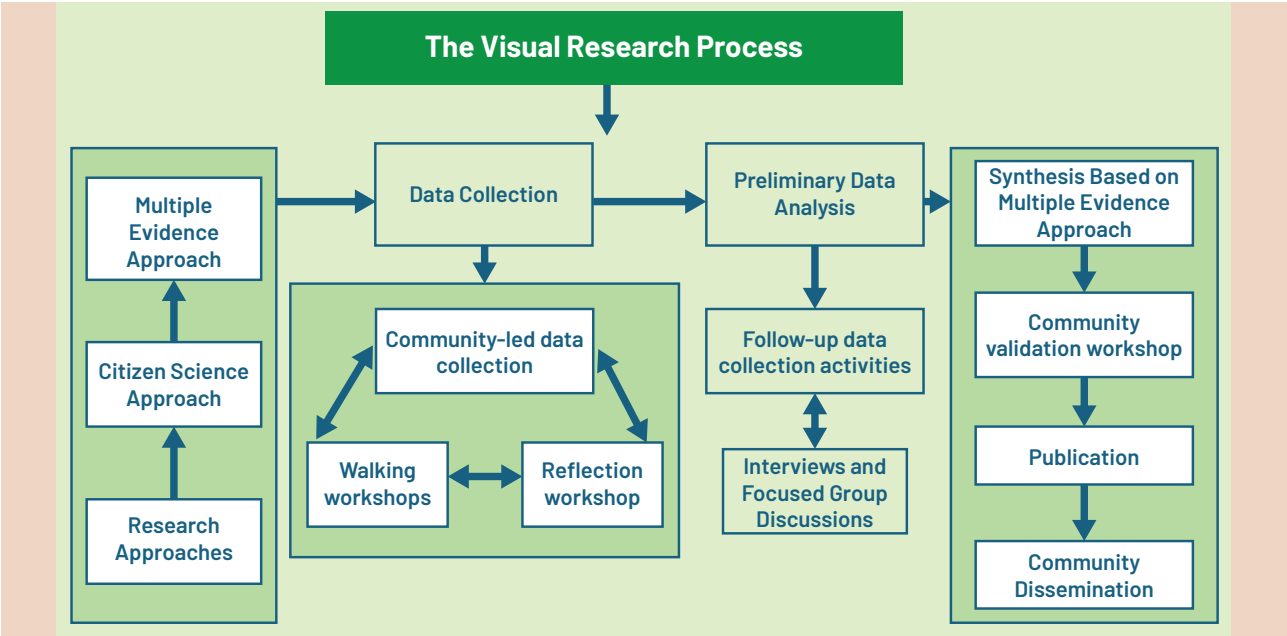


Figure 2.2: Visual illustration of adopted research process

Through the multiple evidence-based approach, the shared Indigenous and local knowledge and practices were recognized as legitimate sources of knowledge and were validated through community settings. The communities played a critical role in validating the research outcomes during the validation and feedback sessions. This participatory validation process ensured that research results were not only theoretically sound but also practically relevant to the communities.

This integration of local expertise provided a robust, holistic perspective that enhanced the overall quality and applicability of the research findings. Engaging the communities at every stage, from data collection to final validation, ensured that the research outcomes were aligned with the actual needs and priorities of local communities it was designed/intended to benefit.

A critical component of this research was the strict adherence to the principle of free, prior and informed consent throughout the process, in accordance with the UN Declaration on the Rights of Indigenous Peoples. This ensured that the Eburu communities were engaged through the research process voluntarily, with full knowledge of objectives, methodologies, and potential outcomes and their implications. This was fundamental in fostering the engagement of Eburu communities in the entire research process and ensuring the research process respected their rights, knowledge, cultures and practices, thereby building trust, ethical engagement, and long-term collaboration.

2.1.2.1 Walking workshops

The data were primarily collected through a walking workshop, a participatory methodology usually led by the local guides (knowledge holders) that enables two-tiers of interactions with the participants and the landscape. Through participants' interaction with the landscapes, the

walking workshop fostered constructive in-situ dialogues, hands-on knowledge exchange, field observation, and demonstrations, thereby activating all five human senses (touch, sight, hearing, smell and taste), allowing participants to experience full sensory immersion in the landscapes. It also provided real time experiences in the field, allowing for reflection on traditional management systems and practices while offering opportunities to share new perspectives and insights.

To further enrich the experience and reflections and provide external perspectives, knowledge holders from three external communities (outside Eburu ecosystem) from Ogiek-Mau, Tharaka and Kamba communities were invited to participate in the workshops. These external knowledge holders, with notable pollinator conservation and/or land management strategies, were invited to participate in walking workshops, enabling cross-community knowledge exchange.

In the Eburu ecosystem, two sets of walking workshops were organised that primarily focused on forest and farming landscapes. The workshops were organised from 29th September to 1st October, 2022.

Figure 2.3: (a) farmland walking workshop (b) farm owner, Mr. Mwenje demonstrating during walking workshop ©KNT

First, a farmland walking workshop was conducted which entailed transect walks in one of the pre-selected farms (by local communities). This was a household farmland run and operated by the husband and the wife, who acted as the walking workshop guide and knowledge providers (Figure 2.3). The farmland walking workshop facilitated interactive dialogues at different stop points between farmers, local communities, Indigenous and local knowledge holders, experts, and scientists on themes such as traditional land management, agroforestry, polyculture (crop diversity), organic farming, on-farm pollinators conservation, natural pest control, and forage, soil and water management. Indeed, this walking workshop served as an on-farm training session to both farming and non-farming communities.

Second, a forest walking workshop (Figure 2.4) was conducted in the Eburu forest and was led by Indigenous Ogiek, popularly known as Ndorobo. Led by their elders, the Ogiek explained

and demonstrated different values and attributes of the forest, including pollinator friendly forages, medicinal plants and wild vegetables that contributed to their health and wellbeing. Additionally, different cultural activities, including honey harvesting practices and techniques were demonstrated. The participants appreciated the Ogiek's knowledge, cultural practices, experiences and skills amassed over the years in conserving pollinators like honeybees and birds. Also, a bird watching experience was organised in the Eburu forest to showcase the role of pollinator/bird diversity in forest and crop production.

Figure 2.4: A forest walking workshop conducted in the Eburu forest. © BES-Net

The walking workshops conducted as part of this initiative also assessed the impacts of degraded areas on community livelihoods and cultural practices in Eburu. Some areas were found to have been severely degraded by flash flood erosion and lacked vegetation cover. Despite these challenges, there were community efforts, albeit on a minimal scale, to mitigate the effects of degradation. These efforts included the construction of terraces and trenches, as well as the implementation of soil and water conservation practices. These assessments provided valuable insights into how land degradation affects the daily lives and traditions of the local communities, highlighting the urgent need for effective conservation strategies. These findings are incorporated into the booklet to offer a holistic view of the challenges faced by the local communities and the potential solutions that can be implemented to restore and protect these vital ecosystems.

2.1.2.2 Reflection dialogue workshop

Thirdly, a multi-community and stakeholder dialogue was organised, bringing together diverse ethnic communities that participated in the walking workshops to reflect on and share their perspectives and learnings (Figure 2.5). The engagement of diverse ethnic communities highlighted the interconnections between the forest and farmland landscapes and the link between practised livelihoods and their impact on pollinators and land degradation/restoration. For instance, the participation of farming communities (i.e. Luhya, Kikuyu, and Kamba) in a forest walking workshop led by Ogiek people (historically a forest-dwelling community) demonstrated how pollinator conservation practices, embedded in Ogiek's

cultural and livelihood practices, positively influence pollination on nearby farms. In turn, the farmers gained insights on the harmful effects of pesticides and fertilisers on pollinators and how this impacts not only on crop production but also on the Ogiek's honey harvesting, which relies on a healthy forest ecosystem. The multi-community dialogue revealed a shared appreciation of cross knowledge and cultural exchange, both within the Eburu communities and with external invited communities from other regions.

Figure 2.5. Reflection meeting with knowledge holders and KNT and BES-Net team. © KNT

2.1.3 Community Validation and Feedback

Following a preliminary analysis of the results gathered during the walking workshops, follow-up data collection activities and community validation meetings were organised in June 2023, in the Eburu ecosystem, Kenya (Figure 2.6). The validation was organised in collaboration with the Eburu CFA and the KFS station manager. Approximately 20 community members that had participated in the walking workshops were engaged for follow-up data collection through interviews and focused group discussions. The participants expressed appreciation to the KNT for providing feedback on their earlier work.

Figure 2.6. Community feedback session in Eburu. ©KNT

During the feedback session, photographs and draft documentaries developed/recorded based on the walking workshops were shown to the community. Two video documentaries focused on the role of Indigenous and local knowledge in (a) land degradation neutrality and (b) pollinator

conservation. The land degradation neutrality video further highlighted local practices for soil and water conservation and sustainable agriculture. The community appreciated seeing their efforts showcased and eagerly provided feedback, frequently requesting the videos to be replayed. Following the publication of this booklet, another community feedback workshop will be organised to disseminate the findings emerging from this booklet.

Figure 2.7. Two documentaries on local pollinator and land management practices in Eburu. © BES-Net

Chapter III:

3. Eburu Territorial History and Stewardship

3.1 Settlement in Eburu

According to local history, the Ogiek *(Ndorobo)* are the aborigines of Eburu. Other communities migrated to the area and found the Ogiek already residing in and utilising the Eburu forest through their hunter-gatherer economy. The Eburu community of Ogiek is from the lineage of *Mebarne* that forms one of the main clans of the Eburu Ogiek. According to the culture of the Ogiek, the occupation of the Eburu forest was clan-based and territorial. This allowed the Ogiek families to own and control huge portions of the forest where they sourced food and provided care to the forest. The Ogiek of Eburu occupied places extending from Narianda, Kongoni, Enosupukia, Morindat, Ortut, Gilgil, and Elementaita. Initially, the Ogiek lived in the numerous caves found in Ortut, the lower side of Eburu and Eburu caves in the forest.

Figure 3.1. Two families of Eburu Ogiek. © KNT

As part of the narration accounts by local inhabitants, the Ogiek solely lived in the forest until colonial time in the early 19th century, when other communities were brought in the areas of Naivasha and Gilgil to work in the European highlands. European settlers in the Delamere farms engaged in wheat, sisal, dairy and livestock farming, which demanded a significant labour force. Consequently, labour was outsourced from various parts of the country, which led to the introduction of other communities such as Turkana, Kikuyu, Meru, Luhya and Kalenjins to work on the farms.

According to community dialogues and interviews conducted in Eburu (2022), in the late 1950s during the Mau Mau struggle for independence, the Ogiek community recalls that this was the first time they were ordered out of the forest, due to allegations of harbouring Mau Mau freedom fighters. Following this eviction, the Ogieks lived near European farms until Kenya attained independence in 1963. During this period, they joined other communities working in European farms. They worked for Ex Peter, Ex Lewis, Morgan, Loise, Ex major Sanyoroi – block, and Dalamere farms, and later in the Agricultural Development Corporation (ADC) farms. After independence, the first school was built in 1964 in Ndabibi, south of Eburu Forest Reserve, and the community started taking their children to school.

In 1984, the Eburu communities began settling in Ol Jorai, facilitated by land buying societies that were aiding their relocation. Some Ogiek moved out of the forest to join the Ol Jorai settlement. Around 1995, a new settlement was established in Songoroi village, comprising both Ogiek and other ethnic communities relocated from forest farming areas in an attempt to conserve the forest. Despite this relocation, the participants revealed that to date, most households lack official land documentation and are awaiting issuance of land title deeds or government settlement arrangements.

Following the settlement of diverse communities in the area, the Plantation Establishment and Livelihood Improvement Scheme (PELIS) was introduced by the Kenyan Government around 2007. Regulated by the KFS, PELIS granted forest adjacent communities, through their community forest associations, the right to cultivate agricultural crops during the early stages of forest plantation establishment, typically for 3 to 4 years, until tree canopy closed (KEFRI, 2014). Although PELIS was meant to enhance farmers' livelihoods and forest restoration, it led to widespread farming activities and forest encroachment, resulting in significant destruction of the forest habitat. These practices were eventually halted after massive deforestation of Eburu forest.

3.2 Co-existence

The Ogiek of Eburu are a hospitable community who welcomed diverse ethnic communities that relocated to Eburu in the early 1990s. Their interaction has brought a fusion of cultures and social-economic livelihoods. For instance, the Ogiek shared their protein-based meal of

honey and game meat[1] with their neighbours. In turn, the Bantu communities introduced crop production systems to the Ogiek. With the Bantu families of Kikuyu and Meru, the Ogiek traded their honey and medicinal products in exchange for cereals like maize and beans. The other crops introduced by relocating communities in the areas include banana, potatoes, sweet potatoes, vegetables, sunflower, avocados, plums, and oranges. The farming communities also brought livestock keeping and reared domestic animals including cattle, goats, sheep, pigs, rabbits, and poultry to supplement their production.

Additionally, the Maasai have significantly influenced the Ogiek language and attire. Indeed, partly as a result of the Eburu Ogiek disconnect with the eastern Mau Ogiek and partly due to their assimilation with Maasai people, the Eburu Ogiek have largely lost their Indigenous language and assimilated Maasai as their local language, spoken alongside Swahili. The authentic native Ogiek language is largely spoken by the elders.

In sum, the harmonious integration of diverse communities in Eburu has fostered a resilient community where Indigenous and local knowledge, resources, and cultural practices are exchanged for mutual benefit. This coexistence not only fosters food security and local economies but also strengthens social cohesion, inter-community collaboration, and environmental stewardship, as further elaborated in the subsequent sections.

Figure 3.2. Diverse communities of Eburu in a prayer session. © KNT

1 Some of the animals hunted by the Ogiek for game included the: buffalo, bush hog, wild pig, antelope, bongo, waterbuck, rock and tree hyrax (*nderit*), among others.

Chapter IV:

4. Ogiek Bee Pollinator Conservation for Ecosystem Health and Honey Harvesting

4.1 Introduction

Hunting and gathering is a long-time traditional method of self-sustenance among many Indigenous forest dependent communities. The Ogiek of Kenya is one of the hunter-gatherer communities that thrived on honey harvesting and supplementing their diet with game meat and wild fruits. Beekeeping for the Ogiek is not just an economic activity but also a cultural one, with knowledge passed down through generations and often involving community rituals and ceremonies (Lengoisa, 2015).

By relying on the forest for their livelihood, the Ogiek became custodians and stewards of forest biodiversity, using their traditional knowledge and cultural practices (Koskei, 2021). Their unique way of life, which is adapted and intricately connected to the forest, has enabled them to become adept conservationists, an attribute which is directly linked to their relationship and dependence to their natural ecosystem (Lengoisa, 2015).

For centuries, the Ogiek have been practising honey hunting and gathering lifestyle in the Mau Forest, which they consider as their ancestral home (Prime Minister's Task Force, 2009). As nomadic honey gatherers/hunters, the Ogiek used bees and birds to interpret seasons and thus were able to migrate from lowlands (*Sooywo)* to highlands (*Moo)* in search of honey (Lengoisa, 2015). Today, honey gathering from rock crevices and tree cavities is uncommon due to conservation measures, as most of these areas are now protected or restricted conservation areas. Consequently, the community has resorted to traditional beekeeping.

4.2 The Ogiek traditional hive

The Ogiek craft their hives from dead wood. They carve log hives from the dead/ softer woods, such as orange-leaved croton tree (*Croton dichogamus*, locally known as *muhuhu* or in Ogiek as *O-onet* or *Olibor benek*). Other trees that were utilised to craft hives included dead cedar tree (*Cendrus*), spiked cabbage tree (*Cussonia spicata*)(locally known as *Olrur* in Ogiek and *mwenyere* in Kikuyu) and Dog plum (locally known as *Songoroi). Olibo benek* and *Olrur* are preferred for their softer tissues, making them easier to carve. However, dead cedar, which often features hollow cavities for bees, is usually durable. The barks of cedar trees were used to cover the log hives.

Traditional log hive hang in the forest

An apiary site comprising of both modern and traditional bee hives

Figure 4.1. Types of hives: Kikuyu hive, Ogiek log hive, and the conventional top bar hive. © KNT

4.3 Making of the hive

First the wood is split into two equal semi-cylindrical parts and then each portion is carved to create a hollow section for bee nesting. The end of each cylinder is pierced to have some fly holes for the bees in addition to the entrance. The size of the hive is measured using the length of the arm from the elbow joint. This is measured from the entrance on both sides.

The interviews with Mr. Lengetu and Mr. Ngardayo, Eburu Ogiek elders (*wazee*), demonstrated the steps of making a traditional Ogiek beehive:

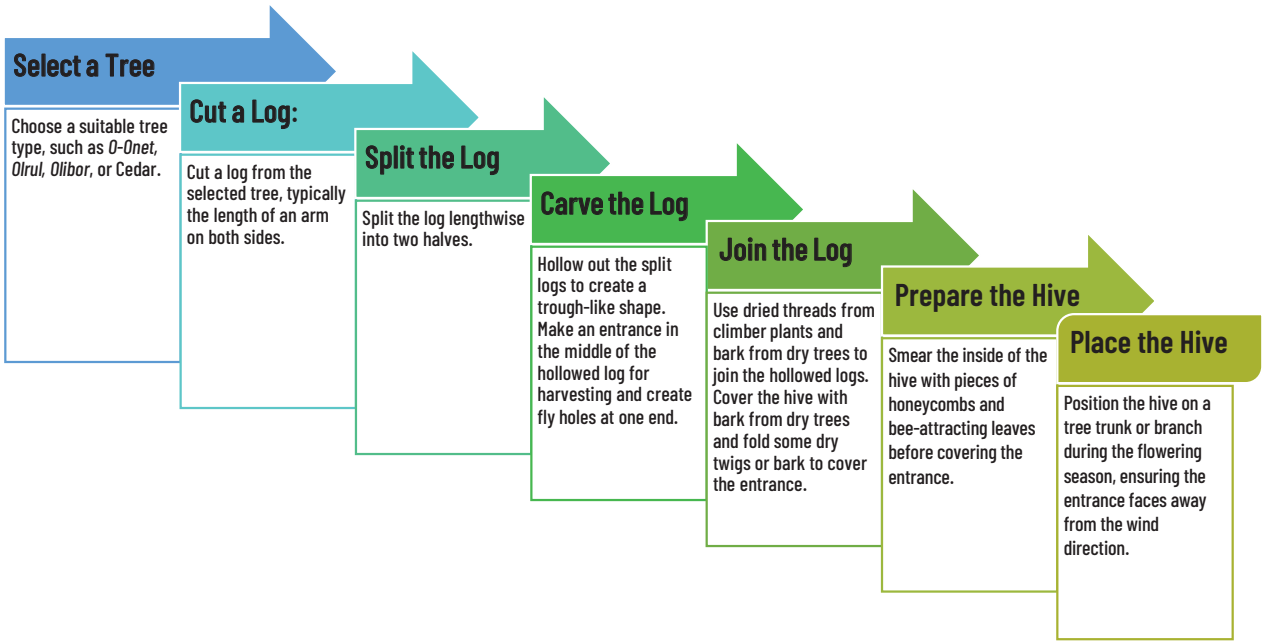


Figure 4.2. Traditional Ogiek hive hanging on a tree branch in Eburu forest © KNT

4.4 Nesting sites

The rich cultural knowledge the Ndorobo-Ogiek have on the Eburu ecosystem is evident through the clear identification of various plants and their uses in relation to bees (pollinators). There are various plants identified as bee forage and having a differential flowering times in a year thereby ensuring bee food is available throughout the year.

a. The Dombeya plant is also referred to locally as Mukeu,Osupuko and Silibwet.
b. A collage of floral resources also found in Eburu.

Figure 4.3. The Dombeya plant © BES-Net

The *osupuko or silibwet* which are species of the *Dombeya goetzninii* are conspicuous and abundant in the forest and are associated with whitish and sweet honey. The barks and the

roots of the same plant were also used as medicine for children's ailments.

Another valuable plant species, the false assegai (*Maesa lanceolata),* locally known as *ol maral*, provides a source of nectar for both bees and birds, making it a significant forage and nesting site. The honey derived from the *ol maral* has a distinctive taste and bitterness, making it unpleasant for children. However, it is valued for its medicinal properties, including pain relief, treating infections and skin conditions.

4.5 Beehive and Colony Management

The honey gatherers of Eburu refer to queenless colonies as *natwoyontunye*. These colonies, usually small bee colonies, typically lack a queen and do not produce honey. When discovered, they are removed from the hive to allow space for larger productive colonies to nest. Interestingly, with the Ogiek community, some smaller families and clans are also named *Natwoyotunye*.

Most hives in the forest are suspended high on trees, a strategy to deter honey badgers and potential thieves. Additionally, traditional beehives within territorial zones are inherited by generations of the Ogiek community based on clanship or family ties.

To effectively manage the apiary and ensure the beehives remain in good condition, frequent visits to the apiary sites are made to inspect and repair any damaged hives. If a beehive is found to be abandoned by bees, it is cleaned using burnt cow dung or smoke-dried moss. Then, good scented/fragrant leaves and/or wax are applied to attract bees back to the hive.

4.6 Honey Harvesting Practices

The Ogiek community has maintained rich traditional practices of beekeeping and bee harvesting. Throughout history and interaction with bees, the community has amassed knowledge and wisdom of bees' observation, monitoring and conservation, and developed tools and methods for extracting honey from the traditional log hives.

4.6.1 Bee Observation

The Ogiek possess knowledge of bee behaviour, which helps them to determine optimal times for honey harvesting based on bee activity and seasonal changes. Once a hive has been colonised and the flowering season begins, harvesting typically occurs approximately two months later, coinciding with the wilting of flowers.

Before harvesting, the Ogiek observe specific signs. For example, if the bees are observed carrying more pollen, it indicates that they are in the process of making honey, which is not yet ready for harvest. Another sign is when the hive becomes noticeably heavy, with its weight causing it to hang lower toward the ground, this suggests that the hive is full of honey.

Figure 4.4. An Ogiek elder observing a honey cavity © KNT

Honey harvesting is typically done early in the morning or late in the evening when temperatures are cooler. Bees are sensitive to heat and tend to be more aggressive during the day when temperatures are higher. However, during the cold season, harvesting can be done at any time of the day, as bees are less active and defensive. Also, bees are sensitive to smell. Honey harvesters usually avoid applying lotion or strong scents when harvesting honey or inspecting the hives, as these can disturb the bees and provoke their defensive behaviour.

The Ogiek community is deeply spiritual, often engaging in prayer during their visits to the forest. They request god to bless the forest and provide them with abundant honey, reflecting their belief in the interconnectedness of nature and their livelihoods.

During honey harvesting, traditional tools and techniques are utilised. First, a smoker is prepared using dry moss plants and tree bark. Then a fire is lit by rubbing a firestick against a dry piece of wood. The hive is lowered from the tree, and the entrance opened. Smoke is applied to calm bees by smoking them. This smoke is typically generated from specific plants known for their gentle yet effective calming properties, allowing harvesting of honey without agitating the bees. A simple knife is used to extract honeycombs from the hive. During harvesting, caution is taken to avoid destroying the brood and to ensure that not all honey is depleted from the hive. After harvesting the hive is closed and placed back onto the tree.

Figure 4.5. The Ogiek traditional way of making fire. © KNT

Smoker (sasik)

Photos: Honey harvesting involving fire making, preparation of the smoker, lowering of the hive and extracting of honey.

Figure 4.6. Honey harvesting process © KNT

4.6.2 Sustainable harvesting practices

The Ogiek ensure that only a portion of the honey is harvested, leaving enough for the bees to continue thriving. This sustainable approach helps maintain bee populations and ensure continuous honey production. Other products obtained from the hives include the: the propolis, the pollen, wax, and royal jelly.

4.7 Honey uses and values

As traditional honey gatherers, the Ogiek community has historically placed a high value on honey, which continues to hold significant economic and socio-cultural values today.

Figure 4.7. Uses of honey. ©Pintrest

4.7.1 Honey as food

Honey serves as a functional food and is an integral part of the food culture within the Ogiek community. Due to its natural sugars, honey provides a dense source of energy and essential nutrients, supporting the Ogiek diet and sustaining them during periods when other food sources are scarce.

4.7.2 Honey as a food preservative and culinary

Honey is essential in culinary practices, food preservation, and storage within the Ogiek community. For instance, it is used to flavour a variety of foods and drinks. Additionally, honey acts as a preservative due its high sugar concentration and low water activity. The Ogiek community uses honey to preserve fruits, vegetables, and meats, allowing for longer food storage, including for consumption during dry periods when food is scarce. For instance, honey is applied in curing processes, helping to preserve the meat by draining moisture and preventing spoilage.

4.7.3 Honey juice

The community also processes honey to create a honey syrup, commonly known as honey juice (*lugumek*), a refreshing beverage enjoyed by community members. It is widely used in traditional and cultural ceremonies.

4.7.4 Honey wine

The Ogiek community makes honey wine, *rotik kap segemik* in Ogiek language. It is made by fermenting honey with water, and may include various flavouring agents such as fruits, herbs, and spices. Honey wine is typically used in community traditional ceremonies, celebrations and rituals. The wine flavour usually varies depending on the type of honey and ingredients used. Primarily, the Ogiek uses bitter honey in wine making, since it is not often suitable for eating it raw.

4.7.5 Honey as medicine

According to the Ogiek community, honey possesses several significant medicinal properties. Like many communities in Kenya, the Ogiek utilise honey as a remedy for oral thrush and sore throats. The Ogiek also apply honey to wounds and cuts to aid their healing due to its natural antimicrobial properties. They also consume honey to aid digestion and alleviate stomach aches. They believe that honey boosts the immune system, helping to prevent common illness and enhance recovery. Expectant women in the Ogiek community often take honey, as the community believe it contributes to giving birth to healthy and stronger babies.

In addition to its direct uses, honey is commonly mixed with various herbs and administered as medicine. Some of the local herbs that the Ogiek combine with honey include aloe vera, turmeric and moringa, each known for their additional health benefits.

Moreover, honey is sometimes used to sweeten bitter medicines, making them palatable for patients. Therefore, honey is essential in maintaining the Ogiek health and wellbeing.

4.7.6 Honey as a source of income and bartering resource

Honey has historically served as a valuable commodity for barter trading among the Ogiek community. For instance, elders indicated that about 50 kg of honey was exchanged for one sheep. The honey was exchanged with milk, animal skins and livestock, mainly with the Maasai community, and with maize, beans, sorghum and millets with the Kikuyu community. Today, honey is primarily traded using local currency; however, honey barter trading for goods or services still exists, albeit rarely. The Ogiek sell both unprocessed and processed honey, with forest-harvested honey in high demand from neighbouring communities and, at times, from markets beyond their immediate area.

4.7.7 Role of honey in rite of passage

Honey is one the key ingredients in Ogiek rites of passage, ceremonies, and celebrations. It symbolises prosperity, health, and a connection with nature. During cultural occasions, honey is shared among community members, reinforcing social bonds.

In traditional wedding ceremonies, honey plays a significant role as it is often used to pay

dowry or bride price. Traditionally, the pride price was about 10 hives, or 5 honey bags (known as *orbene*). Other honey products used in rites of passage and ceremonies include honey wine served in a large *orbene* and honey juice.

4.7.8 Cultural significance of honey

Honey is deeply intertwined with Ogiek spiritual beliefs and practices. As earlier indicated, before entering the forest to harvest honey, the Ogiek often conduct prayers and/or rituals to ask for blessings, viewing the forest and bees as sacred gifts from a higher power. Honey itself may be used in rituals as a form of offering/gift or blessing.

4.8 Use of beehive

Beehives were traditionally given as gifts during traditional ceremonies such as marriages and the naming of a child in the Ogiek community. For instance, a bride would be given a beehive in a given tree within a designated valley on her journey to her bridegroom's family. This act symbolised a wish for a happy family and prosperous marriage.

Additionally, separate hives were designated for honey storage. They were sealed and placed in various locations for honey preservation during dry seasons, including in caves, elevated on tree poles, or sometimes buried underground. At least one hive was buried in lowland areas and another in highland regions to ensure accessibility for different communities/villages.

4.9 Other Bee Products and their uses

The bee products obtained from honey harvesting include the propolis (locally known as *ngorongo),* which the Ogiek community used to seal holes in broken household items. Today, propolis is sold to traders from big towns and cities, such as Nairobi, for approximately KES 3,000 per kg (USD 23 per kg)[2]. However, it takes about 20-30 harvests to obtain just one kilogram of propolis.

Another bee product is the pollen (locally known as *moniren*), which is less commonly used among the Ogiek community, as they primarily recognize it as a food source for young bees. Additionally, the royal jelly or the young bees are not destroyed; instead, a portion of it is extracted to feed young children and the elderly in the community. It is believed that royal jelly mixed with honey is highly nutritious and beneficial for growth and health regeneration.

The honeycombs are also used to make a traditional honey brew, which is consumed in gathering of elders and during significant rituals and ceremonies, such as, childbirth, circumcisions, and marriages.

2 Based on October 2024 average currency exchange rate obtained from the Central Bank of Kenya

4.10 Spiritual values

As earlier stated, the Eburu community is a religious and spiritual community. In Eburu, prayer rituals are conducted at the Eburu shrine situated in *Narogare Nagum*, meaning a place of depression and marshy. At the shrine, the elders gather the community to honour the spirits.

At *Narogare*, there is a crater with a hot spring that appears smokey from a distance. It is at this site that the Ogiek of Eburu come together at specific times of the year to give thanks for their deity and pray for protection against calamities that may befall (or has befallen) the community. *Narogare Nagum* serves as a common gathering ground for all the Ogiek of Eburu.

Another location used for prayer rituals is the site of the fig tree (locally known as *oreteti*), where a sheep/goat is usually slaughtered as a sacrifice, and prayers offered.

Figure 4.8. Narogare Shrine in Eburu forest © KNT

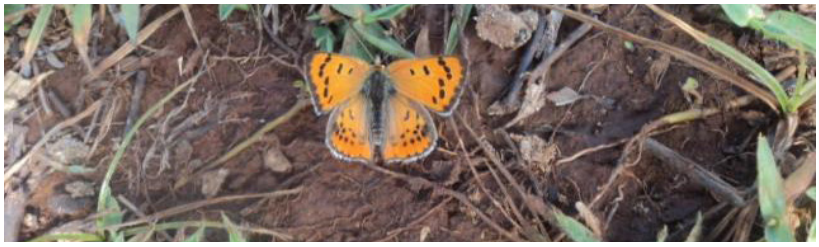
4.11 Key pollinators in Eburu and their cultural values

As illustrated in the previous sections, honey producing bees hold deep cultural significance for the Ogiek community. Beyond their cultural values, bees play a critical role as pollinators, sustaining ecological balance and enhancing farmland productivity. In Eburu, other important pollinators with cultural significance include butterflies and birds. Table 4.1 highlights selected key pollinators in Eburu, illustrating their dual roles as both ecological agents and cultural icons, further underscoring the importance of pollinator conservation.

Table 4.1. Selected pollinators and cultural values and beliefs

Key selected pollinators in Eburu	Associated symbolism and cultural significance
African bee/ Honeybee (*Apis mellifera scutellata*)  © KNT Local name: *Segemiat* in Ogiek **Short descriptions:** African honeybees are a subspecies of the western honeybee. They are known for their resilience and adaptability to various environments, particularly in tropical and subtropical regions. **Characteristics** • Highly adaptable and can thrive in diverse climates. • More aggressive in defending their hives compared to European honeybees. • They tend to swarm more frequently, which helps them establish new colonies quickly.	• Bees are indicators of a health ecosystem. When bees gather and move in a specific direction, it could signal the onset of a dry season or drought. • Honeybees are often employed as a model for illustrating the principles of hard work and unity. • They are associated with marriage, as there is an Ogiek saying, "kole mosiirey chiito segemiikchiik" which means "a person will not avoid marrying his blessed couple".
Stingless bees (Meliponini)  © KNT	• Stingless bees indicate politeness or humbleness. • They are sacred and associated with ancestral spirits. • Used in treatment of coughs, sore throat, and open wounds.

Key selected pollinators in Eburu	Associated symbolism and cultural significance
Local name: *Upura* in Swahili, *kosomeg* in Ogiek or *njore* in Kikuyu **Short description:** Stingless bees are a diverse group of bees from the *Meliponini tribe.* **Characteristics:** • **Social:** Stingless bees live in colonies and exhibit complex social behaviours similar to honeybees. • **Non-Aggressive**: As their name suggests, they do not sting, making them easier to manage. • **Honey Production**: They produce honey, although in smaller quantities compared to honeybees. This honey is highly prized for its medicinal properties.	
Carpenter bee (*Xylocopa)*  © Budget Brothers Termite and Pest Local name: *Seerit in* Ogiek **Short Description:** Carpenter bees are significant pollinators known for their unique pollination technique called "buzz pollination." This method involves vibrating their bodies to release pollen from flowers, which is particularly effective for certain types of plants. **Characteristics:** • Carpenter bees are known for their large size and ability to bore into wood to create their nests. • They are robust and often mistaken for bumblebees.	• Although carpenter bees do not have a prominent role as honeybees, they are recognized and valued as critical pollinators, including for key cultural and medicinal plants.
Bumblebee (*Bombus)*  © KNT	• They are large and do not sting. They are associated with singing around bushes and close to beehives.

Key selected pollinators in Eburu	Associated symbolism and cultural significance
Local name: *Nyukibambi* in Swahili and *koopuryoot* in Ogiek **Short description:** Similarly to carpenter bees, bumblebees are important pollinators known for their ability to perform "buzz pollination," a technique where they vibrate flowers to release pollen. This makes them particularly effective for certain crops and plants. **Characteristics:** • Bumblebees are large and hairy, which helps them carry more pollen. • They are social insects that live in colonies	
Sunbirds (*Nectariniidae*) Local Name: *Chozi* in Swahili and in Ogiek as *chipichipi.* **Short description** Sunbirds belong to the family *Nectariniidae* and share many similarities with hummingbirds, such as their vibrant colours and nectar-feeding habits. They play a crucial role in pollination across various ecosystems in Africa. **Characteristics** • **Brightly Coloured**: Males often have iridescent feathers that shine in the sunlight. • **Nectar Feeders**: They have long, curved beaks adapted for feeding on nectar from tubular flowers. **Agile Flyers**: While they do not hover like hummingbirds, they are agile and can feed while perched or hanging upside down.	• Signifies messengers of hope. • Serves as a morning alarm (nature clock) • Usually, signal dangers e.g. when they spot a dangerous animal. • Due to their beauty, sunbirds are sometimes featured in various forms of art
Butterflies (*Rhopalocera*)  © KNT Local name (singular form): Kipepeo in Swahili, *tapurpuriet* in Ogiek or *kihuruta* in Kikuyu **Short description:** Some of the common butterfly species in these areas include the large striped swordtail (*Graphium antheus*) and various species of the genus *Papilio*. Butterfly farming has become an important conservation and economic activity in Kenya. By breeding butterflies, communities can generate income while promoting forest conservation, as the health of butterfly populations is closely tied to the health of their forest habitats.	• Happiness and joy • Shortness of life • Climate indicators e.g. of rains, weather patterns, through a change of butterfly population • Diseases transmission: Swarming behaviour of butterflies can lead to the spread of diseases for both crops and humans, such as pestilences, flu and cough.

Key selected pollinators in Eburu	Associated symbolism and cultural significance
Characteristics • **Wings**: Large, colourful wings covered in tiny scales. These scales create intricate patterns and vibrant colours, which can serve as camouflage, warning signals, or attractants for mates. • **Life Cycle**: Four stages: egg, larva (caterpillar), pupa (*chrysalis*), and adult. Each stage has unique characteristics and functions. • Butterflies are active during the day. Basking in the sun, to regulate their body temperature. • **Habitat**: Butterflies can be found in a variety of habitats, including forests, grasslands, gardens, and wetlands. They are particularly attracted to areas with abundant flowering plants.	
Beetle (*Coleoptera*)  © KNT Local Name: *Mende-kibyongo* in Swahili or t*oruurwoogēt in* Ogiek: **Short description:** Beetles are often referred to as "mess and soil" pollinators because they tend to eat their way through petals and other floral parts, sometimes leaving behind bits of plant matter and frass (insect droppings). It is believed they were among the first insects to visit flowers and remain essential pollinators today. Beetles play a crucial role in the pollination process by transferring pollen as they move from flower to flower. **Characteristics:** • Beetles have a hard protective outer shell called exoskeleton • Found in nearly all habitats such as forests, grasslands, wetlands, and drylands • Have chewing mouthparts that enable them to feed on a wide range of diet • Are largely solitary	• Fun: children often play with beetles by letting them fly at the end of a string. This simple activity highlights the fascination and joy that beetles bring to everyday life. • Dung Beetles: In the Sahel region, dung beetles are celebrated for their hard work in removing dung. Stories and folklore often emphasise their industrious nature, symbolising diligence and the importance of cleanliness. • Symbolism: In some African cultures, beetles symbolise different aspects of life. For example, the black beetle is sometimes seen as a symbol of death and darkness.

4.12 Conclusion

The forest life of the Indigenous Ogiek fosters a symbiotic bio-cultural relationship with their environment. Understanding and recognizing the benefits pollinators bring, the community has devised strategies and practices to nurture the Eburu ecosystem, maximising the benefit they could get from biodiversity. Their love for honeybees motivates the Ogiek to conserve the forest, ultimately ensuring the abundance of forest vegetation and wild foods through pollination.

The Indigenous knowledge and practices of the Ogiek reveals a profound understanding of the characteristics, relationships, and functioning of honeybees and birds. They can easily name them and describe these species and their usefulness to the community.

However, significant changes are taking place among the traditionally honey hunter-gathers Ogiek, as they increasingly transition to peasant farming and livestock herding. The Ogiek communities are also to some extent transforming their beekeeping practices by placing hives on their farms and planting nectar-rich plants to attract honeybees.

As custodian of their Indigenous and traditional knowledge regarding beekeeping and pollinator and forest conservation, the community is facing cultural attrition, putting this knowledge and practices at a risk of being lost entirely. This knowledge is increasingly becoming the reserve of older members of the community, posing a challenge in contemporary times. As such it is crucial to salvage this knowledge for the future of the community.

Chapter V:

5. Local Land, Water and Soil Management Practices

5.1 Introduction

Eburu is a cosmopolitan ecosystem that hosts diverse ethnic communities, including Kamba, Kikuyu, Kisii, Luhya, Luo, Maasai, Meru, Ogiek and Turkana. Each community contributes its own unique cultural practices and knowledge to the area. The Ogiek, traditionally forest dwellers and hunter-gatherers, have exited the forest and modified their livelihoods, and are increasingly adopting farming practices alongside their forest-based livelihoods. Meanwhile, the other immigrant communities such as the Kamba, Kikuyu, Kisii, and Luhya communities, who have historically relied on cropland farming, contribute to the area's agricultural productivity. This section explores how the coexistence of these communities in the Eburu ecosystem fosters cross exchange of good farming techniques and practices for sustainable land use management.

Apart from cultural diversity, the Eburu ecosystem sustains a rich biodiversity, including the endangered species of mountain bongo, *Tragelaphus eurycerus isaaci*, as well as a variety of bird and insect species, many of which are important pollinators, as highlighted in section 4.11. The soil also supports life forms essential for soil heath, such as worms, fungi, and bacteria, all of which improve soil structure, enhance drainage, and recycle nutrients, benefiting local farmers.

The community in Eburu identified a variety of soil-dwelling organisms that help to keep the soil healthy for crop production, such as earthworms, *Lumbricina*, popularly known as *wadudu* in Swahili, and fungus, *Fungi* (locally known as *makunu*), which help decompose organic matter. Other contributors include moles, *Talpidae,* referred to as *fuko* in Swahili that supports soil aeration, and soil bacteria that helps in nutrient cycling and disease suppression.

The farm landscape in Eburu demonstrates richness in plant biodiversity that supports pollinators, enhances soil health, and promotes high agricultural productivity. The farmers in Eburu cultivate bee forage plants, including hedgerows varieties such as bellflower (*Campanula*), daisies *(Asteraceae),* camphor bush (*Tarchonanthus camphoratus)*, locally known as *leleshwa* in Swahili, Indian coleus (*Plectranthus barbatus*) - locally known as *maigoya*, lantana (*Lantana spp),* and ironweed *(Vernonia lasiopus).* They also plant both indigenous trees and fruit trees,

such as avocado, raspberries, passion, and papaya, creating a pollinator-friendly environment that contributes to both farm productivity and providing additional food and nutrition to their families.

Figure 5.1. Sustainable farming practices: crop rotation, trashlines and mixed cropping in Songoloi village © KNT

5.2 Agricultural landscape

The farming landscape in Eburu reflects a variety of farm practices promoting soil, land and water conservation through a blend of conventional and traditional practices and innovations (Figure 5.1 and 5.2). The IPBES (2018) report on Land Degradation and Restoration revealed that Indigenous Peoples and local communities are critical knowledge holders of local solutions and models for biodiversity and landscape management which if tapped, adopted and improved could significantly contribute to transformation and restoration of landscapes, such as the Eburu ecosystem.

In the visited model farms in Eburu, identified by local communities, several practices fostering healthy and resilient agricultural landscapes were observed. Notable practices include water harvesting technology, land management practices, agrobiodiversity for food security, soil and pesticide control strategies, and pollinator conservation.

Figure 5.2. A depiction of the farmland production patterns in Eburu ecosystem © KNT

5.3 Water harvesting technology from steam

Eburu forest is also known locally as *Oldonyo Purro* in Maasai language, which translates to 'mountain of smoke'. The term 'smoke' primarily refers to the steam that arises from the heated underground water within the volcanic rocks. Eburu presents a unique landscape that is both forested and mountainous, yet its valleys lack surface water, rivers or streams.

To address the challenge of accessing clean water for domestic use, the Eburu communities adopted an innovative water harvesting technique that taps and collects water through condensation from the emerging underground steam. To survive in the riverless Eburu ecosystem, the locals have utilised technology introduced by German visitors in the 1930s, who demonstrated how to tap and condense the steam into water. The locals have been innovative in the process utilising locally available resources to harvest water from steam.

Figure 5.3. Water harvesting technology involving trapping and condensing of underground steam © KNT

The process of water harvesting begins with trapping of the steam from the rock fissures using metallic pipes. The pipes are securely anchored near the ground, and a long metallic or aluminium pipe is then attached to the steam trapping pipe from underground. As the steam travels through this long aluminium pipe, condensation occurs, resulting in drops of water that are collected via a separate pipe into a clean water container or a tank, where further cooling occurs.

The local communities believe that the hot water, condensed from steam, is free of infections. Therefore, the collected water is presumed to be portal and safe for human consumption. This technology provides valuable water resources for villages in Eburu, catering for their household and livestock needs.

The water harvesting system has also been enhanced by adding more trapping points and establishing common water collection points to serve a broader region of the community. Furthemore, the government and other organisations in the area, such as the Kenya Electricity Generating Company (KenGen), are supplementing the steam water harvesting through piping water from nearby Lake Naivasha into the village, an effort to boost water security.

5.4 Soil management and pest control practices

In Eburu model farms, best practices for soil management and pest control are implemented. Farmers embrace agricultural biodiversity by cultivating a variety of crops, integrating agroforestry systems, and rearing diverse livestock, including pigs, cattle, goats, sheeps, chicken, ducks, and rabbits. Additionally, donkeys are kept to provide local transportation, especially of farm produce.

These animals significantly support farmers by generating farmyard manure, which is blended and used to replenish the soil. For instance, manure collected from chicken, rabbits and pigs is mixed with ash and other plant herbs to create compost manure. Additionally, rabbit urine is collected to make local foliar fertiliser; from just five rabbits, a farmer can gather about three litres of urine per week, enough to nourish crops in approximately one acre of farmland, although the exact coverage varies depending on crop type and spacing. The recommended ratio of rabbit urine to water is 1:20. This urine can also be mixed with herbs to create a special organic concoction used as a pesticide.

These innovative practices emerged through interactions and knowledge and experience exchange among various communities in Eburu. Farmers from central and western Kenya, predominantly crop farmers, who have settled in Eburu, introduced these innovative agricultural practices and techniques to the area, an area that was previously dominated by a pastoral and a hunter gatherer economy.

Figure 5.4. Mzee Mwenje demonstrating the processing of making foliar from rabbit urine. © BES-Net

The local innovation in creating agricultural inputs such as the liquid (foliar) fertiliser, organic manure, and pesticide have boosted crop yields. These innovations are particularly effective in growing indigenous vegetables such as, African nightshade (*Solanum nigrum*, known as *mnavu* in Swahili or popularly as *managu*), spider plant (*Cleome gynandra*, known as *mwangani* in Swahili), and amaranth or pigweed (*Amaranthus*, known as *mchicha* in Swahili), as well as fruits and potatoes. The cultivation of indigenous crops ensures a diverse, healthy, and nutritious food source for the local communities.

5.5 Land conservation practices

As Eburu terrain is hilly and sloppy, so are farmlands that usually have upper and lower sections. Consequently, soil and water conservation practices become essential to maintain soil fertility and support food production. Furthermore, to minimise land degradation, Eburu farmers have adopted agroforestry and a mixed system of diverse crop and livestock farming. Notable soil, land, and water conservation practices and techniques include: Terracing, contour farming, use of trashlines, fallowing, mixed and intercropping, rotational farming, bench terracing, and agroforestry, among others. These practices are elaborated below:

Picture 1: *Trench to control runoff*

Picture 2: *Mixed varieties of crops i.e. vegetables, cover crops and fruits*

Picture 3: *Compositing farmyard manure*

Figure 5.5. Land conservation practices © KNT

5.5.1 Contour farming

Contour farming involves planting permanent cover crops, such as napier grass, across the ridges to reduce surface runoff speed while also providing fodder for livestock. At the visited model farm in Eburu, napier grass was grown along contours to further control soil erosion on the sloped farmland. This practice not only conserves soil but also enhances the farm's productivity by ensuring a steady supply of livestock feed.

Figure 5.6. A napier grass contour © BES-Net

5.5.2 Trash lines

Farmers place crop residues, dead weeds, twigs and sticks in lines across sloped farmland to help reduce surface runoff and increase water infiltration rates. This method also helps trap soil and sediments carried by surface runoff, especially after clearing a farm. As the plants decay, this practice enhances soil conservation and fertility. It is particularly beneficial at the beginning of the rainy season when the soil is bare. The decayed organic matter later serves as mulch once the crops germinate, further enhancing soil fertility.

Figure 5.7. Trash lines in Eburu © BES-Net

5.5.3 Fallow systems

Eburu farmers practise fallowing, a traditional practice of resting portions of arable farmland for one to three farming seasons. This approach allows the soil to replenish before it's cultivated again. By giving the land a break, the soil can rest and regenerate, promoting weed growth that aids in soil regeneration. This rejuvenation supports soil fertility and reduces crop diseases present in the soil. The farmers reported that fallowing revitalises the land, leading to better crop yields. Furthermore, the fallow spaces become refugia habitat, providing floral resources to pollinators when the crops have been harvested.

Fig 5.8 Rested portion of land in Eburu model farm © BES-Net

5.5.4 Rotational farming

Farmers in Eburu practice crop rotation, cultivating different crops on the same plot in different seasons to restore soil nutrients and minimise crop-specific diseases. They alternate crops seasonally, often planting nitrogen-fixing legumes like beans after nutrient-demanding crops like maize, thereby naturally enhancing soil fertility. Root crops like potatoes are followed by leafy greens crops such as maize to reduce pest and disease buildup.

5.5.5 Agroforestry

Agroforestry is a sustainable land use management system where trees or shrubs are grown around or among crops or pastureland. Trees produce a wide range of useful and marketable products such as fruits, nuts, medicines, and wood products. Additionally, planted trees provide forage for pollinators when crops are out of the flowering season and serve as nesting sites. Trees observed at the model farm included cypress trees (*Cupressus*), acacia (*Dombeya torrida*, locally known as *mukeu*), rattle pods (*Crotalaria spp*), and southern silky oak (*Grevillea robusta*, commonly known as *sepesepe*).

Figure 5.9: Agroforestry in the model farm in Eburu © BES-Net

5.5.6 Intercropping

Eburu farmers employ intercropping, growing multiple crops on the same plot of farmland. Common intercropping combinations include maize with beans, peas, or cowpeas, and potatoes with cowpeas. Intercropping offers several benefits: it provides continuous soil cover and canopy coverage to shorter crops, enhances nutrient uptake, and supports nitrogen fixation in the soil through leguminous crops. This approach not only improves soil fertility but also helps in weed suppression as well as pest and disease management by diversifying the plant species grown together. Intercropping also diversifies farmers' income by reducing reliance on a single crop, which may be vulnerable to market price fluctuations, poor yields, adverse weather or diseases.

5.5.7 Cover crops

Eburu farmers utilise cover crops to prevent the soil erosion and minimise water evaporation by reducing exposure of bare soil. Cover crops increase water percolation below ground, reduce the impact of raindrops directly hitting on the soil, decrease the speed of surface runoff, and

prevent wind erosion. Popular cover crops include sweet potatoes, vines and pumpkins.

5.5.8 Hedgerows

A hedgerow is a closely planted line of shrubs or small trees, often forming a boundary or fence. Hedgerows were commonly found in Ol Sirwa and surrounding farms. The plant species planted to form hedgerows included, Indian coleus (*Plectranthus barbatus),* lantana *(Lantana camara),* Sodom apple *(Calotropis procera),* Mexican marigold *(Tagetes erecta),* Euphorbia *(Euphorbiacease),* varieties of aloes (*Aloe*), camphor bush *(Tarconanthus camphoratus),* and a variety of daisy plants.

Hedgerows play a crucial role in pollination and enhancing farm productivity by providing habitats and forage for pollinators such as birds, bees, butterflies, and other beneficial insects. By attracting and sustaining these pollinators, hedgerows contribute to improved crop yields and food security. Additionally, they act as windbreakers, reducing wind speed and protecting crops from wind damage.

Figure 5.10 Examples of Hedgerows. © KNT

5.5.9 Bench terracing

Bench terracing is an effective water conservation technique used primarily on sloped lands to reduce soil erosion and manage water runoff. The hilly and sloppy landscape of Eburu presents challenges for farmers, prompting the adoption of benching terracing.

To make the sloped land suitable for farming, farmers create a series of flat, step-like areas (benches) along the contour of the slopes. These terraces are designed to slow down water runoff, allowing more water to infiltrate the soil rather than washing away valuable topsoil

In constructing bench terraces, the slope is divided into a series of horizontal or nearly horizontal steps. Each step is supported by vertical or near-vertical risers, which can be reinforced with vegetation or stone walls to prevent collapse. By breaking the slope into smaller, flat sections, the speed of water runoff is reduced, allowing water to soak into the soil, thereby increasing moisture retention and reducing erosion. These terraces help to trap soil that would otherwise be carried away by runoff, maintaining soil fertility and structure.

Figure 5.11. Mzee Mwenje demonstrating soil and water conservation methods of terraces in Songoloi village. © KNT

5.5.10 Woodlots

Many farmers in Eburu had set aside portions of their land for woodlots, where they planted trees primarily for firewood and timber. These woodlots vary in composition, with some consisting entirely of indigenous trees, while others feature a mix of exotic trees, sometimes with indigenous trees. Common trees found in these woodlots include camphor bush (locally known as *leleshwa*), cypress, grevillea, dombeya, and bluegum. These trees serve multiple purposes, providing fuelwood, timber, and suitable sites for apiaries, further enhancing pollination.

Fig 5.12. Woodlot in Eburu farm model. © BES-Net

In the early stages of establishment, vegetables or crops are often intercropped within the woodlot. This practice not only optimises land use but also supports biodiversity and enhances food production.

5.6 Conclusion

Pollinator conservation and land and soil conservation are two interrelated and mutually reinforcing goals that can contribute to sustainable development and enhance conservation of biodiversity and ecosystem services. Pollinators are essential for the seed production of many crops and wild plants, and they provide ecosystem services that support human well-being and biodiversity. Land degradation neutrality targets aim to maintain or improve the condition of the land and its productivity, by avoiding, reducing and reversing land degradation. By implementing pollinator-friendly practices, such as restoring native habitats, reducing pesticide use, enhancing crop diversity and promoting agroforestry, Kenya can contribute to increased food production through pollinator conservation and land degradation neutrality, as well as other benefits such as climate change adaptation and mitigation, food security and poverty reduction. For example, the Kenya Agricultural and Livestock Research Organisation (KALRO) has developed and promoted the use of biopesticides that are derived from natural sources and have minimal impact on pollinators and other beneficial insects, such as neem, pyrethrum and rotenone. This has reduced the reliance on synthetic pesticides that are harmful to the environment and human health and increased the diversity and abundance of pollinators and natural enemies of pests.

Another example is by the KNT in partnership with UNDP and BES-Net where they carried out pollinator conservation and land degradation neutrality awareness activities (or project) in Eburu involving the local communities and schools (KNT 2023 reports, unpublished). The project promoted knowledge on useful insect species and demonstrated their linkage to food production through demonstration plots. The pollinated crops produced (fruits) while those that were bagged died and didn't produce. Further conservation of soil and water was demonstrated using Indigenous methods to conserve soil and maintain its productive capacity.

Chapter VI:

6. Guidelines for Implementation

6.1 Policy Options

The current status and challenges of pollinator conservation and sustainable land management in Eburu as well as the successful examples and best practices from different regions and sectors showcased in this booklet serve to build the knowledge base and enhance biodiversity conservation practices in Kenya, learning from the case study of Eburu. It also provides key policy options and guidance for policymakers, practitioners, scientists, and stakeholders who are interested in advancing these two important agendas in Kenya and can be adopted by other local communities to improve their practices toward pollinator conservation and management.

Table 5.1. Suggested policy options based on this study.

Suggested Policy Options	Relevant Actor/Stakeholder
Promote and leverage hybrid knowledge systems, including scientific, Indigenous and local knowledge, for evidence-based decision-making and actions.	Decision-makers at national and county government levels, including policymakers and leaders in environmental and agricultural sectors.
Embrace interdisciplinary, multidisciplinary, transdisciplinary, and multiple evidence-based approaches, as well as multi-institutional approaches when working in the field for results.	The research community, including universities, research institutions, and think tanks.
Develop and implement a national strategy for pollinator conservation and land degradation neutrality that aligns with national development plans, policies, and commitments.	The Government of Kenya in collaboration with relevant partners, including international organizations and NGOs.
Strengthen institutional coordination, collaboration, and capacity building among different actors involved in pollinator conservation and land degradation neutrality at national, county, and local levels.	The Government of Kenya, relevant ministries (e.g., Ministry of Environment and Forestry, Ministry of Agriculture), and local government bodies.

Suggested Policy Options	Relevant Actor/Stakeholder
Increase awareness, education, and engagement of the public, especially farmers, youth, and women, on the importance of pollinators and land degradation neutrality for their livelihoods and well-being, to further boost food production and ecosystem restoration.	Relevant government agencies at both national and county levels, educational institutions, community organizations, and NGOs.
Promote the adoption of pollinator-friendly practices across different land uses, sectors, and scales, such as agriculture, forestry, urban planning, tourism, and conservation.	Kenya National Trialogue, agricultural extension services, forestry departments, urban planning authorities, tourism boards, and conservation organizations.
Monitor and evaluate the progress, impacts, and challenges of pollinator conservation and land degradation neutrality interventions using appropriate indicators, tools, and methods.	Relevant government agencies, research institutions, and monitoring and evaluation experts.
Promote preservation and teaching of endangered Ogiek language in Eburu: This could be achieved through: (a) intra-community connectivity by linking Eburu Ogiek with eastern Mau Ogiek, for the former to learn from the latter, and (b) introducing community language learning programmes such as elder-youth mentorship and mobile learning tools.	State Department of Culture and Heritage, OPDP, NMK, UNESCO and other institutions supporting the implementation of International Decade of Indigenous Languages (2022-2032)

6.2 Land Tenure Rights for Eburu Communities

The sustainable management of the Eburu forest ecosystem and its surrounding landscape, including its agroecosystem, fundamentally relies on the stewardship and tenure security of the Eburu communities whose livelihoods are largely dependent on the ecosystem and their Indigenous and local conservation practices attached to the land and other resources. The Eburu ecosystem is home to diverse ethnic communities. According to the elders, the original settlers, Ogiek (Ndorobo), were relocated from the Eburu Forest Reserve and resettled in villages such as Songoroi. In recognising the Ogiek, historically a forest-dwelling community, deep connection with the Eburu forest, an integral space to their cultural, social, and economic wellbeing, the Kenya Forest Service is commended for provision of forest user-rights to the community. Other ethnic communities from other regions of Kenya migrated into the area in the early 1990s. These communities continue to co-exist and live in harmony. As indicated in section 3.1, participants revealed that most households, to date, lack official land documentation or government settlement arrangements. The Government of Kenya, through the relevant departments and in accordance with (a) the Kenya's Community Land Act, (b) adverse possession, and/or (c) custodial agreements, could prioritise and provide security of tenure. Security of tenure in Eburu is essential not only for sustainable land management and conservation efforts but also enhancing community wellbeing, development, stability, and resilience.

7. Bibliography

- Hill., R., Adem, C., Alangui, W. V., Molnar, Z., Aumeeruddy-Thomas, Y., Bridgewater, P., Tengo, M, Thaman, R., Yao, C. Y., Berkes, F., Carino, J., Carneiro, M., Diaw, M. C., Diaz, S., Figueroa, V. E., Fisher, J., Hardison, P., Ichikawa K., Kariuki, P, Karki, M, and Xue, D. et al. (2020). Working with Indigenous, local and scientific knowledge in assessments of nature and nature's linkages with people. *Current Opinion in Environmental Sustainability*, Volume 43, 2020, Pages 8-20.
- IPBES. (2016). The assessment report of the Intergovernmental SciencePolicy Platform on Biodiversity and Ecosystem Services on pollinators, pollination and food production. (Eds.) Potts, S. G., Imperatriz-Fonseca, V. L., & Ngo, H. T. (Eds.). Bonn, Germany: Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.
- IPBES (2018): Summary for policymakers of the assessment report on land degradation and restoration of the Intergovernmental Science- Policy Platform on Biodiversity and Ecosystem Services. (Eds.) Scholes, R., Montanarella, L., Brainich, A., Barger, N., ten Brink, B., Cantele, M., Erasmus, B., Fisher, J., Gardner, T., Holland, T. G., Kohler, F., Kotiaho, J. S., Von Maltitz, G., Nangendo, G., Pandit, R., Parrotta, J., Potts, M. D., Prince, S., Sankaran, M., and Willemen, L. Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. https://doi.org/10.5281/zenodo.3237392.
- IPBES (2019). Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. S. Díaz, J. Settele, E. S. Brondízio E.S., H. T. Ngo, M. Guèze, J. Agard, A. Arneth, P. Balvanera, K. A. Brauman, S. H. M. Butchart, K. M. A. Chan, L. A. Garibaldi, K. Ichii, J. Liu, S. M. Subramanian, G. F. Midgley, P. Miloslavich, Z. Molnár, D. Obura, A. Pfaff, S. Polasky, A. Purvis, J. Razzaque, B. Reyers, R. Roy Chowdhury, Y. J. Shin, I. J. Visseren-Hamakers, K. J. Willis, and C. N. Zayas (eds.). IPBES secretariat, Bonn, Germany. 56 pages.
- KEFRI (2014). *Contribution of PELIS in Increasing Tree Cover and Community Livelihoods in Kenya*. Kenya Forestry Research Institute, Nairobi.
- Kobei., D. (2022). At Home and at Peace in the Mau Forest of Kenya-Understanding the Ogiek Experience. *The Earth and I*, New York. Retrieved September 23, 2024 from https://www.theearthandi.org/post/at-home-and-at-peace-in-the-mau-forest-of-kenya-understanding-the-ogiek-experience.
- Koskei., E. (2021). The Orchestrating Ogiek Culture: The beekeepers and preservers of forests. *Global Tourism Resilience and Crisis Management Centre*, November 21.

Nairobi, Kenya. Retrieved October 2, 2024 from https://storymaps.arcgis.com/stories/c901f40a9583431685b2c9670edfde8e.

- Lengoisa, J. S. (2015). Ogiek peoples of Kenya: Indigenous and local knowledge of pollination and pollinators associated with food production. In (Eds.) Lyver, P., Perez, E., Carneiro da Cunha, M, and Roue, M. *Indigenous and Local Knowledge about Pollination and Pollinators associated with Food Production.* Paris, France: UNESCO, 18-26.
- McLeish, D. (2020). Eburu Forest in Kenya Back from the Brink. *Conservation Mag*, August 11. Cape Town, South Africa. Retrieved October 26, 2024 from https://conservationmag.org/en/places/eburu-forest-in-kenya-back-from-the-brink.
- Prime Minister's Task Force, (2009). Report of the Prime Minister's Task Force on the Conservation of the Mau Forests Complex. Government of Kenya: Nairobi, Kenya, retrieved from https://www.kws.go.ke/sites/default/files/2019-11/Mau%20Forest%20Complex%20-%20Report.pdf.
- Rhino Ark Kenya Charitable Trust (2017). *The Mau Eburu Forest – A Visitors' Guide*. Rhino Ark Kenya Charitable Trust, Nairobi,. Retrieved from https://m-pesafoundation.org/images/pdf/EBURU_guidebook_lite_environment.pdf.

OGIEK PEOPLES' DEVELOPMENT PROGRAM

NATIONAL MUSEUMS OF KENYA

WHERE HERITAGE LIVES ON

In partnership with:

BESNet
Biodiversity and Ecosystem Services Network

unesco

UNDP

Supported by:

Federal Ministry
for the Environment, Nature Conservation,
Nuclear Safety and Consumer Protection

based on a decision of
the German Bundestag

IKI INTERNATIONAL CLIMATE INITIATIVE

ISBN: 996-6--955--21--6

9 789966 955210