



Mitigate+: Research
for Low-Emission
Food Systems

A review of forest-food linkages in Kenya

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Executive summary

This working paper was developed based on a policy and literature review to take stock of the latest information on forest-food linkages in Kenya. Our review shows Kenya's forests playing important roles in providing food directly to local communities, as well as requisite conditions for sustainable food production systems in the country. Food-forest linkages are widely articulated in different policies issued by the Government of Kenya that draw on the principle of producing food without destroying forests. Different cross-sectoral bodies have been established to foster holistic food-forest solutions. The government expects forest protection and conservation policies to provide appropriate incentives and support for local food production and needs. Numerous academic publications have analysed the roles forests play in providing food, ensuring food security and supporting national development in Kenya.

Despite the availability of scientific evidence on food-forest linkages, and policies and institutions being in place, translating policies into practice has been ineffective as forest loss continues to result in high-emission food systems. Complex drivers of deforestation and forest degradation in Kenya include weak governance; population growth; forest conversion for agriculture production; insecure tenure; and a lack of finance. Our review highlights the need to address these drivers by implementing current policies more effectively. Assessing how effective current policies are for addressing deforestation and forest degradation, and for low-emission food systems, will require further research across the country and should become a future research priority in Kenya.

1 Introduction

The roles of forests and the land-use sector in ensuring food security, income and employment for local communities, and for climate change adaptation and mitigation are widely recognized in international frameworks such as the High Level Panel of Experts on Food Security and Nutrition (HLPE 2017) and the COP 28 UAE Declaration on Sustainable Agriculture, Resilient Food Systems and Climate Action, as well as in numerous academic publications (Vinceti et al. 2013; Nurhasan et al. 2022; Steel et al. 2022; Vansant et al. 2022). Forests provide nutrient-rich foods, incomes for food security and ecosystem services for food production, and add resilience to food systems (Ickowitz et al. 2019; Ickowitz et al. 2022). Sunderland (2023) highlights that rural dietary diversity depends on people's access to wild food from forests. Such foods contribute to improving women's diets in India (Cheek et al. 2023) and Cambodia (Nurhasan et al. 2022), and to children's dietary diversity in Africa (Galway et al. 2018; Mirindi et al. 2019). Evidence from around the world shows that women having greater access to forests results in improved family and household food and nutrition (Kimanzu et al. 2021).

Despite these important roles, there is limited understanding and recognition among policymakers and practitioners towards developing and implementing sustainable forestry management to fully integrate the different functions of forests and trees – from farm and landscape to global levels, and at different timescales – for enhanced food security, improved nutrition and sustainable development (Ickowitz 2022). Moreover, very few studies have focused explicitly on food security, indicating the need for further research (Duffy et al. 2021).

Despite the large number of studies reviewed, limitations in the evidence base, including methodological heterogeneity; a dominance of case studies as study designs; and unequal geographical representation in study locations; make it difficult to generalize about the overall importance of gender and its effects on access to and use of forests for food security in developing countries (Kimanzu et al. 2021).

This working paper was developed based on a literature review, and aims to take stock of current research and knowledge on the relationship between forests and food in Kenya.

2 An overview of the forestry sector in Kenya

In Kenya, a forest is defined as having a minimum of 15% canopy cover; a minimum land area of 0.5 ha and a minimum height of 2 metres (Ministry of Environment and Forestry 2020a). Kenya, which has different forest types distributed across different regions (Figure 1), has an estimated 3.6 million hectares (ha) of forested land and an additional 24.5 million ha of bush land.

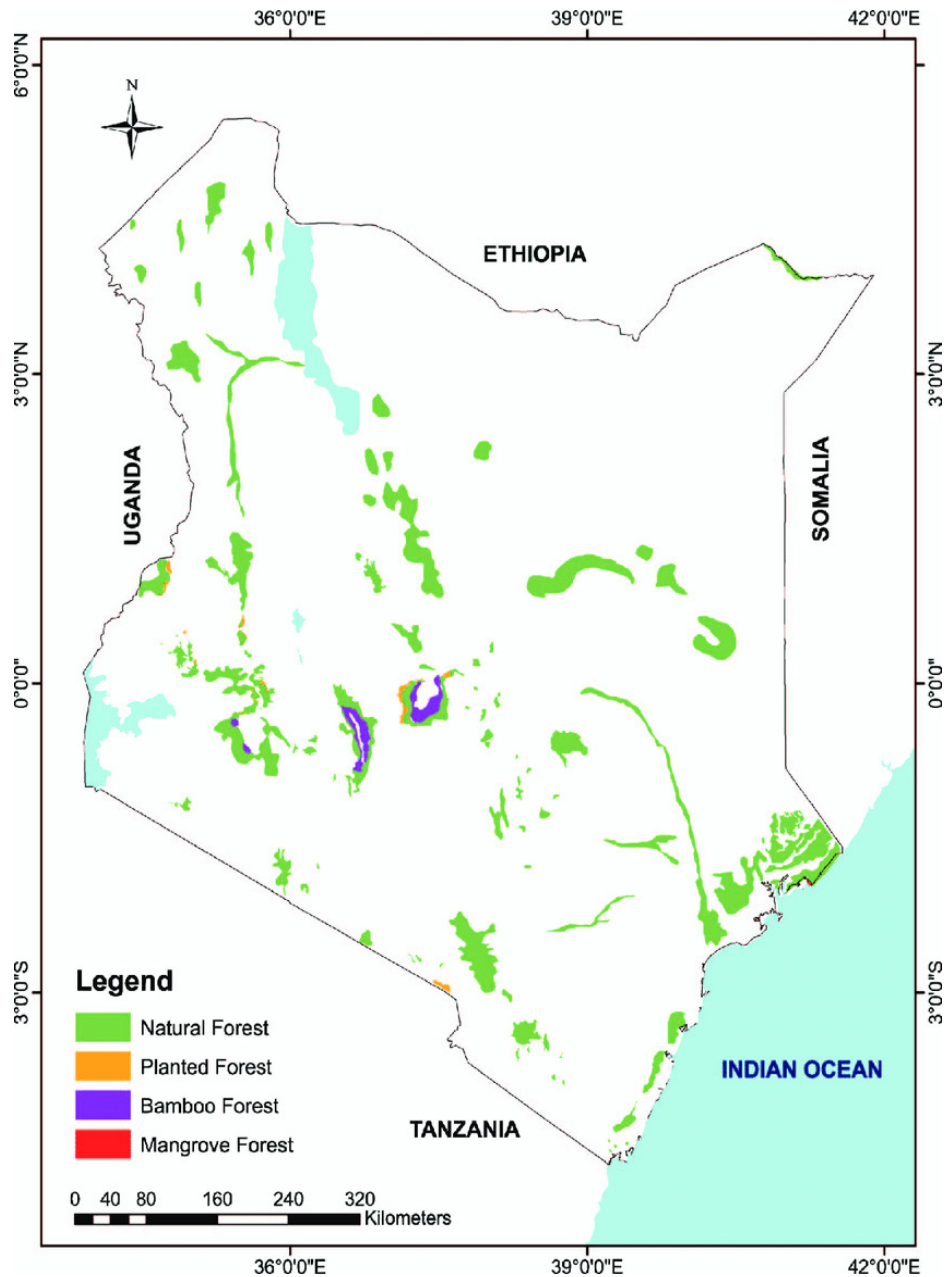


Figure 1. Forest types and distribution in Kenya

Source: National Forest Programme Secretariat 2015

In 2022, Kenya surpassed the constitutional target of 10% tree cover, reaching an impressive 12.13%, translating to 7,180,000.66 ha (Kenya Forest Service 2021). Forest cover had already increased from 5.9% in 2018 to 8.83% in 2021; the equivalent of 5,226,191.79 ha (Kenya Forest Service 2021). However, tree and forest cover are unevenly distributed, with ten of Kenya's 47 counties yet to realize the constitutional target of 10% (Bulimo 2023). Counties in the country's Central, Western and Coast regions have more tree cover than those in other regions.

According to the Forest Conservation and Management (FCM) Act of 2016, forests in Kenya are classified into three categories under different management regimes.

Forests also provide a wide range of ecosystem goods and services that support Kenya's economy, as well as 50,000 direct jobs and another 300,000 jobs indirectly (Government of Kenya 2022). Montane forests regulate more than 75% of the country's renewable water resources, which are critical for the sustainable development of sectors such as agriculture, forestry, fisheries, electricity, water, hotels and other tourist facilities, public administration and defence (Government of Kenya 2022).

According to the National Climate Change Action Plan (NCCAP) 2013–2017, forestry and other land use-related emissions accounted for 19.6 million tons of carbon dioxide equivalent (MtCO₂e) in 2010, or around 32% of national emissions. Deforestation, forest and grassland fires, and land clearing for agriculture are major sources of greenhouse gas (GHG) emissions. However, farmers do not associate land use, land-use change and forestry (LULUCF) with carbon emissions. Currently, managing farmers' high expectations regarding carbon markets is critical, and emphasis should be placed on benefits that come from farms in terms of increased productivity and incomes, rather than carbon trading (Ministry of Agriculture, Livestock and Fisheries 2017).

Table 1. Classification of forests according to the Forest Conservation and Management Act of 2016

#	Type	Definition/ownership	%
1	Public Forests	Public forests are managed by national government agencies (mainly the Kenya Forest Service and Kenya Wildlife Service) and county governments, mainly for the provision of environmental goods and services, but are also contain belts managed for timber, poles and fuelwood.	39%
2	Private Forests	<ul style="list-style-type: none"> • Forests on registered land held by any person under any freehold tenure; • Forests on land held by any person under leasehold tenure; • Any forest owned privately by an individual, institution or body corporate for commercial or non-commercial purposes; • Forests on any other land declared private land under an Act of Parliament. 	6.5%
3	Community Forests	<ul style="list-style-type: none"> • Forests on land lawfully registered in the name of group representatives; • Forests on land lawfully transferred to a specific community; • Forests on any other land declared to be community land by an Act of Parliament; • Forests on land lawfully held, managed or used by specific communities as community forests; • Forests on ancestral lands and lands traditionally occupied by hunter-gatherer communities; • Forests lawfully held as trust land by county governments, but not including any public land held in trust by county governments under Article 62(2) of the Constitution. 	54.5%

Sources: Mongabay 2011; Government of Kenya 2016a

3 Forests and food in Kenya

Approximately 25 percent of Kenya's population is food insecure due to the low productivity of its agricultural land; reliance on rain-fed agriculture; low levels of mechanization; and high post-harvest losses (National Food and Nutrition Security Policy Implementation Framework 2017). Around 70 percent of Kenya's rural population rely on forests for their well-being (Bulimo 2023). However, deforestation and forest degradation, coupled with climate change, have reduced people's capacity to produce sufficient food and pasture for their livestock (Wakhungu 2023). According to the National Forest Resources Assessment Report (2021) and Integrated Food Security Phase Classification (2023), most of Kenya's counties with high food insecurity rates are those with less than 10 percent forest cover (Integrated Food Security Phase Classification 2023). Forested areas play a critical role in diversifying diets and meeting nutritional needs, particularly for communities that rely on wild foods. The loss of wild fruits, mushrooms and other edible fruits and berries from forests due to deforestation has a significant impact on communities that depend on forests for their livelihoods, such as the Ogiek and Sengwer peoples in Mau Forest in Embobut Forest, respectively. The cumulative result of this loss is an increase in child malnutrition and hunger, which have reversed the gains in lowering malnutrition over the years in Kenya (Integrated Food Security Phase Classification 2023).

Forests and forestry-related activities also help to improve agricultural productivity by conserving soil and water, and enhancing soil fertility (Ministry of Agriculture, Livestock and Fisheries 2017). Forests and trees play multiple functions in contributing to the livelihoods of Kenyans – particularly women and marginal groups – through their provision of food and energy, especially in rural areas (Ministry of Environment and Natural Resources 2016). Forests are also enablers of Kenya's Big 4 Agenda through their contributions to housing, health, manufacturing and food security (Ministry of Environment and Forestry 2019).

Linkages between forests and food provision have long been recognized in research, policies and practices. For example, the Plantation Establishment and Livelihood Improvement Scheme (PELIS) was first introduced by the colonial government in Kenya in 1910 as a non-residential cultivation scheme to promote local livelihoods and economies while ensuring sustainable management and conservation of forests through provision of raw materials for expanding the timber industry and reducing pressures on natural forests (Kagombe and Gitonga 2005). The scheme has provided essential nutritional value and improved health for local people (Odwori et al. 2013; Okumu et al. 2020), alleviated food insecurity and landlessness, and increased food production (Odwori et al. 2013). In Aberdare Forest, for example, households continue to depend on food production from cultivation of forest land under the PELIS scheme (Elizabeth et al. 2018).

The *Shamba* system, first introduced in Kenya in 1910, is an approach where farmers grow food crops for the first two to three years on previously deforested land allocated to them (Kabubo and Gachoki 2008). Under the scheme, farmers are allowed to grow plantation trees and food crops on small, half-acre plots, which allows them to tend trees and harvest crops for three to four years until the tree canopy closes. When the canopy does close, they then move on to other degraded areas identified by foresters for similar reforestation interventions; an arrangement that benefits both parties (Okumu et al. 2020).

Forestry contributed around 1.4% to Kenya's GDP in 2014 and contributes approximately USD 365 million annually (Ministry of Environment and Natural Resources 2016). These statistics, however, do not include forestry's contributions to household wood energy (charcoal production), non-timber forest products (NTFPs) and ecosystem services (Ministry of Environment and Natural Resources 2016).

In Mbooni in Makueni County, local people collect NTFPs, including plant and animal species, for food, supplemental income generation and medicinal purposes (Mbuvi and Boon 2009). In East Mau Forest, for example, the forest contributes 33% of local earnings, 50% of local firewood and charcoal use, and 27% of food consumption, mostly for the poor (Langat 2015). In Dundori and Bahati forests in Nakuru District, the forests' main contributions local community well-being include food products, fuelwood and fodder (Kabubo and Gachoki 2008). Similar situations are also found in Rabuko-Sokoke Forest (Matiku et al. 2013) and Arabuko-Sokoke Forest (Mbuvi and Ayiamba 2005). In Loita Subcounty in Narok County, forests also provide food for communities not living in or near them, and play important roles for such communities in times of hardship (Mbuvi and Kungu 2021). Children and women also collect wild forest fruits and plants in some areas of Kenya (Emerton 1996). Marsabit Forest provides honey and food for local people (Muhati and Warui 2022), while those in and around South-West Mau Forest collect wild food as a traditional practice whilst simultaneously practicing new agriculture production approaches for food provision (Kang'ethe et al. 2000). Forest trees provide important food and fodder during periods when people have less time for food preparation, such as during peak cropping seasons (Ministry of Environment and Natural Resources 2016). Traditionally, trees have provided food and fodder during emergency periods, especially during times of drought and famine (Ministry of Environment and Natural Resources 2016). In the Eastern Mau Forest Reserve, women in community forest associations had more forest related incomes more than non-CFA¹ members. The forest incomes were derived from nature based income generating activities which included bee keeping, tree seedling collection and fish farming (Mutune et al. 2017).

In improving food security and nutrition, climate change mitigation actions were expected to result in GHG emissions reductions of 2.61 MtCO₂e by 2022 through agroforestry, minimum tillage systems, manure management, livestock management efficiency and improved management of ecosystems and biodiversity (Government of Kenya 2018).

1 Community Forest Associations (CFAs) are institutions established by the Forest Act 2016 in which community members adjacent to forest resources participate in co-management of forest resources together with Kenya Forest Service

4 Drivers of deforestation and forest degradation, and threats to food systems and food security

Despite the forestry sector playing important roles in food systems and food security, and climate change mitigation and adaptation, the country loses around 12,000 ha of forest each year on average (FCPF 2021), with an annual deforestation rate of around 0.17% (Ministry of Environment and Forestry 2020a).

Forest ecosystems are highly degraded due to agricultural expansion and encroachment for settlements (Duguma et al. 2019; Imo 2021; Muok et al. 2021; Teucher et al. 2022). Between 1990 and 2010, Kenya lost 2.8% of its natural and indigenous forest cover in spite of a logging ban (KAM 2021). Growing illegal timber trade contributes to deforestation and loss of biodiversity in many regions across Kenya (Bleher 2006; Bunei 2017; Rotich 2019). Other challenges include a growing population and its increasing demand for forest products and services; historically poor enforcement of forest regulations; overlapping policies and institutional mandates; policy conflicts; inadequate land tenure policies; poor collaboration and coordination between forest conservation agencies and between state and non-state stakeholders; and inadequate regulation of grazing in arid and semi-arid (ASAL) lands, woodlands and dryland forests resulting in overstocking and overgrazing (Ministry of Environment and Forestry 2020a).

Deforestation and degradation of forest ecosystems remove critical carbon sinks from Kenya, and cause significant environmental problems. Deforestation has been driven mainly by clearance for agriculture linked to rural poverty and rapid population growth; unsustainable utilization of forest products (timber harvesting and charcoal production); grazing in forests; and past governance and institutional failures in the forestry sector (NCCAP 2018–2022). Forests have been deliberately and illegally reduced to croplands, and croplands changed to grasslands, while grasslands are slowly becoming deserts. These changes are noticeable through declining crop yields and livestock numbers per unit of land, and rural people having to cover longer distances for fuelwood, water and grazing areas (Ministry of Lands and Physical Planning 2016).

Forest destruction is directly linked to changes in land use over time in Kenya, and has led to biodiversity loss (Teucher et al. 2021). As the population increases, there is increased demand for agricultural products, timber and charcoal. This has caused significant damage to forest ecosystems. Numerous logging bans have been imposed as a means for protecting forest ecosystems from further degradation, with the main reasons for the imposition of bans and/or moratoriums always being the same: destruction of forest ecosystems leading to increased degradation; and threats to tree species. Over time, while bans have reduced the destruction of forest ecosystems to some extent, corrupt officials have used the associated decrees for short-term economic gain (Ndiso 2018).

Poor knowledge management, inadequate mechanisms for access and benefit sharing arrangements, and minimal involvement of community members in decision making (Mutune et al. 2016) and strained relationships between state agencies and between the private sector and government agencies have also impeded the performance of the forestry sector (KAM 2021). Forest degradation is also driven by political and economic instability (Chimdesa 2017). Between 2017 and June 2023, the Government of Kenya, through the Ministry of Environment and Forestry, imposed a moratorium (which was lifted on 3 July 2023) on timber harvesting in all public and community forests to allow for the reassessment and rationalization of the country's entire forestry sector. While saw mill owners and forest investors have claimed logging bans disregard the survival of the sector (KAM 2021), conservationists and international NGOs argue that lifting the ban will have a negative impact on Kenyan forests (Bulimo 2023; Fuchs 2023).

5 Key forestry-food system policies in Kenya

To protect forests and enhance forestry potential and food security in achieving Kenya's NDC targets, the country has issued a large number of legal frameworks and policies (Table 2).

It is clear that forest-food security linkages are recognized and articulated in existing policies. The Government of Kenya has also set a clear direction and vision for addressing climate change and sustainable food systems by reducing deforestation and forest degradation. In addition to technical solutions such as fostering reforestation, afforestation and agroforestry practices and implementing REDD+, institutional changes such as setting up multistakeholder forums, exploring new financial mechanisms for forestry-based mitigation options and networks for forest committees might lead to better forest and food outcomes.

However, the policies in place – whether individual or collective – require careful assessment for determining their effectiveness and recommending adaptive changes. The recent long-term logging ban was a key instrument in reducing forest loss, but in February 2023, the Ministry of Forestry and Climate Change announced its intention to lift the ban in July 2023 and impose taxes on imported timber to encourage locally-made products and open up economies in areas that depend on forest products (Openda 2023). The lifting of the ban has led to serious concerns among different groups concerned about the potential for further forest destruction², as the lifting of earlier bans³ in Kenya have shown (Bhandari and Lamichhane 2020).⁴

While the promotion of agroforestry in croplands and REDD+ are central priorities for the country, effective mechanisms for incentivizing emissions reductions, forest conservation, sustainable forest management and enhancement of carbon stock in farming systems are lacking (Ministry of Agriculture, Livestock and Fisheries 2017).

Government agencies' poor coordination of the large numbers of policies in place poses a significant challenge to implementing policy visions in an effective manner. The Forest Management and Conservation Act of 2016 (Government of Kenya 2016a) and Agricultural Policy 2021 (Ministry of Agriculture, Livestock, Fisheries and Cooperatives 2021), for instance, approach the two sectors independently, causing a rift between initiatives to preserve forests and others to increase food production. This has led to long-term destruction of forest land through clearing for agriculture, thereby causing deforestation and land degradation, which both jeopardize the country's long-term food security (Wakhungu 2023).

Harnessing the potential of Kenya's forest ecosystems to enhance food security requires strengthening a unified framework that prioritizes the sustainable coexistence of forestry-food security; safeguarding forest ecosystems by taking strong action to reduce deforestation and forest degradation for agricultural expansion; clear tenure arrangements; effective law enforcement; and appropriate financial incentives.⁵

Further research is required to assess the effectiveness of existing policies and projects, and to offer lessons learned for improvements in the future.

2 Shamba: Kenya's agroforestry in the spotlight (chinadialogue.net)

3 Kenya's logging ban has been lifted – it's a political decision and a likely setback for conservation (theconversation.com)

4 As Kenyans farm in forests, incomes rise and deforestation falls (trust.org)

5 Leveraging Forest Ecosystem to Boost Food Security in Kenya – KIPPRA

Table 2. Key climate change, forest and food security policies

Year	Policy	Forest-related
2010	Kenya Constitution 2010	Maintain and accelerate efforts for achieving and maintaining tree cover of at least 10% of the total terrestrial area. To achieve this, Kenya needs to plant 1.8 billion seedlings by 2022, and rehabilitate 4 million acres of heavily degraded forest land at an estimated cost of USD 200 million (Green Fiscal Incentive Policy).
2012	National Policy for the Sustainable Development of Northern Kenya and Other Arid Lands (Prime Minister of the Republic of Kenya 2012)	<p>The goal of this policy is to facilitate and fast-track sustainable development in Northern Kenya and other arid lands by increasing investment in such regions and ensuring resource use is fully reconciled with the realities of people's lives.</p> <p>The Government will:</p> <ul style="list-style-type: none"> • reinforce the authority of traditional natural resource management systems that promote sound environmental practices; • protect and promote indigenous knowledge and practice, promote environmental education and awareness, and intensify environmental conservation efforts; • protect and increase forest cover, riverine vegetation and critical water catchment areas in arid and semi-arid lands (ASALs), including special ecosystems such as Mount Marsabit and Kulal; • eradicate undesirable invasive species such as <i>Prosopis</i>; • ensure the interests of pastoralists, particularly pastoralist women, are adequately and appropriately addressed in new land legislation and institutions, in line with the National Land Policy.
2013	Agriculture and Food Authority Act	An act of parliament to provide for the consolidation of laws on the regulation and promotion of agriculture; to provide for the establishment of the Agriculture, Fisheries and Food Authority; and to make provision for the respective roles of the national and county governments in agriculture excluding livestock and related matters. It prohibits, regulates and controls the undertaking of any agricultural activity including the burning, clearing or destruction of vegetation, and from the afforestation or reforestation of land.
2013	Crops Act	The current 2019–2029 Agricultural Sector Transformation and Growth Strategy (ASTGS) has identified 13 crop value chains that can be developed to increase smallholder farmer production. Implementation of mechanisms under the Crops Act to support scheduled crops, and incentives proposed by the ASTGS should be screened through the 2017–2026 Climate Smart Agriculture Strategy lens to ensure they support climate resilience and GHG emissions reductions, and are not drivers of deforestation and forest degradation.
2016	Forest Conservation and Management Act (No. 34 of 2016)	<p>The Forest Conservation and Management Act has twin objectives of sustainable forest conservation and enhanced livelihoods. It provides for:</p> <ul style="list-style-type: none"> • community participation in the management of forest lands through community forest associations; • trade in forest products; • protection of indigenous forests; • protection of water resources; <p>It also makes provision for the conservation and management of public, community and private forests and areas of forest land that require special protection, defines rights in forests, and prescribes rules for the use of forest land.</p>
2016	Green Economy Strategy and Implementation Plan (GESIP) 2016–2030	GESIP aims to enable sustainable exploitation of natural resources including forestry. Together with its implementation plan, it focuses on overcoming the main socioeconomic constraints to the attainment of Kenya Vision 2030. It targets multiple challenges including infrastructure gaps, food insecurity, environmental degradation, climate change and variability, poverty, inequality and unemployment. It also helps Kenya on a new economic trajectory characterized by low emissions, resource efficiency and higher economic growth.

Objectives and visions

Food-related

Every person has the right to the highest attainable standard of health, which includes reasonable standards of sanitation; to be free from hunger and have adequate food of acceptable quality; and to clean and safe water in adequate quantities.

In order to strengthen food security, the Government will:

- develop policies that recognize the contribution of cross-border trade and facilitate cross-border movement of livestock for food security;
 - ensure livestock-based food products enter national food reserves;
 - strengthen research and extension systems relevant to rain-fed crop production, including soil and water conservation, organic farming and agroforestry;
 - promote water harvesting to ensure food security in collaboration with regional development authorities;
 - increase access to the skills and technologies needed for irrigated agriculture, particularly when community-managed;
 - promote improved practices in post-harvest storage and management;
 - strengthen market linkages between lowland and highland economies;
 - establish mechanisms to extend affordable finance to smallholder farmers, particularly women;
 - establish a multistakeholder forum bringing together Government, UN agencies, development partners, NGOs and the private sector, in a forum modelled on the Kenya Food Security Meeting (KFSM) structure. A series of thematic sub-groups, such as food security, social services and infrastructure are likely to feed into the forum.
-

Promote best practices in, and regulate, the production, processing, marketing, grading, storage, collection, transportation and warehousing of agricultural and aquatic products excluding livestock products as may be provided for under the Crops Act, and the Fisheries Act.

The objectives of this Act are to:

- accelerate agriculture growth and development;
 - enhance farmer productivity and rural incomes;
 - improve the investment climate for, and efficiency of agribusiness;
 - develop agricultural crops as export commodities to augment the country's foreign exchange earnings through promotion of the production, processing, marketing and distribution of crops in suitable areas of the country.
-

All indigenous forests and woodlands shall be managed on a sustainable basis for purposes of:

- conservation of water, soil and biodiversity;
 - riparian and shoreline protection;
 - cultural use and heritage;
 - recreation and tourism;
 - sustainable production of wood and non-wood products;
 - carbon sequestration and other environmental services;
 - education and research purposes;
 - habitat for wildlife in terrestrial forests and fisheries in mangrove forests.
-

In pursuance of the above, the forestry service shall, in consultation with the forest conservation committee for the area where the indigenous forest is situated, prepare forest management plans.

Strategies proposed in GESIP support key development priorities, namely: rapid economic growth, infrastructure development, diversification and commercialization of agriculture, food security, wider access to better quality education and healthcare, youth employment, and provision of better housing and improved water sources and sanitation. The focus in the public health sector will be improving access to clean potable water, sanitation and food security.

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Table 2. Continued

Year	Policy	Forest-related
2016	National Climate Change Framework Policy	<p>The goals of this framework policy are to enhance adaptive capacity and resilience to climate change, and promote low carbon development for the sustainable development of Kenya.</p> <p>The agriculture sector is the largest contributor of GHGs emissions in the country, mainly from livestock methane emissions and land-use change. GHG emissions for the livestock subsector are expected to increase by up to 30 percent by 2030. The agriculture sector has the potential to reduce GHG emissions through sequestration of carbon in trees and soils through agroforestry, improved pasture and range land management, conservation agriculture, efficient dairy production systems, and improved manure management.</p>
2016	Ministry of Finance and Treasury - National Policy on Climate Finance	<p>The policy focuses on climate financing from both domestic and international sources, and establishes a national Climate Change Fund to identify sources of climate financing.</p> <p>Increasing tree cover to a minimum target of 10 percent of total land area is a stated goal of Kenya's Constitution and Vision 2030.</p> <p>Planting trees and protecting forest ecosystems are important elements of Kenya's climate change response by building resilience and increasing carbon sinks. Climate investment can support such actions as:</p> <ul style="list-style-type: none"> • Reduction of deforestation and forest degradation; • Conservation and sustainable management of forest areas; • Conservation and protection of water towers; • Increased afforestation and reforestation activities, such as restoration of dry and arid land forests and reforestation of degraded forests; and development of sustainable fuelwood plantations.
2016	National Land Use Policy (NLUP)	<p>The overall goal of the NLUP is to provide a legal, administrative, institutional and technological framework for optimal utilization and productivity of land-related resources in a sustainable and desirable manner at national, county and community levels.</p> <p>The NLUP addresses the destruction of natural resources like forests through encroachment and deforestation, and the destruction of wetlands.</p>
2016	Ministry of Environment and Natural Resources - National Forest Programme (NFP) 2016–2030	<p>The goal is sustainably managed forests and allied natural resources for socioeconomic growth and climate resilience. The NFP integrates national values of integrity, good governance and social justice into the forestry sector. It forms a reference for forest management and aims to meet local, county, national and global needs by linking national and international partnerships. The NFP will enhance environmental, economic and social sustainability in the Kenyan forestry sector by achieving five strategic objectives:</p> <ul style="list-style-type: none"> • Increase forest/tree cover and reverse forest degradation; • Enhance forest-based economic, social and environmental benefits; • Enhance capacity development, research and adoption of technologies; • Increase investment in forest development; • Integrate national values and principles of good governance in forest development.
2017	Kenya's Climate Smart Agriculture Strategy 2017–2026	<p>The broad objective of the strategy is to adapt to climate change and build the resilience of agricultural systems while minimizing emissions for enhanced food and nutritional security and improved livelihoods.</p> <p>To achieve the objectives of Kenya Vision 2030, agriculture is expected to be innovative, commercially oriented and modern, while increasing forest cover by 4%, halving environment-related disease incidence, and carrying out reforestation and promoting agroforestry in croplands.</p>

Objectives and visions

Food-related

The resilience and adaptive capacity of poor communities must be strengthened to protect against projected climate change impacts and vulnerability arising from increased food insecurity and escalating public health threats (Government of Kenya 2016c).

Climate finance can support actions to build climate resilience and reduce vulnerability to drought and flooding, such as:

- Monitoring systems – Quality, credible early warning and food security monitoring systems that make effective use of advances in meteorological monitoring information technology;
- Multi-year food and cash mechanisms – Based on early warning and food security data;
- Water management – Effective and environmentally appropriate systems of water harvesting, management and irrigation, and emergency water supply;
- Climate-proofing of infrastructure – Infrastructure development (water and sewerage, transport, electricity) with improved climate-resilient standards;
- Livelihoods diversification – Investment in community-based livestock systems, crop farming (both irrigated and rain fed), dryland forestry and forest products, fisheries and other alternative livelihoods.

To address low vegetation cover due to competing land uses, the government shall:

- carry out an inventory of all land cover classifications;
- establish mechanisms to ensure protection and improvement of vegetation cover over time;
- incorporate multi-stakeholder participation in afforestation programmes and initiatives;
- develop a framework for incentives to encourage maintenance of forest cover;
- promote the use of alternatives and efficient production methods to reduce demand on forest products;
- ensure public participation in stakeholder forums in the determination of planning zones.

Kenya's increasing population, the demand for food, water and other products will exert pressure on forest resources. Forests and trees play multiple functions in contributing to the livelihoods of communities, especially women and marginal groups, in supplying food and rural energy.

The NFP commits to increasing food, water and energy security. It also requires research to focus on integrating tree planting for commercial purposes and other non-timber forest products with crop production to ensure food security.

Kenya will improve national food security and development goals with three key programmes:

- sustainably increase agricultural productivity and incomes;
- adapt and build resilience to climate change;
- minimize greenhouse gas emissions where possible.

continued on next page

Table 2. Continued

Year	Policy	Forest-related
2018	National Climate Change Action Plan (NCCAP) 2018–2022 -Government of Kenya	<p>The country’s vision is that farmland and dry land tree planting at the farm level (an agroforestry system that intends to incorporate bee-keeping) will contribute to 10% forest cover nationwide. It aims to:</p> <ul style="list-style-type: none"> • increase forest cover to 10% of total land area; • rehabilitate degraded lands, including rangelands; • increase resilience of the wildlife and tourism sector. <p>Strategic activities include:</p> <ul style="list-style-type: none"> • promoting farm forestry; • protecting fish breeding sites; • afforesting and reforesting degraded and deforested areas; • reducing deforestation and forest degradation; • promoting sustainable timber production on privately-owned land; • restoring degraded landscapes (ASALs and rangelands); • conserving land areas for wildlife.
2019	National Strategy for Achieving and Maintaining over 10% Tree Cover by 2022	<p>This strategy, which aligns with the National Forest Programme, is a cross-sectoral framework that provides for broad institutional and multi-stakeholder participation in accelerating the achievement of the Constitutional target of 10% tree cover of the national land area. The government has committed to restoring 5.1 million ha of degraded landscapes as a contribution to the Africa Forest Landscape Initiative (AFR100); and a 50% reduction in forestry sector emissions by 2030 as part of its Nationally Determined Contribution (NDC).</p> <p>Government strategic interventions include:</p> <ul style="list-style-type: none"> • producing 1.8 billion quality tree seedlings by 2022 needed to increase tree cover to 10%; • enhancing conservation and protection of natural forests on public, community and private lands and rehabilitation of degraded areas; • implementing agroforestry and urban forests and green spaces, greening infrastructure and schools; • increasing efficiency in wood conversion and utilization, and alternative energy sources.
2020	Kenya’s Updated Nationally Determined Contribution (NDC) - National and county governments	<p>An enhanced commitment to the domestic contribution to the NDC costs (subject to national circumstances) from 0% to 13.2% compared to the initial NDC.</p> <p>Kenya commits to abating GHG emissions by 32% by 2030 and has committed to planting 15 billion trees to achieve 30% tree cover by 2032. The 15 billion National Tree Growing and Restoration Campaign will accelerate and enhance Kenya’s efforts to reduce forestry sector emissions and address barriers to new afforestation programmes.</p>
2021	Kenya’s National REDD+ Strategy	<p>By 2030, Kenya will achieve 10% tree cover and become a carbon-neutral, middle-income country providing a high quality of life to all its citizens in a clean and secure environment. It has specific objectives including increased forest and tree cover; enhanced forest productivity; increased investments in forest development; protection of existing forest cover; integrated good governance in the forestry sector; enhanced forest-based economic, social and environmental benefits; and enhanced livelihoods for Indigenous Peoples and local communities.</p>
2021	National approach to safeguards and a safeguards information system for REDD+ implementation	<p>The goal of Kenya’s approach to safeguards is: to determine how to fulfil the Cancun (and other applicable) Safeguards, which having been clarified for Kenya’s national circumstances and context under the Constitution and applicable policies, laws and regulations (PLRs), can ensure that REDD+ actions and PAMs contribute to the objectives of the National REDD+ Strategy.</p>

Objectives and visions

Food-related

The action plan aims to increase food and nutrition security by enhancing the productivity and resilience of agricultural systems in as much of a low-carbon manner as possible by:

- improving crop productivity through the implementation of climate smart actions;
- improving crop productivity by increasing acreage under efficient irrigation;
- increasing productivity in the livestock sector through implementation of climate-smart actions;
- enhancing productivity in the fisheries sector through implementation of climate-smart actions;
- diversifying livelihoods to adjust to a changing climate.

Improving forest ecosystems to makes invaluable contributions to food security

As Kenya prioritizes food security for its citizens, its climate change response should safeguard citizens' basic rights to food.

Interventions to achieve REDD+ objectives include activities designed to both reduce emissions and meet the food requirements of local authorities.

Kenya will scale up afforestation, reforestation and landscape restoration programmes; enhance governance and policy to prevent conversion of forest to other land; and increase productivity of public plantations to deliver social benefits including improved food security and nutritional status.

continued on next page

Table 2. Continued

Year	Policy	Forest-related
2022	Green fiscal incentive policy	<p>Identify and prioritize the implementation of a coherent suite of green fiscal actions that will allow Kenya to exploit the opportunities of accelerating the transition to a low-emissions development pathway while enhancing climate resilience and ensuring environmental sustainability.</p> <p>The policy sets out a series of green fiscal policy actions of particular interest to the Government of Kenya. Key sectors identified in the policy with the greatest potential to green Kenya’s economy in line with the NCCAP include agriculture, food and nutrition security, water and sanitation, blue economy, health and sanitation, and forestry.</p> <p>The policy also introduces a carbon tax. By 2030, Kenya’s combined GHG emissions from forestry, electricity generation, energy demand, transportation, agriculture, industrial processes, and waste are projected to grow to around 143 MtCO₂e.</p> <p>Proposed fiscal actions for the forestry sector include:</p> <ul style="list-style-type: none"> • incentivizing tree growing and management; • reducing pressure on forests; • ecological fiscal transfers (EFTs); • payments for ecosystem services (PES); • integrating afforestation and reforestation into carbon tax design; • more support for ecotourism and wildlife.
1986, 2011, 2007, 2018, 2021, 2023	Logging bans	<p>The Government of Kenya issued different logging ban policies in 1986, 2011, 2007, 2018, 2021 and 2023 to stop and prevent deforestation and forest degradation, and halt the impending extinction of tree species such as sandalwood.</p>
2023	THE CLIMATE CHANGE (AMENDMENT) ACT, 2023	<p>Reduced Emissions from Deforestation and Forest Degradation, which includes activities in the forest sector that reduce greenhouse gas emissions from deforestation and forest degradation, as well as the sustainable management of forests and the conservation and enhancement of forest carbon stocks at national and sub national levels.</p>

Sources: The National Council for Law Reporting 2010; Government of Kenya 2007, 2013a, 2013b, 2016a, 2016b 2016c, 2016d, 2019, 2022; Prime Minister of the Republic of Kenya 2012; Ministry of Lands and Physical Planning 2016; Ministry of Environment and Forestry 2019, 2020b, 2021a, 2021b; Ministry of Environment and Natural Resources 2016; Ministry of Agriculture, Livestock and Fisheries 2017; Government of Kenya 2018

Objectives and visions

Food-related

The government will therefore explore a range of fiscal policy response measures, as follows:

- water-saving irrigation systems and strategies;
- reduction of post-harvest losses;
- green technology in crop production: promoting the use of integrated crop management technology, organic farming and the use of low carbon emission equipment for cultivation;
- improve adaptive and resilience technologies to increase livestock production and productivity by 2030;
- cooperative development for sustainable agriculture;
- degraded land rehabilitation.

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- low carbon economy through climate resilient land-based technologies for climate change mitigation and adaptation
 - the establishment of the Reduced Emissions from Deforestation and Forest
 - sequestration carbon from atmosphere via afforestation, reforestation and nature-based
 - technology-based removal such as agroforestry
 - regulation of carbon markets and carbon related benefits related to land and non-land sector
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6 Conclusions

This short review shows the important role of Kenya's forests in ensuring food security for the country's people. Numerous policies and scientific papers have recognized this strong linkage, and the Government of Kenya has committed to implementing policy interventions to ensure food security without destroying forests. Different cross-sectoral bodies have been established to foster holistic food-forest solutions. However, translating these policies into practice is challenging as forests are still being lost due to weak governance; population growth; forest conversion for agriculture production; insecure tenure; and a lack of finance. Our review highlights the need to address these drivers by implementing current policies more effectively. However, assessing how effective current policies are for addressing deforestation and forest degradation, and for low-emission food systems, will require further research across the country and should become a future research priority in Kenya. There is need to embolden good forest governance through meaningful involvement of community members besides proper coordination and collaboration between forest state and non-state actors.

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This working paper was developed based on a policy and literature review to take stock of the latest information on forest-food linkages in Kenya. Our review shows Kenya's forests play important roles in providing food directly to local communities, as well as requisite conditions for sustainable food production systems in the country. Food-forest linkages are widely articulated in different policies issued by the Government of Kenya that draw on the principle of producing food without destroying forests. Different cross-sectoral bodies have been established to foster holistic food-forest solutions. The government expects forest protection and conservation policies to provide appropriate incentives and support for local food production and needs. Numerous academic publications have analysed the roles forests play in providing food, ensuring food security and supporting national development in Kenya. Despite the availability of scientific evidence on food-forest linkages, and policies and institutions being in place, translating policies into practice has been ineffective as forest loss continues to result in high-emission food systems. Complex drivers of deforestation and forest degradation in Kenya include weak governance; population growth; forest conversion for agriculture production; insecure tenure; and a lack of finance. Our review highlights the need to address these drivers by implementing current policies more effectively. Assessing how effective current policies are for addressing deforestation and forest degradation, and for low-emission food systems, will require further research across the country and should become a future research priority in Kenya.

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