AN ASSESSMENT OF THE STATUS OF BLUE ECONOMY SECTORS IN KENYA

Sector Report on Coastal and Marine Forestry

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To

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LIST OF ABBREVIATIONS

UNDP	United Nations Development Programme
GDP	Gross Domestic Production
KNBS	Kenya National Bureau of Statistics
FAO	Food and Agriculture Organisation
AFA	Agriculture and Food Authority
MALF	Ministry of Agriculture, Livestock and Fisheries
KEFRI	Kenya Forest Research Institute
ASAL	Arid and Semi-Arid Land
IFAD	International Fund for Agricultural Development
EAC	East African Community

Section I: Background and Context

1.1 Forestry in Kenya

Before the colonisation by Britain (pre - 1885), the forests were managed by the Kenyan indigenous communities through their elders, clans, family heads such as the Lugha, Kikuyu, Maasai and Digo (Ongugo and Mwangi, 1996; Luke and Robertson, 1993). This entailed controlling access to different forest resources such as sacred groves used for traditional cultural activities and religious practices and maintenance of selected valued species for timber supply, medicinal purposes as well as fodder. There were strict punishments and sanctions put in place for people who didn't follow this laws like the Maasai communities (Trench and Makee, 1994). In some communities the medicine men would plant the medicine trees to ensure a steady supply (Ongugo and Mwangi, 1995).

After Kenya was acquired by Britain first as a protectorate and then a colony, there were several laws and policies put in place for the management of the forests in Kenya. The first forestry legislation was Ukamba Woods and Forest Regulation of 1897 which main aim was to ensure a study supply of wood fuel for the construction of Kenya Uganda railway. This placed the forest on a one mile radius along the railway line to the railway construction administration (Logie and Dyson, 1962). In 1902, the East African Forestry Regulation was published putting the forests under the Forestry Department (DP). The essence was to reduce the destructive impacts of shift cultivation and pastoralism in the forested areas. It thus introduced the gazettement of forested areas, forest offences, licences for permitting activities in the forests and collection of fallen trees and branches for wood. Other regulations that followed include Forest ordinances of 1911, 1915, 1941,1949 and 1954 which lead to creation of reserves in the forest, protection of catchment forests and creation of a forest subcommitte which recommended planting of 6,000 acres per year of softwood (Logie and Dyson, 1962; Mugo et al., 2010; Ototo and Vlosky, 2018). This regulations were advised by visiting experts until 1957 when the first forest policy was formulated (White Paper number 85). The policy focused on management and conservation of forests on the government land and has since undergon several revisions the most recent one being draft forest policy 2020 (Ototo and Vlosky, 2018; Mbuvi, 2020)

Currently, the forests in Kenya cover an estimated 4,138,000 ha accounting for only 7.0 % of the land mass of Kenya (KFS, 2013). The forests are divided into natural and planted forests. The natural forests are divided into montane forests (34.1%), western rainforests (3.4%),

coastal forests (8.1%) and dryland forests (4.7%)(Kenya, 2016, Ototo; Vlosky, 2018) (see Appendix 1). Planted forests on the other hand are divided into public, private and community owned. Planted public forests according to KFS (2010) are estimated at 94,572 ha and mainly comprising of pinus, cypress and eucalyptus plantations. Private planted forests are estimated at 94,000 ha and are intensively managed plantations (e.g. Finlay Kericho forests and KTDA forests) and planted trees on agroforestry systems where trees are planted and inter cropped as woodlots, field demarcation and as windbreakers (UNEP, 2017).

The forestry activities, including logging, contributes about 1.3% of the Kenya's GDP and is one of the leading sectors providing wage employment (KNBS, 2020). It employees 50,000 people directly and an estimated 300,000 people indirectly (KFS, 2015; Chisika & Yeom, 2020). However, according to UNEP, 2012, there are a lot of unrecorded economic contributions of forests due to subsistence use and informal market trades. Thus the estimated annual contribution of forests to the GDP is estimated at between 3–3.6% without the inclusion of the ecosystem services they provide (Kenya, 2016).

1.2 Coastal and Marine forestry

Our global ocean covers more than 72% of the earth's surfaces and is responsible for providing food, jobs, and recreation for a large portion of the world's population; and it has become a significant driver of global GDP (World Bank, 2017). Oceans provide a substantial portion of the global population with food and livelihoods and are the means of transport for 80% of global trade (UNCTAD, 2012). The last few years have seen a spectacular increase in attention devoted to the need to protect the world's ocean and seas. At the same time, interest has been growing in the huge potential offered by the future development of ocean-based industries. The world's ocean and seas hold the promise of immense resource wealth. Moreover, they are increasingly recognized as indispensable for addressing many of the global challenges facing the planet in the decades to come, from world food security and climate change to the provision of energy, natural resources and environment [1].

The blue economy is the sum of the economic activities of ocean-based industries, together with the assets, goods and services of marine ecosystems. At the core of the Blue Economy

[1] OECD (2016). The Ocean Economy in 2030: The Ocean as a Sustainable Source of Economic Growth Policy, OECD Publishing, Paris

concept is the dissociating of socio-economic development from environmental degradation. To achieve this, the Blue Economy approach is founded upon the assessment and incorporation of the real value of the natural (blue) capital into all aspects of economic activity. Worldwide, the economies of coastal communities and their resilience highly depend on the ecosystem services that Coastal Zones provides. **Global ecosystem services are valued at an approximate $141 trillion per year; $60- 68% of which is derived from marine and coastal environments (Constanza et al., 2014).** According to the European Commission Blue Economy provides over 5 million jobs and contributes €500 Billion per year (Malshini, 2019).

Coastal ecosystems include mangrove forests, coral reefs, sea-grass beds, marshes, beach and dune systems as well as pelagic systems. These ecosystems provide goods and services that are of environmental, ecological and economic value to the society around the world. Mangroves are among the most productive ecosystems and provide a variety of ecosystem goods and services like carbon sequestration. The global economic value of mangroves attached to this core benefit of sequestration is estimated to be at $30.50ha^{-1} **yr^{-1} (Barbier et al., 2011). Coastal and marine ecosystems are also important revenue generators through tourism. Globally, the value attached to these ecosystems through tourism is approximately $30 billion per year (UNEP 2006).**

Section II Coastal and Marine Forestry in Kenya

2.1 Terrestrial coastal forests

The Kenyan coast is endowed with rich natural resources that support the local and national economy. Some of these resources include mangrove forests, coral reefs, terrestrial forests, sandy beaches and seagrass beds. These ecosystems support high biodiversity which in turn support economies and livelihoods (Samoilys et al. 2015). The richness of the region's world-class ocean ecosystems is under threat from both direct and indirect pressures through resource exploitation and human-induced habitat degradation. For example, mangrove coverage is diminishing in most countries in the region – Kenya and Tanzania lost about 18 per cent of their mangroves over 25 years, and Mozambique lost 27 per cent over a shorter timeframe (Bosire 2015).

Coastal forests in Kenya are composed of mangrove forests, eastern arc mountain forests, and the lowlands terrestrial forests. This forests covers the 6 coastal counties (Lamu, Malindi,Kilifi,Athi River, Kwale and parts of Taita Taveta and Garissa). The Kenyan coastal forests are part of the eastern coastal forests and are known for the high number of endemic fauna and flora. The forests extend from the Somalia to Mozambique and are a biodiversity hotspots with more than 4500 species from 1050 genera and are referred to as the 'Swahili center of endemism') (Burgess and Clarke, 2000; Luke, 2005; Fungomeli et al., 2019). Apart from being habitat for the flora and fauna, this forests are also significant reservoirs of carbon. However, 90% of these forests have lost due to threats they are facing of increased anthropogenic activists due to the growing population and development and climate change (Burgess and Clarke, 2000; Fungomeli et al., 2019; Ngumbau, 2020). This forests cover about 3170 km^2 with Kenya having an approximated 20% (787 km^2) (Burgess et al. 2003). Some of the forests gazetted as conservation areas include Shimba Hills, Arabuko-Sokoke and Tana River Forests, managed jointly by Kenya Forest Service (KFS) and Kenya Wildlife Service (KWS). Kaya forests are managed by the National Museums of Kenya for to their cultural significance (Table 1).

Table 1: Coverage and legal status of terrestrial forests in coastal counties of Kenya

COUNTY	FOREST	AREA (ha)	LEGAL STATUS
Kilifi	Arabuko Sokoke	42,000	Forest reserve
	Madunguni	1000	Forest reserve
	Mwangea Hill	2,000	Trust land/ private

	Nzovuni	500	Trust land/ private
	Dakatcha woodlands	32,000	Trust land
Kwale	Shimba Hills	19,242	Forest reserve
	Mkongani	2,479	Forest reserve
	Mwaluganje	1,414	Forest reserve
	Mwache	417	Forest reserve
	Buda complex, Mrima, Dzombo, Marenje, Gonja.	5,080	Forest reserve
	Kilibasi	500	Trust land
Tana river	Wayu	42,512	Forest reserve
	Kokani	61,495	Forest reserve
	Bangali	119,373	Forest reserve
	Mbalambala, Hewani ,Mwina	10,298	Forest reserve
	Kipini	22,016	Provisional forest
Lamu	Witu Lamu	4,676	Forest reserve
	Boni/ Lungi	39,925	Forest reserve
	Panda Nguo	41,316	Forest reserve
	RasTenawi	2,000	Trust land
Taita Taveta	Forest Reserve (incl. Fururu, Mwandogo, Ngangao etc.)	1108	Forest reserve
	Trust Land (incl. Kasigau, Kalangu, Mwarang'u etc.)	5275	Forest reserve
All counties	Kaya (over 50 sites)	2,840	National monuments

Sourced from KFS, 2015, Samoilys et al., 2015

2.1.1. Kaya forests:

These are essentially residual forest patches (average 0.1- 2km^2) of lowland forests that were once broad and wide-ranging. In Kenya, Kaya forests usually occur in the plains and hilly coastal regions. These Kayas are highly diverse, harbouring more than half of the rare plants in the Kenyan coast (Younge, 2002). In the beginning, Kayas survived due to the culture and religion of the coastal Mijikenda ethnic groups. Over time, a decline in knowledge and respect for traditional values resulted in the degradation and loss of many of the small Kaya forests.

The loss was worsened by rising demand for forest products and land for agriculture, mining and other activities due to increased population. A survey was carried out in 1986 which covered over 20 Kaya sites and collected interesting and rare plant specimens which brought the Kayas to the attention of Government for their key role in biodiversity conservation (Younge, 2002: UNESCO, 2003.). Following the survey, the State began to gazette Kayas as National Monuments in 1992. To date, there exist almost 50 Kaya forest patches in the coastal region most of which are now gazetted (Table 2) and protected under the National Museums' Coastal Forest Conservation Unit with support from the World Wide Fund for Nature WWF (Polidor, 2004).

Table 2: Key kayas and area extent (source- UNESCO, 2008)

Name	**Coverage (ha)**
Kaya Giriama	204
Kaya Jibana	140
Kaya Kambe	75
Kaya Ribe	36
The Rabai Kayas	580
The Duruma Kayas	398
Kaya Kinondo	30
Kaya Kauma	75

2.2. Eastern Arc mountain forests

The Eastern Arc Mountains stretch for some 900 km from the Makambako Gap, southwest of the Udzungwa Mountains in southern Tanzania to the Taita Hills in south-coastal Kenya. They comprise a chain of 12 main mountain blocks: from south to north, Mahenge, Udzungwa, Rubeho, Uluguru, Ukaguru, North and South Nguru, Nguu, East Usambara, West Usambara, North Pare, South Pare and Taita Hills. The total Taita Hills is approximately 600 ha, mostly in fragmented form with a closed canopy forest of about 200 ha. In addition, 120 ha of land in Taita Hills are protected as a forest reserve. Their proximity to the Indian Ocean ensures high

rainfall of about 3,000 mm/year on the eastern slopes of the Ulugurus, falling to about 600 mm/year in the western rain shadow.

2.3 Mangrove Forests

Mangroves are trees and shrubs that grow in the intertidal areas of tropical and subtropical coasts around the world; between latitudes 25° N and 25° S. Along the Kenyan coast, mangrove forests are a common feature in protected bays, creeks and tidal estuaries extending between high and low water marks of the spring tides. These forests are estimated to cover an area of 61, 271 ha (Table 3), translating to about 3.0% of the national forest cover.. Lamu county has the largest coverage of mangrove forests (61%) while Mombasa and Tana River Counties have the least coverage. *Table 3: Distribution of mangroves along the Kenyan coast*

County	**Areal extent(ha)**	**% cover**
Lamu	37,350	61
Tana River	3,260	5
Kilifi	8,536	14
Mombasa	3,771	6
Kwale	8,354	14
Total	**61,271**	**100**

Section III

Contributions of terrestrial coastal forests and mangroves

3.1 Direct Contributions

The entire environment and natural resources sector in Kenya contributed about US$ 3 million to the country's GDP in 2019, approximately 3.2% (KNBS, 2021). Of this, the forestry and logging industry contributed about US$ 1.2 million. While recent figures on economic valuations on coastal forests are lacking, as of 2008, the 660 square kilometres of coastal forests were valued at US$ 133 million while the 500 square kilometres of mangroves were valued at US$ 500 million (UNEP, 2009). It is estimated that the formal forest sector in the country employs 18,000-50,000 people directly and 300,000-600,000 people indirectly making it a major source of employment particularly in the rural areas (MENR, 2016). However, the contribution of coastal forests to Kenya's GDP remains under-reported due to the omission of value addition of forest products by the manufacturing sector, the omission of the provision of wood and non-wood forest products to the subsistence economy as well as the omission of the provision of ecosystem services.

Mangrove forests in Kenya provide timber products for construction, furniture and boat building. Mangrove species such as *Rhizophora mucronata* and *Ceriops tagal* are preferred due to their excellent wood quality and resistance to termites. *Sonneratia alba* is used to make the ribs of boats while large trunks of *Avicennia marina* are used to make dug-out canoes. About 96,739 scores of mangrove poles (1 pole= 20 poles) were harvested across the Kenyan coast in 2014. Many communities living adjacent to the forests also depend on coastal forests for fuelwood, either as firewood or charcoal. It is estimated that up to 90% of rural household energy requirements are met by coastal forests (Githitho, 2004). The forests also provide opportunities for wood carving that generate between US$ 20-25 million annually in export revenues. The mahogany tree from the Arabuko-Sokoke forest is one of the main trees exploited for wood carving, making it a vital element in the coastal tourism sector.

Other than wood products, communities also extract other non-wood products from the forests such as medicines, tannins and honey. Coastal forests provide 70-80% of the medicine used by the poor local communities. Communities around the Arabuko-Sokoke forest earned ~US$ 37,000 in 2001 from bee-keeping and butterfly farming. Wild animals hunted for game meat are another valuable resource provided by coastal forests to the local communities.

Communities adjacent to the Arabuko-Sokoke forest hunted game meat worth an estimated value of US$ 13,000 in 1991 (Matiku, 2004).

Coastal forests are rich in minerals as well, mainly titanium and lead. Silica sand used for glass manufacture has been harvested in Arabuko-Sokoke forest, but this has since stopped, with the old sand quarries becoming a distinctive biodiversity site within the forest. Extensive salt works have been established in Ngomeni, Kurawa and Gongoni which has led to the destruction of the mangrove habitats within these areas. There are also vast titanium reserves in the Magarini sand belts that are currently being mined in Kwale district (Matiku, 2004; UNEP, 2009). Titanium mining in Kenya generated earnings of $115.7m in the last financial year which is 65% of Kenya's total mineral output value. Direct taxes, royalties and VAT in the last financial year from titanium mining amounted to $32.5m (Base Titanium 2021).

Coastal forests are important tourist destination areas. The forests of Shimba Hills and Arabuko-Sokoke are among the best known for nature trails and camping. While the board-walks at Gazi, Wasini and Mida Creek mangrove forests generate incomes for the local communities. The Wasini boardwalk generates more than US$ 25,000 annually through mangrove tourism. The mangrove forests along the coast also offer excellent opportunities for bird-watching such as those of Mida Creek, Ramisi and Kipini. Local communities in Shimba Hills have earned incomes from tourism through the development of lodges within the Mwaluganje conservancy. Coastal forests are also key research fronts for international researchers. In addition to this, the coastal forests of Kenya have globally unique biodiversity values with more than 554 endemic plants (40% of the total endemic plants in the forests of Kenya) and 53 endemic animals. The area is therefore considered a major global conservation priority due to the high level of endemism and severe degree of threat. The Arabuko-Sokoke forest is ranked the second most important forest for conservation of bird species in Africa, with over 230 bird species recorded in the area, including six globally threatened species. The high endemism in the area supports tourism activities as well as research activities which contribute to the country's GDP.

3.2 Indirect contributions

Coastal forests indirectly contribute to the country's GDP through regulating services such as coastal protection and carbon sequestration, as well as supporting other activities such as fisheries and tourism. Coastal tourism in Kenya contributes about $1.5 billion annually which is about 4% contribution to the country's GDP (GoK, 2020). The indirect economic

contributions of coastal forests may, in some cases, exceed the direct contributions to GDP. For instance, the mangroves in the South coast of Kenya are valued at US$ 6.5 million with 59% of the value on average derived from regulating services (Huxham et al., 2015).

Mangrove forests play an important role in shoreline protection. They diminish the energy of incoming waves, lessening the risk of flooding to the communities living behind the mangroves. The alternative to mangrove forests would be the construction of sea walls which are expensive to construct and maintain considering the sea wall at Vanga was constructed at a cost of US$ 952 per metre with 1% of the total cost required annually for its maintenance (Huxham et al., 2015). Currently, the value of mangroves to shoreline protection in Kenya has been estimated at US$ 1,200 per hectare annually (Kairo et al., 2008; GoK, 2017).

Mangrove forests support the sustenance of fish populations by providing habitats for fish to breed, spawn, hatch and feed. It is estimated that 70% of commercial fishery species depend on mangroves as breeding and fishing habitats. The value of mangroves to fisheries in Kenya has been estimated at US$ 95 per hectare annually (Kairo et al., 2008). More than 85% of fishing activities along the coast are carried out by artisanal fishermen in the shallow inshore areas within and adjacent to the mangroves. This sector directly employs more than 20,000 fishers.

Coastal forests also play an important role in the context of climate change, by acting as carbon sinks. Mangrove forests are critical ecosystems because these ecosystems are capable of storing 10 times as much carbon as their terrestrial forests. Consequently, the degradation and conversions of these habitats has the potential of large-scale carbon emissions. The carbon captures by these ecosystems could be accounted for and sold in international carbon markets. The Mikoko Pamoja community group in Gazi bay, Kwale county, has successfully been able to trade mangrove carbon credits in the voluntary carbon market generating an annual income of US$24,000. Activities of Mikoko Pamoja have been replicated in Vanga Blue Forest, in Vanga; where the community are receiving double the income in Gazi through sale of mangrove carbon credits.

3.3 Benefits of coastal forestry to the local economies

The livelihood activities of the coastal communities surrounding the coastal forests include; tourism, mariculture, fishing, carvings, agriculture, salt production and harvesting of wood,

wildlife and medicinal plants. The main goods derived from this forest are medicine, honey, fuelwood (firewood and charcoal), timber, carving logs, water, snakes, poles and even pasture for livestock. The services include habitat for biodiversity, catchment for water, shoreline and erosion protection, an attractive tourists destination, and carbon sequestration. They also play a key role in culture as they are used for worship, as burial areas, ceremonial sites and meeting places for special occasions by the communities. This forests are also rich in minerals like Titanium, lead, silica sand, limestone, coral blocks, iron ore, rubie, barites, galena, gypsum and even salt.

SECTION IV

4.1 Blue Economy Initiatives in Coastal Forestry

The concept of Blue Economy (BE) is recognized as central for sustainable development and incorporates climate, community and biodiversity benefits (Yarhood et al., 2020). At the backbone of the BE, the United Nations underscores the need for "improved human wellbeing and social equity, while significantly reducing environmental risks and ecological scarcities" (UNEP, 2015) thus placing the society, economy and environment at the core of the discourse. Besides, it emphasizes the sustainable use of ocean resources for economic growth, improved livelihoods, and jobs creation while preserving the health of ocean ecosystem. While BE can be harnessed in different sectors including forestry, challenges to sustainable utilization of coastal and marine forest resources still exist. Government and non-governmental organizations, private entities and local stakeholders have increased efforts over the past and present decade to promote programs that enhance ecological integrity, social and economic development around coastal and marine forest resource (Yarhood et al., 2020).

4.2 Externally funded conservation initiatives

A number of externally funded projects have been developed and implemented in Kenya's coastal and mangrove forests over the past decades on top of government budget and forest management agencies (Appendix 1). The selected forest areas and types have been the focus of most of external investments. These areas include mangrove forests, Arabuko Sokoke, Shimba hills, and the sacred Mijikenda Kaya forests. Notably, the bias may have been due to several reasons. For instance, Arabuko Sokoke has been identified as a primary conservation site for endemic birds for many years (the second most important site on the Africa mainland) (Burgess & Clarke, 2000). While mangrove forests had been neglected over the past decades, the development of the Mangrove Ecosystem Management Plan (2017-2027) is likely to open new frontiers to enhance ecosystem integrity and its contribution to the local and national economy through sustainable management and rational utilization of mangrove resources (GoK, 2017). Specific programs inherent to the management plan include (a) conservation and sustainable use of mangroves, (b) fisheries development and management, (c) community participation, (d) research education and development, and (e) ecotourism development. Additionally, mangroves' efficiency to capture and store huge stocks of carbon, support to fisheries and biodiversity and high productivity has attracted external support of several

programs along the Kenyan coast. In particular, Payment for Ecosystem Services (PES) in compensation for the conservation of mangrove forests aims to improve the health and productivity of these ecosystems while at the same time improving community livelihoods. For example, Mikoko Pamoja is the world's first community type project to restore and protect mangrove forests through the sale of carbon credit. The project is now achieving its climate and community conservation benefits. Activities of Mikoko Pamoja have been replicated in Vanga Blue Forests (VBF) in Vanga (UNEP 2020).

The Kayas have also benefited from World Wildlife Fund (WWF) involvement in conservation activities in the eastern Africa coastal forest mosaics over the past decades. This is due to their richness of biological life forms in the region combined with severe threats. Extensive research on taxonomy and successful execution of projects seems to have encouraged donors to invest in extensions to project activities. Shimba hills forest is also endowed with high plant diversity and large mammals including elephants and the graceful Sable antelope alongside beautiful landscapes. For this reason, there has been long standing interest by the wildlife managers to protect these species (Githitho, 2004).

4.3 Government Initiatives

Other conservation initiatives have been implemented by the government in response to national and international frameworks (Table 4). As a signatory to the Convention on Biological Diversity (CBD), Kenya commits to the CBD Aichi Target 11 and the SDG 14 which calls for conservation of 10% of the coastal and marine areas through effectively and equitably managed, ecologically representative and well-connected system of protected areas (CBD, 2012). Kenya uses two approaches namely, the Marine-Protected Areas (MPAs) and locally Managed Marine Areas (LMMAs) (Table 5) as strategies to meet its conservation obligation to the CBD. The protected areas constitute coastal and marine forests that prohibit or limits the rights for direct utilization of resources by the local communities. While the existing challenge is how to make the already conserved areas deliver tangible benefits to the local communities, this potential needs to be fully tapped to benefit the local and national blue economies.

Table 4: Some of the Kenya's protected coastal and marine forests

MPA	**Designation**	**Size (km^3)**	**Year established**

Kiunga	Marine reserve	600	1980
Malindi	Marine park	6.3	1968
Watamu	Marine park	32	1968
Malindi & Watamu	Marine reserve	177	1968
Mombasa	Marine park	10	1986
Mombasa marine reserve	National reserve	200	1986
Diani	National reserve	75	1993
Kisite	National park	28	1978
Mpunguti	National reserve	11	1978

(Source: Tuda and Omar 2012)

Section IV

Challenges and Opportunities for coastal and marine Forestry in Kenya

5.1 Challenges Facing Coastal and Mangrove Forests in Kenya

Deforestation and forest degradation is one of the major challenges hindering sustainable coastal forest management. As such, overexploitation of forest resources has contributed to fragmentation and loss of biodiversity. These have been attributed to high demand for supply of forest resources by the growing population that results in an increase in the rate of exploitation for wood products and non-wood products (Habel et al., 2017). To exacerbate this, high poverty levels of the adjacent forest communities coupled with few or no livelihoods options have created overdependence mounting pressure on forest resources. For instance, around Arabuko Sokoke region, charcoal burning is prevalent due to the fact that the local communities do not have secure individual or communal land tenure to support their livelihoods. This has denied the coastal region the opportunity to develop cheap alternatives to pole wood, fuel wood, and construction which are among the most important threats to the remaining small forests (Matiku, 2004). Inappropriate land-use and widespread encroachment into the forests has led to physical alterations and destruction of habitats. For example, poor agricultural practices and pastoralism pose serious threats leading to land degradation (Samoilys et al., 2015). Besides, there exist other forms of pressure including intentional and accidental forest fires, illegal hunting of wildlife, illegal trade on fauna and flora (Samoilys et al., 2015). Mining activities also poses a significant threat to coastal forests given that large reserves of titanium have been discovered within Kwale and Kilifi Counties. As such, vegetation in Kwale county have been cleared due to cast and strip mining of titanium (Chelagat, 2015).

Analysis of the threats show that the root causes to loss and degradation of these forests include population growth, high poverty levels, inadequate management capacity, and weak governance. Governance issues are linked to increased human-resource interaction, weak enforcement of existing policies and legislations, lack of localised forest management plans, inadequate capacity of the institutions (human and financial resources), inadequate coordination among the sectors (conflicting responsibilities) and poor stakeholder or community participation and corruption issues(UNEP, 2009). The high degradation of coastal and mangrove forests weakens the natural resource base. This is exacerbated by the continuing population growth that increases the pressure on the natural resources. The rural-urban

migration witnessed in the coastal zone over the years partly explains the worsening pressure on peri-urban coastal and mangrove forests. The degradation and fragmentation of coastal and mangrove forests destroys habitats leading to unintended losses in biodiversity and ecosystem services such as carbon sequestration and shoreline protection. These effects not only threaten the overall ecosystem health but also threatens the livelihoods of coastal communities.

An estimated 62% of coastal residents live below the poverty line. The depletion of coastal and mangrove forests threatens these vital ecosystems which, in the long run, risks worsening the poverty levels along the coast. Hence, the government has developed an integrated coastal zone management scheme (ICZM) to promote the protection of these coastal resources while ensuring the economic empowerment of the local coastal communities. The scheme encourages the provision of alternative income-generating activities that have the potential to reduce the over-exploitation plaguing the sector. However, full implementation of the scheme remains a challenge due to insufficient human and financial resources.

In addition to the ICZM scheme, other reforms have taken place in the coastal forest sector such as the development of the National Mangrove Ecosystem Management Plan (2010), the National Forests Program (2016-2030) and the Forest Conservation and Management Act, 2016. Despite the development of these policy and legal reforms, their implementation remains a challenge due to limited human and financial resources. There still exists some gaps and failures in policies regarding coastal forests in Kenya. For instance, the Shimba Hills forest is gazetted both as a forest reserve and a national reserve. This creates conflict in terms of the prosecution of offenders and even the development of new programs and activities within the forest. There is also poor coordination among law enforcement agencies such as the Kenya Forest Service, the Kenya Wildlife Service and the Kenya Police. This leads to uncoordinated efforts that result in low compliance.

Similar to terrestrial coastal forests, mangrove coverage in Kenya has continued to decline. For instance, the country lost about 20% of its mangrove forest cover between 1985 and 2009; translating to annual loss of 450 ha (Kirui et al., 2013). The loss was exceptionally high in the peri-urban mangroves of Mombasa where more than 70% cover loss was recorded (Bosire et al., 2014). The threats on mangrove ecosystem have been attributed to both anthropogenic and natural causes. Human induced threats include over-exploitation of wood (poles for construction, firewood) and non-wood products. While mangrove trees are valued for their hardwood, few species including *Rhizophora* and *Ceriops* may suffer over-exploitation due to

community utilization preference. Mangrove ecosystems have also suffered from alteration and land-use conversion. For example, between 1921 -1976, large areas of mangroves (7,922 ha) were converted to pave way for salt extraction at Gongoni-Kurawa in Malindi (Abuodha and Kairo, 2001). Moreover, coastal infrastructural developments such as Lamu port and the Mombasa Port Area Road Development Project (MPARD) project have seen mangroves cleared. Other drivers include; aquaculture, sedimentation, pollution from accidental oil spills at Mombasa sea port as well as poor disposal of solid waste and sewage (GoK, 2017).

Nevertheless, mangroves have not suffered much from natural stressors. Few cases include massive sedimentation caused by extreme events as flooding caused by Elnino (1997/98) which led to destruction of mangroves in Tana River, Mombasa and Gazi. Other reported cases include pest infestation in Gazi bay (Jenoo et al., 2016, 2019). It is also predicted that future impacts of climate change, for example, rise in sea level and flooding threatens the survival of low-lying mangrove areas.

The root causes of the loss and degradation of mangrove habitat have been identified as population pressure, poverty and inequality, lack of awareness on true values of mangroves, economic growth development, and poor governance. Poor governance manifests itself in a range of management problems and deficiencies, and generates threats from forest encroachment, overexploitation of resources among other activities (UNEP, 2009).

Finally, WWF-EARPO (2006) identified the main threats Eastern Arc Mountains as being agriculture (subsistence and commercial), settlement, urbanization, lack of legal protection, fires, illegal logging (using temporary sawmills and selective logging of particularly valuable trees), hunting, grazing, pole cutting, firewood collection, charcoal burning, mining and medicinal plant collection. It is more apparent that as the population continues to grow, the pressures on the forests will become even more significant. Above all, poverty is considered a root cause behind many of these problems.

Other challenges affecting the coastal forests in Kenya include; bureaucracy around the operating environment of logging companies, poor infrastructure, shortage of raw materials (wood deficit), inadequate and poor uptake of technology, inadequate knowledge and incentives for alternative livelihoods, conflict at multiple levels, inadequate financial mechanisms to support forestry investment, corruption, poor industry representation and

market constraints for alternative forest products such as honey and eco-tourism (Matiku, 2004; UNEP, 2009; GoK, 2017).

5.2 Opportunities for Coastal and Mangrove Forests in Kenya

Traditionally, the local communities had knowledge on the conservation and management of their coastal forests. While some of this indigenous knowledge has been incorporated into current conservation and management plans such as the development of harvest plans for coastal forests, a lot of indigenous knowledge is yet to be incorporated into conservation programmes. This information can provide cheaper or easier alternatives to the conservation and the management of coastal forests.

The high degree of endemism witnessed in the coastal forests of Kenya presents an opportunity for research activities. With over 550 endemic plants in the forests, and high botanical diversity, there is huge potential for the development of pharmaceutical and industrial products from the area.

The devolution of government provided for by the Constitution of Kenya, 2010, provides an opportunity for institutions and other stakeholders to be involved as partners, managers and co-managers of forests and forest resources especially at the local level. This together with the Forest Conservation and Management Act of 2016 enhances the role of the county governments in adopting and implementing policies on forest activities.

The Forest Conservation and Management Act, 2016 also opens up a more decentralised way of managing forest resources through the formation of rules and regulations governing the exportation and trade of forest produce as well as rules for incentive and benefit sharing. The act also calls for the review of existing rules on production, transportation and marketing of charcoal. The act therefore guarantees the long-term public benefit provided by the forests, while enhancing bottom-up decision making. This enhances accountability and harmonises the processes for developing participatory forest management plans at both national and county levels.

The REDD+ forest finance scheme also provides opportunities for avoiding deforestation in coastal forests through the conservation of these forests. It is likely that moving forward into the future, REDD+ payments will be a significant source of forest-based revenue. Such programs have already been implemented for the dryland woodland of Taita Taveta (Kill, 2016) as well as the mangrove forests of Gazi and Vanga.

The Blue Economy concept focuses on the sustainable use of blue ecosystems. This will create immense economic opportunities for coastal and marine forests by ensuring the nature capital is put to good use for both the people and the environment. Sustainable blue economy principles are expected to inform policy decisions and development programs in the future.

Kenya is also signatory to a number of international agreements. As a signatory to the Convention of Biological Diversity, the country has committed to protect and enhance biodiversity. The sustainable development goals ensure the sustainable use of natural resources making sure they are protected while at the same time providing benefits to the communities that depend on them. As a signatory to the Paris climate agreement, the country has also committed to reduce greenhouse gas emissions. This means that the country will support activities aimed at reducing emissions. Coastal forests have a huge role to play, especially the mangrove forests, due to their higher capacity to sequester carbon compared to the other coastal forests. Hence, their protection is critical not only in supporting carbon capture, but also due to the threat of huge potential carbon emissions once these ecosystems are degraded.

SECTION VI

6. 1Coastal and marine forestry governance framework

6.1 Legal and policy frameworks

In Kenya, there are several legal policies and frameworks that govern forestry in Kenya. However the main policies guiding the conservation of forests are the National Land Policy, 2009 and the National Land Use Policy, 2017, forest policy and environment policy. These policies have legislations that enable their implementation in governing forestry in Kenya in accordance to the Constitution of Kenya 2010.

The following are the pieces of legislation which support the governance of forestry in Kenya.

- Constitution of Kenya, 2010

  this is the supreme law governing the sovereignty of Kenya. Under the Constitution of Kenya 2010, the state has a duty:

  a) to ensure sustainable exploitation, utilisation, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;
  b) work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya;
  c) protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities;
  d) encourage public participation in the management, protection and conservation of the environment;
  e) protect genetic resources and biological diversity;
  f) establish systems of environmental impact assessment, environmental audit and monitoring of the environment;
  g) eliminate processes and activities that are likely to endanger the environment; and
  h) utilise the environment and natural resources for the benefit of the people of Kenya

Every citizen also has a duty to cooperate with state organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.

- Environment Management and Coordination (Amendment) Act, 2015
- The Act provides the framework law for environmental conservation, management and coordination. EMCA provides for the protection of forests and Environmental Impact Assessment (EIA) of forestry related developments. Provisions of this Act towards forestry include; Environmental protection, protection of the rights of forest adjacent communities, provided the role of the county governments in environmental management, provided the functions of NEMA in relation to forestry, provisions for forests registration, provisions for climate change mitigation and adaptation, forest conservation and management and biodiversity conservation.
- The Forest Conservation and Management Act, 2016

- The Forests Conservation and Management Act (FCMA), 2016 is the culmination of a review of the Forest Act, 2005 to realign with the Constitution and address emerging issues on forest conservation and management. The Act gives effect to Article 69 of the Constitution on environment and natural resources. It is the main statute governing all forests on public, community and private land.
- This act: includes County governments in forest management and conservation; introduces benefit sharing arrangements and incentives to increase forest and tree cover, provisions for a national strategy to increase and maintain forest and tree cover to at least 10% of the total land area; establishes a national forest resource monitoring system and establishment of a Forest Management and Conservation Trust Fund.
- County Government Act, 2012 (revised 2013)
- This is an Act of Parliament that provides for county governments' powers, functions and responsibilities to deliver services and for connected purposes. Thus act spells out what functions the county government has power over and how these functions are to be administered and regulated.
- Intergovernmental Relations, 2012
- An Act of Parliament to establish a framework for consultation and co-operation between the national and county governments and amongst county governments; to establish mechanisms for the resolution of intergovernmental disputes pursuant to Articles 6 and 189 of the Constitution, and for connected purposes.
- The Climate Change Act, 2016
- This Act provides a framework for promoting climate resilient low carbon economic development. The Act establishes a National Climate Change Council, chaired by the President, with Deputy President as vice-chair, that provides an overarching national climate change coordination mechanism. It also establishes the Climate Change Directorate - Secretariat to the Council and the lead agency of the government on national climate change plans and actions.
- Its objectives of the act in relation to forestry are:

a) mainstream climate change responses into development planning, decision making and implementation;

b) build resilience and enhance adaptive capacity to the impacts of climate change;

c) formulate programmes and plans to enhance the resilience and adaptive capacity of human and ecological systems to the impacts of climate change;;

d) provide incentives and obligations for private sector contributions to achieving low carbon climate resilient development;

e) promote low carbon technologies to improve efficiency and reduce emissions intensity by facilitating approaches and uptake of technologies that support low carbon, and climate resilient development;

f) facilitate capacity development for public participation in climate change responses through awareness creation consultation, representation and access to information

g) mainstream the principle of sustainable development into the planning for and decision making on climate change response

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- The Wildlife Conservation and Management Act, 2013

  This Act envisions Wildlife conservation and management as being devolved in line with Kenya constitution 2010. It further outlines how conservation and management shall be done which is in cooperation with communities through effective public participation.

  Conservation and management done through effective public participation has to be done sustainably to meet the benefits of present and future generations, with the benefits accrued there after equitably shared by the people of Kenya.

  The cabinet secretary is required by law to publish a national wildlife conservation and management strategy that will guide protection, conservation, management and sustainable utilization and control of wildlife resources which includes their habitats, where coastal and marine forests fall.

- The Water Act, 2016

- This act provides for management regulation and development of water resources in Kenya. It advocates for devolution of water sector where National government regulates the management and use of water resources while the County governments are responsible for water supply and sanitation.

- This act also provides for formulation of a National Water Resource Strategy, reviewed every three years and revised every five years, with the sole purpose of providing for the protection, conservation, control and management of water resources. Other strategies provided for through this act are the Basin area water resources management strategy and National Water Service Strategy.

- This act's provisions relevant in coastal forests are; for the protection of catchment areas to protect vulnerable water resources, protection of ground water for public interests, aquifers recharge and for ecological stability with control measures for ground water loss, environmental conservation that requires Environmental Impact Assessments before any permits are given for water abstraction or waste disposal to protect water resources.

- Agriculture, Fisheries and Food Authority Act, 2013

- This is an Act of parliament that provides for for the consolidation of the laws on the regulation and promotion of agriculture generally, to provide for the establishment of the Agriculture, Fisheries and Food Authority, to make provision for the respective roles of the national and county governments in agriculture excluding livestock and related matters

in furtherance of the relevant provisions of the Fourth Schedule to the Constitution and for connected purposes.

- This Act provides for the establishment of the Agriculture, Fisheries and Food Authority, the administration of matters of agriculture and the preservation, utilization and development of agricultural land and related matters which include cultivation of crops and horticultural practice within the meaning of the Crops Act, breeding of aquatic animals and plants in the Kenya fishery waters and sea ranching and fish farming in the sea as provided for in the Fisheries Act, the use of land, meadow land, market gardens or nursery grounds, fish harvesting within the meaning of the Fisheries Act, the use of land for agroforestry, when that use is ancillary to the use of land for other agricultural purposes, transgenic and microbial formulations for use and application in agricultural systems.
- The Energy Act, 2019
- This Act aims at catalyzing electricity generation through renewable energy sources, encouraging innovation in renewable energy technology and reducing green house gaas emissions.
- This act works towards reducing the reliability on natural resources like trees for electricity poles production, electricity production through non- renewable energy sources like oil and instead rely on renewable energy technology technology for provision of electricity. This protects coastal forests and mangroves from exploitation in energy production through mining of oil or harvesting of trees for poles
- The Mining Act, 2016
- This act requires that a holder of a permit or licence under this Act Land use. shall use the land in accordance with the terms of the permit or licence and shall ensure the sustainable use of land through restoration of abandoned mines and quarries; that the seepage of toxic waste into streams, rivers, lakes and wetlands is avoided and that disposal any toxic waste is done in the approved areas only; that blasting and all works that cause massive vibration is properly carried out and muffled to keep such vibrations and blasts to reasonable and permissible levels in conformity with the Environmental Management and Coordination Act; and that upon completion of prospecting or mining, the land in question shall be restored to its original status or to an acceptable and reasonable condition as close as possible to its original state. 180. (1)
- The Land Act, 2012 (as amended in 2016)
- An Act of Parliament that aids to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land based resources, and for connected purposes.
- The following values and principles relate to coastal and marine forests under this act

a) equitable access to land; security of land rights;

b) security of land rights;

c) sustainable and productive management of land resources

d) transparent and cost effective administration of land;

e) conservation and protection of ecologically sensitive areas;

- affording equal opportunities to members of all ethnic groups; The Community Land Act, 2016

  The Act provides for a classification of land known as community land. To this end, the Constitution provides that community land shall vest in and be held by communities. The Act requires a community claiming an interest in or right over community land to be registered and the land can be held in customary, free hold, leasehold or any other tenure system recognised under the act or other written law. Providing for, first, the recognition, protection and registration of community land

For any conversion of community land at least two thirds of community members should ratify this decision. Any agreement relating to investment in community land the agreement reached should provide for the payment of compensation and royalties, capacity building of the community and transfer technology to the community. A County Government is prohibited from selling, disposing, transferring, and converting for private purposes or in any other way disposing of any unregistered community land that it is holding in trust on behalf of a community. This protects coastal forests like Mangroves and Kayas which are community owned from any exploitation

- Public Private Partnerships Act, 2013
- This Act of Parliament provides for the participation of the private sector in the financing, construction, development, operation, or maintenance of infrastructure or development projects of the Government through concession or other contractual arrangements; the establishment of the institutions to regulate, monitor and supervise the implementation of project agreements on infrastructure or development projects and for connected purposes. The regulatory institutions are established to ensure that natural resources like coastal and marine forests are sustainably used in the development agenda driven by these partnerships leaving no leeway for exploitation and degradation of such resources.
- Physical and Land Use Planning Act, 2019
- This Act governs matters relating to planning, use, regulation and development of land in Kenya. This act provides for Increased public participation, Classification of developments where developments will require development permission eg. subdivision, amalgamation, change of user, extension of user, extension of lease and approval of building plans, base transmission stations, petrol stations, eco lodges, campsites, power generation plants and factories, from the relevant county government before any activity can commence, Definition of commercial and industrial use.
- Seeds and Plant Varieties Act, 2012
- This Act amends the Seeds and Plant Varieties Act with respect to a wide variety of matters including: long title; establishment of a national centre for plant genetic resources; the definitions of "plant variety", "breeder", "national variety list" and various other definitions; appointment of the Service as the national designated authority for matters relating to seeds and plant variety protection; appointment of inspectors, analysts and examiners; preparation by the Service of a national variety list; the making of Regulations for the carrying out of national performance trials; applicant for a plant breeders' right; other matters regarding protected varieties and relative rights.
- The newly established National Plant Genetic Resources Centre shall be responsible for the conservation and sustainable utilization of plant biodiversity in Kenya. It shall, among other things: (a) protect the ownership of indigenous seeds and plant varieties, their genetic

and diverse characteristics, associated indigenous knowledge and its use by the communities of Kenya; (b) carry, out inventories by evaluating and mapping plant genetic resources distribution in the country; (c) conserve plant genetic diversity by devising and implementing management procedure, including ex-situ and in-situ maintenance; and (d) ensure safe custody and accessibility of all plant bred and naturally occurring germplasm.

- National Museums and Heritage Act, 2006
- Act of Parliament to consolidate the law relating to national museums and heritage; to provide for the establishment, control, management and development of national museums and the identification, protection, conservation and transmission of the cultural and natural heritage of Kenya.
- Areas of cultural value like Kayas in coastal Kenya are placed under the control of the National Museums and access to such areas is restricted. Where private land is included in a protected area, and the development or other use of that land is prohibited and compensation justly and fairly issued.
- National Climate Change Action Plan 2018-2022
- The National Climate Change Action Plan (NCCAP), 2018-2022, is a five-year plan that helps Kenya adapt to climate change and reduce greenhouse gas emissions. It aims to further Kenya's development goals by providing mechanisms and measures that achieve low carbon climate resilient development.
- This plan:

a) enables all sectors to act to achieve climate change adaptation and mitigation objectives;

b) Supports achievement of the Big Four Agenda and Sustainable Development Goals c)Prioritises adaptation actions because of the devastating impacts of droughts and floods, and the negative effects of climate change on vulnerable groups in society including women, older members of society, persons with disabilities, children, youth, and members of minority or marginalised communities.

c) Undertakes actions, where possible, in a way that limits greenhouse emissions to ensure that the country achieves its mitigation NDC under the Paris Agreement.

d) Enables actions to be undertaken in an integrated manner that address several priorities. For example, actions to plant trees also contribute to disaster risk management, water, and food security objectives.

- Kenya National Adaptation Plan - 2015-2030
- The National Adaptation Plan aims at enhancing climate resilience towards attaining Kenya Vision 2030. Its objectives are:

a) Highlight the importance of adaptation and resilience building actions in development;
b) Integrate climate change adaptation into national and county level development planning and budgeting processes;
c) Enhance the resilience of public and private sector investment in the national transformation, economic and social and pillars of Vision 2030 to climate shocks;
d) Enhance synergies between adaptation and mitigation actions in order to attain a low carbon climate resilient economy; and

e) Enhance resilience of vulnerable populations to climate shocks through adaptation and disaster risk reduction strategies.

- The National Forest Programme 2016 – 2030
- The National Forest Programme 2016- 20130 is a national multi-stakeholder, cross-sectoral framework involving national and county governments, communities, civil societies and the private sector in promoting sustainable forest management. The NFP integrates national values of integrity, good governance and social justice into the forestry sector.
- It is important in achieving to increased forest and tree cover in the country and reducing degradation by mobilising the private sector, particularly tree farmers, investors and communities in the forests-to-markets value chain. Profitability and competitiveness in forestry and forest-based industries need to be in place to safeguard the social and environmental base for people's well-being.
- The objectives of this programme are:

a) Increase forest/tree cover and reverse forest degradation.

b) Enhance forest-based economic, social and environmental benefits.

c) Enhance capacity development, research and adoption of technologies.

d) Increase investments in forest development.

e) Integrate national values and principles of good governance in forest development.

- Forest (Charcoal) Rules, 2009
- Under the forest regulations, this rule protects endangered and threatened plant species in forests. Coastal forests especially mangroves are most exploited for charcoal and these regulations provide that:

a) Every charcoal producer shall ensure that charcoal is produced in a sustainable manner and as may be prescribed from time to time by the Service.

b) No person or association may be granted a licence for charcoal production without a reforestation plan for the area the subject of the proposed charcoal production

c) No person shall produce charcoal from endangered, threatened and protected plant species.

d) The Service shall, through Gazette, publish regularly a list of endangered, threatened and protected plant species.

6.2 Institutional framework

The following are some of the relevant institutions involved in forest operations, Management and governance/ regulation.

- The Ministry of Environment and Forestry
- To facilitate good governance in the protection, restoration, conservation, development and management of the environment and natural resources for equitable and sustainable development

- Kenya Forest Service (KFS) –
- The national agency responsible for conservation and management of public forests. Its core mandate is to provide for the development and sustainable management, including conservation and rational utilization of all forest resources for the socioeconomic development of the country and for connected purposes.
- The Kenya Wildlife Service (KWS
-) -The national agency responsible for managing wildlife. A lot of terrestrial wildlife are found in forests. Its mandate is to conserve and manage wildlife in Kenya, and to enforce related laws and regulations. KWS undertakes conservation and management of wildlife resources across all protected areas systems in collaboration with stakeholders. It's goal is to work with others to conserve, protect and sustainably manage wildlife resources.
- National Environment Management Authority (NEMA)-
- The national agency ssupervises and coordinates environmental activities and implements environmental policies in all sectors. Its mandate is to ensure sustainable management of the environment through exercising general supervision and coordination over matters relating to the environment and to be the principal instrument of government in the implementation of all policies relating to the environment.
- National Land Commission (NLC) –
- The national agency responsible for managing public land. It has various mandates guided by the constitution of Kenya 2010 under the Land Act and the Land Registration Act, all of 2012.
- Its mandates are shown in Box1:

BOX1:

1. Manage Public land on behalf of the national and county governments,

2. Recommend a National Land Policy to the national government,

3. Advise the national government on a comprehensive program for the registration of title in land throughout Kenya

4. Conduct research related to land and the use of natural resources, and make recommendations to appropriate authorities,

5. Initiate investigations, on its own initiative or on a complaint, into present or historical land injustices, and recommend appropriate redress,

6. Encourage the application of traditional dispute resolution mechanisms in land conflicts,

7. Assess tax on land and premiums on immovable property in any area designated by law,

8. Monitor and have oversight responsibilities over Land Use Planning throughout the country,

9. Perform any other functions prescribed by national legislation

- Kenya Water Tower Agency (KWTA)-

The national agency coordinates the conservation of water towers with a mandate to coordinate and oversee the protection, rehabilitation, conservation and sustainable management of all the critical water towers in Kenya.

- National Alliance of Community Forest Associations (NACOFA) -

  The umbrella organization of Community Forest Associations (CFAs) in Kenya.

- Community Forest Associations (CFAs)

Involved in forest management activities at the community level in the co-management of public and community forests.

- County government

6.3 Gaps in the Legal, institutional and policy framework

The Forest Policy does not give much recognition to farm forestry but to redeeming and protection of natural forests and the issue of sustainable use of biodiversity in forests is largely ignored. It should be emphasized that without a firm agriculture foundation based on successful practices on the basis of which emerging issues can be tackled, the challenges will continue to be over whelming hence the need of firmness in executing the food policy.

EMCA (2015) provides for a broad crosscutting framework for environmental issues. Therefore to have in place a strong implementation platform there is need to provide a specific legislation to provide a legal framework for integration and coordination of the sectors that directly or indirectly have stake in use of coastal and marine resources.

In wildlife management, there are legal gaps that lead to Land use conflicts leading to encroachment into the wildlife protected areas which arise from poor local and national land use planning. There is also need for innovative approaches e.g. devolved participatory wildlife management to enlist support from private sector, NGOs and CBOs.

The social responsibility of the tourism industry to local communities is weak and not commensurate with the level of revenue generation derived from the ecological areas and cultural zones where they operate. This is probably because of a gap in the tourism acts existing that are blind to the social responsibility for well being of communities around tourism areas.

There is need to review the Fisheries Act to harmonize the regional and international conventions, and agreements into Kenyan law for their efficient implementation. This is largely due to the overlapping institutional mandates by the various institutions birthed by the fisheries act that are interlinked with fisheries resources.

Section VII
Conclusions and Recommendations

8.1 Conclusions

Coastal and marine forests in Kenya contribute both directly and indirectly to the country's GDP. Further, they provide an array of social and ecological benefits to both the local communities and the nation. While the utilization of these coastal forests varies from non-destructive uses to destructive, the growing pressure on forest resources resulting from increased population pressure as well as the effects of climate change threaten the health and continued existence of these forests. The resulting decline in ecosystem productivity leads to diminished capacity to supply goods and services which ultimately affects the livelihoods of the communities that depend on the forest. Therefore, understanding the root causes of forest degradation will play a key role in stemming coastal forest degradation. Currently, governmental and non-governmental players, as well as local community groups have put in place measures aimed at conserving and restoring coastal forest resources. These measures have received renewed attention with the advent of the blue economy initiative that is likely to open up new frontiers in ecological investments aimed at supporting the conservation of coastal forests while at the same time, improving the livelihoods of the local communities. Despite this, there still exist social, ecological, and economic hurdles to the successful implementation of conservation and restoration programs. In order to overcome these challenges, it is important to strengthen and enhance collaborations among the stakeholders and increase the support to community groups involved in conservation.

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Table 4: Forest types and their size in Kenya 2012

Forest type	**Forest sub-type**	**Area (ha)**	**% of forest area**	**Examples**
a) Natural forests				
Montane forest	Mixed indigenous forests	1,359,860	32.1	Mt. Elgon, Mt. Kenya, Aberdare Range, Cherangani Hills and Mau forest
	Bamboo	85,693	2.0	
Western rainforests/western plateau	Mixed indigenous forests	144,615	3.4	Kabarnet, Kakamega, Nandi, TransMara. Kakamega
Coastal forests	Mixed indigenous forests	295,871	7.0	Arabuko Sokoke, Tana, Kayas and mangroves of the whole coast region
	Mangroves	48,522	1.1	
Dryland forests	Mixed indigenous forests	1,875,316	44.3	Ndoto, Mathews Range, Leroghi, Kulal and Marsabit
	Riverine forests	135,231	3.2	Tana and tributaries, Ewaso-Ngiro, Kerio, Turkwel and Galana
b) Plantation forests	Indigenous and exotic trees	286,716	6.8	Finlay Kericho and KTDA forests
Total area		4,231,824	100	

Appendix 1: Blue economy initiatives in Kenya's coastal and marine forests

Past and present Blue economy initiatives on Coastal Forestry					
Site	**Period**	**Budget (US $)**	**Project name**	**Donor/supporters**	**Activity/program**
Current and future initiatives on coastal and marine forests					
Mangroves of Kenya	**2017-2027**	38, 000, 000 (Proposed)	Mangrove Ecosystem Management Plan	Government of Kenya and partners	Mangrove Forest Conservation and utilization -Fisheries Development and Management -Community engagement -Research, Education and Development -Tourism development Program
Mangroves of Kenya	2019-Date	80,M	Mikoko Project: Save the Mangroves of Kenya	IRD/CIRAD	-Capacity building -Restoration and preservation of mangroves
Gazi mangroves	2013-2033	15,000 per annum	Mikoko Pamoja project	Voluntary Carbon Market	-Capacity building -Mangrove

					reforestation -Community development -Ecotourism -Avoided deforestation -Carbon trading
Vanga Mangroves	2019-2039	30,000 per annum	Vanga Blue Forests project	Voluntary Carbon Market	-Capacity building -Mangrove reforestation -Community development -Ecotourism -Avoided deforestation -Carbon trading
Mangroves of Kwale	2018-2022	4.2M	Public-private-people partnerships for biodiversity conservation	International Climate Initiative/WWF	-Reforestation -Biodiversity conservation -Capacity building, -Economic development
Lamu Mangrove	2019-2022	28,000 per	Strengthening	The Nature Conservancy/NRT/PE	Develop PFM guidelines,

s		annum	Management of Lamu mangroves	W	Reforestation Improve nature based Businesses
Past and present initiatives on coastal terrestrial forests					
Arabuko Sokoke	1996-2001	1,000,000	Arabuko Sokoke Forest Conservation Project	Birdlife International/ EU	Rural Development activities, Ecotourism Development, Strategic Plan Development, Participatory Forest Management piloting
	2001-2004	1,500,000	Alisei Farm Forestry and Natural Resource Conservation Project	European Union	-Develop on-farm forestry around A/Sokoke and diversify agroforestry products. -Land fertility improvement, beekeeping
	2003		Enhanced Sustainabilit	USAID thru	-Develop PFM guidelines.

		1 000 000	y of Arabuko Sokoke thru' Improved NRM	Nature Kenya	-Improve nature based businesses. -Develop participatory NRM plans
Shimba Hills System	2004	240 000	Shimba Hills Forest Landscape Restoration Project	WWF, Lafarge	-Enterprise development, -Ecotourism, afforestation, awareness activities
Taita Taveta forests	1998-2028	133, 800,000	Kasigau Corridor REDD+ project	Voluntery Carbon Makte/Althelia Climate Fund	-Reforestation and afforestation -protection of wildlife -supporting education -
Mijikenda Sacred Kaya Forests	1992-1994	20 000	Kaya Forest Conservation Project	WWF International	-Organizing local communities, -Protection support. -Plant Survey cont. Gazettement
	2001-	75 000	Kaya	Ford	-Piloting

	2003		Kinondo Ecotourism Project	Foundation/WWF	Community Ecotourism on sacred site, -Awareness, enterprise.
Mangroves of Kenya	**2013-2017**	41, 040, 000	Kenya Costal Development Project	World Bank	Mangrove Ecosystem Management Plan development – Develop mangrove restoration guidelines