



USAID | **KENYA**
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KENYA TROPICAL FOREST AND BIODIVERSITY ASSESSMENT

PROSPERITY, LIVELIHOODS AND CONSERVING ECOSYSTEMS
(PLACE) IQC, TASK ORDER AID-121-TO-11-00008



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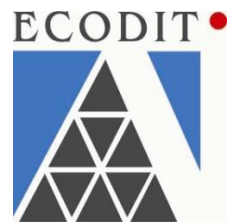
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Cover photo: Artisanal fishermen returning from the Malindi Marine National Reserve, which encloses the Malindi and Watamu Marine National Parks and functions as a multiple-use buffer zone for these parks. Marine protected areas have been shown to increase fish stocks and benefit local fishing communities. Photo by B. Byers (2011).

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ABBREVIATIONS AND ACRONYMS

ASALs	Arid and Semi-Arid Lands
AWF	African Wildlife Foundation
CBD	Convention on Biological Diversity
CBNRM	Community-Based Natural Resources Management
CFA	Community Forestry Association
COBRA	Conservation of Biodiversity Resource Areas
CORE	Conservation of Resources through Enterprises
DG	Democracy and Governance
EAWLS	East African Wildlife Society
EEZ	Exclusive Economic Zone
EMCA	Environmental Management and Coordination Act
FCC	Forest Conservancy Committees
FTF	Feed The Future
GBM	Green Belt Movement
GDP	Gross Domestic Product
GEF	Global Environment Facility
GOK	Government of Kenya
ICS	Interim Coordinating Secretariat for the Mau
ICZM	Integrated Coastal Zone Management
IUCN	International Union for the Conservation of Nature/The World Conservation Union
KEFRI	Kenya Forestry Research Institute
KFS	Kenya Forest Service
KNBS	Kenya National Bureau of Statistics
KES	Kenyan Shilling
KWS	Kenya Wildlife Service
LAPSSET	Lamu Port-Southern Sudan-Ethiopia Transport Corridor
LWF	Laikipia Wildlife Forum
NEMA	National Environment Management Authority
NGO	Non-Governmental Organization
NRM	Natural Resources Management
NRT	Northern Rangelands Trust
PA	Protected Area
PES	Payment for Ecosystem Services
SEA	Strategic Environmental Assessment
TIST	The International Small Group & Tree Planting Program
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNESCO	United Nations Economic, Social and Cultural Organization
USAID	United States Agency for International Development
WRUA	Water Resource Users Association
WWF	World Wildlife Fund

EXECUTIVE SUMMARY

BACKGROUND AND CONTEXT

USAID/Kenya last conducted a full Tropical Forests and Biodiversity Assessment, as required by FAA Sections 118-119, in 2000 and updated it in 2005. Since the 2005 update, the political and economic situation in Kenya has changed significantly, including a period of post-election violence in 2007 and the adoption of a new Constitution. USAID/Kenya is in the process of developing a new Country Development Cooperation Strategy for its programs (from 2012 to 2017) in this new country context and therefore requested ECODIT to undertake a new Tropical Forests and Biodiversity Assessment for Kenya.

To place this assessment in context, it should be recognized that a lack of ecologically sensitive and sustainable development has fueled famine, conflict, and environmental degradation in the greater Horn of Africa region for many decades. Until governments and communities in the region – including Kenya – get on a path of ecologically-sound development, they are condemned to recurring humanitarian crises. Breaking the vicious cycle of disaster relief and reconstruction required by conflict and famine requires long term investment in development. And sustainable social, political, and economic development is founded on the conservation of biodiversity and the benefits it provides to societies. A senior Kenyan government official stated the underlying premise of this assessment clearly: “With so many people so dependent on nature, we first need to secure the environment as the basis for food security and water security.” A senior staff member of a conservation NGO (Non-Governmental Organization) echoed this view: “If we focus on food security and water security, we will be securing our biodiversity.” Both of them were reflecting a fundamental premise of USAID’s approach to biodiversity programming. As stated in the handbook, *Biodiversity Conservation: A Guide for USAID Staff and Partners* (USAID, 2005a), “Biodiversity and functioning ecosystems make up the foundation for human well-being. USAID recognizes that improving livelihoods, security, and human health depends on the conservation of biodiversity in healthy ecosystems. It is well established that conservation, economic growth and governance are interdependent.”

METHODOLOGY

ECODIT’s three-person assessment team gathered information for this assessment through review of relevant documents and web-based information, and interviews and meetings with representatives of key stakeholder groups, ranging from ministers to mangrove cutters. We talked to approximately 100 people, including those from relevant national government agencies, international and national NGOs, international donors, USAID/Kenya Mission and project staff, and from natural resource-dependent communities. Our information also came from site visits to many of the ecosystems of Kenya, including montane forests, savanna woodland and bushland, coastal forests, beaches and dunes, mangroves, and coral reefs.

OVERVIEW

This report summarizes the status of biodiversity and forests in Kenya; discusses the values and economics of biodiversity; identifies relevant laws, policies, and institutions of the Government of Kenya that affect biodiversity and forest management; and reviews the activities of non-governmental institutions of all kinds (NGOs, donors, and the private sector). We use the “threats-based approach” that guides USAID’s biodiversity programming as the conceptual framework for our analysis. We first analyze the principal direct threats to biodiversity in Kenya, and their social, political and institutional, and economic causes. We identify the actions needed to address, reduce, and/or remove the causes of threats to forests and biodiversity, thus meeting the first of the requirements of the Foreign Assistance Act (FAA Sections 118 and 119.

We then address the second required component of FAA 118-119 analyses by discussing the extent to which the actions proposed by USAID/Kenya could contribute to meeting the identified actions necessary.

ACTIONS NECESSARY

Our assessment of actions necessary began with a review of two recent sources that present the views of the Government of Kenya on this topic. These are:

- The Fourth National Report to the Convention on Biological Diversity, submitted in 2009, and prepared by the National Environment Management Authority (NEMA) with support from the United Nations Development Programme. Fifteen “actions necessary” were implied or proposed in this report, which include six “social” actions, six “governance” actions, and three “economic” actions, based on our informal categorization.
- The Kenya State of the Coast Report, also completed in 2009 by NEMA. Thirty-two “actions necessary” were implied or proposed, including 14 social, 17 governance, and one economic action.

The Assessment Team also compiled a list of all of the “actions necessary” that were proposed by our approximately 100 informants. This list totaled 116 proposed “actions necessary,” some of which were similar or proposed by more than one person. Of these, 30 actions addressed social, scientific, or educational causes of threats; 70 addressed political, institutional, and governance issues; and 16 dealt with economic actions needed.

Illustrative examples of proposed social, scientific, or educational actions needed included:

- Scientific research to understand climate change effects on marine and terrestrial biodiversity to design resilience into Protected Areas (PAs)/Marine Protected Areas system.
- Identification & mapping of wildlife dispersal corridors.
- Support for high-quality environmental journalism that raises the level of information and awareness nationally about coastal forests.
- Public awareness and education campaigns about the value of forests.

Examples of political, institutional, and governance actions needed included:

- Clarification and elaboration of implications of new constitution for wildlife, forests, land, and other policies and laws.
- Support for institutional reforms and improved governance; for example, for better stakeholder participation.
- Support for devolved/decentralized forest sector institutions, especially Community Forestry Associations.
- Build the capacity of NGOs to better educate, advocate, and lobby for biodiversity and forest conservation.
- Transparent information on plans for Lamu Port and Lamu Port-Southern Sudan-Ethiopia Transport (LAPSSET) Corridor, and a Strategic Environmental Assessment for those projects.

Examples of economic actions needed included:

- Demonstration projects to prove viable Payment for Ecosystem Services models (e.g., hydrological services, carbon sequestration).
- Development of incentives to conserve wildlife outside of PAs on community and private lands.

- Diversification of the geographic base of wildlife tourism in Kenya to bring economic incentives to more (and more dispersed) local communities (i.e., expand beyond Mara, Amboseli, Lake Nakuru).
- Mechanisms to support the opportunity costs for small enterprises in the risky environment of bio-products.

PRIORITIES AND RECOMMENDATIONS FOR CONSERVATION ACTIONS

Analysis of the threats, causes, and actions necessary for conserving Kenya's biodiversity and forests led us to identify four major ecosystems as high priorities for action.

The **montane forest ecosystem** stands out as a high priority for conservation because:

- These forests are the ecosystem with the greatest percentage of total area lost of any ecosystem in Kenya, with only about 10% of their original coverage remaining;
- Montane forests provide irreplaceable ecosystem services at the national level, in particular as the watershed catchments for all of the rivers of Kenya, and have higher potential for carbon sequestration than any other ecosystem;
- This ecosystem has relatively high levels of endemic species; and
- The demand for agricultural land, and conflicts over it, still threaten even the remaining small fraction of this ecosystem.

The ecosystems of Kenya's **coastal and marine zone**, from its beaches, mangroves, and coral reefs out to the edge of its 200-mile Exclusive Economic Zone in the western Indian Ocean stand out as a high priority for conservation because:

- This zone accounts for a large proportion of the species in Kenya, although it is much less studied than terrestrial ecosystems;
- The ecosystem services of this zone, in particular nutrient cycling, and the protection of the coast from storms, are irreplaceable and undervalued;
- Coastal natural resources support the livelihoods of coastal communities, and there is conflict for access and use rights; and
- The pelagic marine ecosystem of the open ocean is almost one-third the area of Kenya, but its living resources are almost unmanaged and are not contributing nearly what they could to the country's well-being.

The dynamic ecological mosaic of **savanna grassland, woodland, and bushland** in the Arid and Semi-Arid Lands of Kenya are a high priority for conservation because:

- They cover approximately 80% of the country;
- They are threatened with loss and degradation from unsustainable grazing and fragmentation caused by corridors for large-scale movements of both wildlife and livestock;
- These ecosystems support the big, charismatic mammals that are a major factor drawing international tourists to Kenya;
- They also support traditional pastoral communities who live in areas unsuitable for significant crop production.

The unique **coastal dry forests** of the East African coastal lowlands, including those found in Kenya, are a high priority for conservation action because:

- They contain an unusually high proportion of endemic species of plants and other taxa;
- Significant areas of these forests have been cleared for agriculture because they are found in a zone with sufficient precipitation for rainfed crops; and

- They are now highly fragmented, and are still being degraded and converted.

Content analysis of the identified “actions necessary” leads us to recommend the following five thematic areas as the highest priorities for biodiversity and forest conservation in Kenya:

- Devolution, decentralization, and community-based natural resources management
- Land and Natural Resources Management (NRM) policy and legislative reform to create the enabling environment for community-based natural resources management (CBNRM) and biodiversity-based economic opportunities
- Enhanced livelihoods and economic opportunities
- Applied science, environmental information, and monitoring
- Public awareness and education and capacity of NGOs for advocacy

Our proposed priority ecosystems and priority themes can be arrayed in a matrix to be used as a conceptual framework for designing strategies and programs to conserve biodiversity and tropical forests in Kenya.

EXTENT TO WHICH USAID CONTRIBUTES TO ACTIONS NEEDED

USAID/Kenya is currently working towards meeting some of the needs we identified through its portfolio of environment and NRM activities. Some of the actions needed that USAID contributes to include:

In **montane forests**, the ProMara program is helping regularize and clarify land tenure, supporting enforcement of the land law, and trying to stop irregular and extra-legal land allocation. The program is also working to improve conservation, restoration, and management of native montane forests and watersheds.

In **savannas and bushland**, USAID contributes to: maintaining or restoring corridors for wildlife movement; transforming traditional pastoral tenure and dispute resolution mechanisms through improved communication; increasing systems and capacity for anti-poaching control; and diversifying economic opportunities in pastoral areas through increased tourism, handicrafts, commercial meat sales, beekeeping, and bio-enterprises for native plant products.

On the **coast** of Kenya, USAID supports actions that address the need for secure land tenure for traditional coastal communities and works to stop irregular and extra-legal beach-front land allocation.

The thematic priorities identified in the assessment suggest some areas of cross-sectoral overlap between the actions necessary for biodiversity and forest conservation and the proposed objectives of USAID/Kenya’s Democracy and Governance (DG), Education and Youth, Health, and Agriculture, Business and Environment (including Feed the Future) programs. The thematic areas of devolution, decentralization, and CBNRM, as well as policy and legislative reform, ought to link closely with the Democracy and Governance objectives of the Mission. There are large opportunities for synergy between USAID’s NRM and DG programs related to managing and mitigating land and natural resource conflicts. The livelihoods and economic opportunities theme likewise should synergize with objectives of the agriculture, competitiveness, and food security aspects of the Mission’s portfolio. Public education and NGO advocacy link logically with Education and Youth, as well as DG, objectives.

The geographic focus proposed for the Mission's Feed the Future (FTF) program shows some overlap with areas that are among the highest priorities for biodiversity and tropical forest conservation. One such area of overlap is in the western montane and highland forest zones that include Mt. Elgon, the Cherangani Hills, the Mau Forest Complex, and Kakamega Forest. The hydrological linkages between forests and agriculture in these areas are of critical importance, and a better understanding of these linkages will be important in designing and implementing specific FTF activities. Another area of geographic overlap between FTF focal areas and biodiversity conservation priorities occurs in the southern savanna ecosystems northeast of Amboseli National Park, and near Tsavo East and Tsavo West National Parks.

A number of the development goals promoted in the Government of Kenya's (GOK) Vision 2030 have significant potential to harm ecosystems and species unless properly carried out, including mining and oil and gas development, development of resort cities, and construction of transportation corridors and by-pass roads. In particular, many of our key informants raised concerns about the proposed development of the Lamu Port and the LAPSSET Corridor. The Assessment Team sees this as a prime opportunity for USAID to engage with the GOK in developing and promoting the use of modern environmental planning measures, such as the use of Strategic Environmental Assessments (SEA). For example, if USAID/Kenya were asked to assist the GOK in developing an agricultural strategy for the LAPSSET Corridor, the Mission should insist on a SEA as a first step in the process, and build capacity of the relevant GOK agency, probably NEMA, to conduct a transparent and participatory SEA that meets international standards.

CONCLUSION

Despite the serious threats to biodiversity in Kenya, and their complex causes, we observed a high level of commitment, knowledge, skills, and professional dedication to biodiversity and forest conservation that give us hope that needed actions can be undertaken in time to secure the future for the country's rich and irreplaceable natural heritage. We hope that in some small but significant way this report will give voice to the calls for action that we heard, from the halls of government to local resource-dependent communities, and lead toward improved conservation and management of Kenya's biodiversity and forests in support of its sustainable social, political, and economic development.

1.0 INTRODUCTION

1.1 PURPOSE

The US Foreign Assistance Act (FAA), which authorizes US bilateral foreign aid programs, requires that a Tropical Forests and Biodiversity analysis be conducted in conjunction with the development of new foreign assistance strategies and programs. The purposes of this legal requirement are: 1) to provide a summary for USAID of the “actions needed” for conserving the biodiversity, including the tropical forests, of the host country; 2) to inform the development of USAID assistance strategies and programs by identifying ways in which the host country could be supported to conserve its biodiversity and forests; and 3) to assure that US foreign aid does not support activities that harm the biodiversity and forests of host countries. This requirement is predicated on the view that biological diversity, including tropical forests, provides the foundation for long-term, sustainable social and economic development in any country, and therefore must be conserved.

In the amendments to the Foreign Assistance Act of 1961, Sections 118 and 119, the legislation states:

FAA Sec 118 (e) Country Analysis Requirements. Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of (1) the actions necessary in that country to achieve conservation and sustainable management of tropical forests, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.

FAA Sec 119 (d) Country Analysis Requirements. Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of (1) the actions necessary in that country to conserve biological diversity, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.”

USAID/Kenya conducted an FAA 118-119 assessment in 2000 and a brief update in 2005. Since the last assessment, the political and economic situation in Kenya has changed significantly. USAID/Kenya is now developing a new Country Development Cooperation Strategy for its programs (from 2012 to 2017) and contracted ECODIT to conduct a new Tropical Forests and Biodiversity Assessment for Kenya.

The major objectives of this analysis were to:

- summarize the status of Kenya’s biological diversity and forests;
- describe the direct biophysical threats to Kenya’s biodiversity and forests, and the causes of those threats;
- identify actions needed to reduce and/or mitigate the causes of those threats in the current political, economic, and social context; and
- recommend opportunities for USAID/Kenya to support such needed actions within its proposed Country Development Cooperation Strategy and planned programs.

In order to meet these objectives, this report provides all of the information requested in the Scope of Work (SOW) (Annex B, Statement of Work for Assessment) to the extent possible.

This report is also intended to serve as a baseline for USAID/Kenya in reporting toward biodiversity and tropical forestry funding objectives and requirements.

1.2 METHODS

Information needed to meet the above objectives was collected by the ECODIT team (see Annex A, Biographical Sketches of Assessment Team Members). The information-gathering and analysis process followed USAID guidance on a threats-based approach to biodiversity conservation described in *Biodiversity Conservation: A Guide for USAID Staff and Partners* (USAID, 2005a), and the “best practice” guidance provided in *Tropical Forestry and Biodiversity (FAA 118-119) Analyses: Lessons Learned and Best Practices from Recent USAID Experience* (USAID, 2005b).

Information was gathered from several sources. No single source by itself was sufficient, and information from one source was validated by, and supplemented with, information from other sources. The sources of information include the following:

- Review of relevant documents, including the two previous Kenya FAA 118-119 analyses conducted in 2000 and 2005; Government of Kenya (GOK) documents; donor project documents; reports in the scientific literature; and web-based information on institutional websites and blogs;
- Interviews and meetings with approximately 100 people representing key stakeholder groups (see Annex C, Persons Contacted), including national government agencies, international and national NGOs (Non-Governmental Organizations), private sector representatives, staff of organizations implementing USAID projects, international donors (bilateral and multilateral), and USAID/Kenya Mission staff; and
- Site visits to: 1) the Lewa area and conservancies working with the Northern Rangelands Trust north of Isiolo; 2) forest areas around Mt. Kenya; 3) the Mau Forest; 4) the Lamu Archipelago and Kiunga Marine National Reserve; the Arabuko-Sokoke Forest Reserve near Malindi; and the Malindi Marine National Park and National Reserve.

2.0 STATUS OF BIODIVERSITY

The modern concept of biological diversity, or “biodiversity” for short, encompasses the variety and variability of life at three levels of organization: ecosystems, species, and genes. Biological diversity is the diversity of species, the diversity of the genes they contain, and the diversity of the ecosystems they create. This chapter will review the status of Kenya’s biodiversity at the ecosystem and species levels, and provide a brief discussion of genetic diversity.

Since Kenya lies within the tropics, all of its forests are “tropical.” Definitions of “forest” vary, but for the purposes of this report we will focus on the closed-canopy forests of three general kinds found in the country: montane forests, dry coastal forests, and mangrove forests. Although the US Foreign Assistance Act includes a separate amendment, Section 118, dealing with tropical forests, they are really only one component of the biodiversity of tropical countries, and will be treated as such in this report.

2.1 BIOPHYSICAL SETTING

Kenya covers a land area of approximately 583,000 square kilometers (WRI, et al. 2007), making it comparable in size to France or Thailand. Kenya straddles the Equator between approximately 4.5 degrees South and 4.5 degrees North latitude. With a coastline of approximately 536 km, the total area of the Kenyan marine Exclusive Economic Zone (EEZ) extending 200 nautical miles from the coast is about 230,000 sq. km. (Ministry of Fisheries Development). Thus, by area, about 28% of Kenya’s ecosystems are marine and 72% are terrestrial.

About two-thirds of Kenya’s land is less than 900 meters in elevation and one-third is comprised of highlands above that elevation. The highlands, mainly in southwestern Kenya, surround five major areas of mountains or hill ranges (Mount Kenya, Mount Elgon, the Aberdare Range, the Mau Escarpment, and the Cherangani Hills). The Great Rift Valley, stretching north-south across the country, splits the highlands into a western and eastern part. The Rift Valley contains numerous closed-basin saline lakes and some freshwater lakes, including Lake Naivasha and Lake Baringo in the eastern branch of the Rift, and Lake Victoria, which lies between the two Rift branches. Freshwater and saline ecosystems cover about 8% of Kenya, including rivers, lakes and wetlands (NEMA and UNDP, 2009, p.13), with Lake Victoria, Lake Turkana, Lake Naivasha, and Lake Baringo being the four largest inland water bodies.

Five major watersheds spread from the mountains and highlands, supplying water to the major permanent rivers that traverse the dry lowlands:

- the Lake Victoria watershed, including the Mara River;
- the Rift Valley watershed, including the Turkwel River;
- the Ewaso Ng’iro River watershed;
- the Tana River watershed; and
- the Athi-Galana-Sabaki River watershed.

The Tana is Kenya’s longest river. The Ewaso Ng’iro has no outflow to the ocean, while the Tana and Athi-Galana-Sabaki flow into the Indian Ocean.

Kenya’s average annual rainfall is approximately 630 millimeters per year, but this precipitation varies dramatically across the country. It ranges from 200–400 millimeters per year in northern and eastern Kenya to up to 2,000 mm per year in the highlands and mountains of the

southwest. More than 80% of Kenya is arid and semi-arid. Distinct rainy and dry seasons occur, and, as is usual for equatorial countries, total precipitation can vary widely from year to year, and droughts are common.

Rainfed agriculture generally requires about 450 mm of rainfall per year, so most of Kenya is not suitable for crop production without irrigation. It is thus not surprising that the areas of crop production shown in the map of ecosystems in Figure 2.1 correlate strongly with precipitation. Croplands and the associated agro-ecosystems cover about 19% of Kenya.

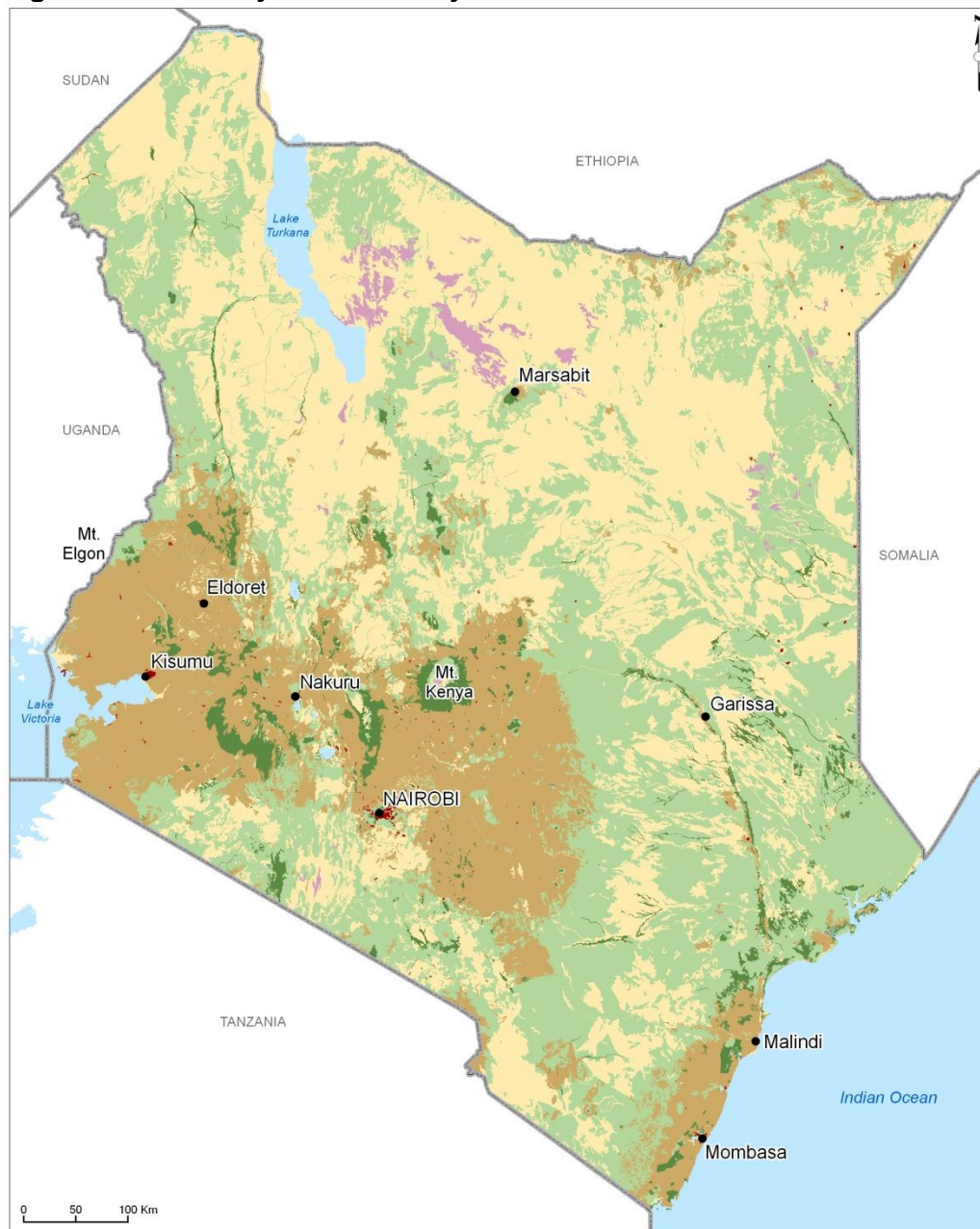
It is also not surprising that the human population in Kenya is concentrated in areas with sufficient precipitation for rainfed crops. Population density ranges from more than 600 persons per km sq. in parts of the highlands of southwest Kenya, and on the south coast from Malindi to Mombasa, to fewer than 20 persons per km sq. in arid regions of the north and northeast. Roughly 80% of Kenyans live in the 20% of the country with adequate rainfall for crops, and 20% live in the arid and semi-arid lands (ASALs). Overall, Kenya's population is estimated at 40 million, with a growth rate of 2.7%, according to the Population Reference Bureau's 2010 World Population Data Sheet. This growth rate corresponds to the population doubling in approximately 26 years.

2.2 ECOSYSTEMS

2.2.1 TERRESTRIAL ECOSYSTEMS

Grassland Savanna, Woodland Savanna, and Bushland

A mosaic of grassland savanna, woodland savanna, and bushland plant communities are found in Kenya's ASALs, depending upon soil type, rain-shadow effects, and other factors. Savanna grassland ecosystems are estimated to cover 39 percent of Kenya, and woodland savanna or bushland ecosystems cover 36 percent (WRI, et al., 2007). A unique assemblage of large mammals, including large herbivores and carnivores, inhabits these ecosystems. These large mammals form the main attraction for nature tourism in Kenya. Almost all of the largest and most famous national parks and national reserves in Kenya are located in savanna and bushland ecosystems. Because of the aridity and frequent droughts in these areas, many of the resident species (e.g., elephant, zebra, wildebeest) have evolved an adaptive strategy of large-scale movements within the landscape to find adequate water and grazing, a system mimicked by the traditional pastoralist societies that also occupy these areas (NEMA and UNDP, 2009).

Figure 2.1 Ecosystems of Kenya**MAJOR ECOSYSTEM TYPES**

- Forest
- Bush- and woodland
- Cropland
- Savanna and grassland
- Bare areas
- Urban areas
- Water bodies

Source: World Resources Institute et al., 2007

Montane Forests

In areas with rainfall above 800 mm/year the potential natural vegetation would be closed-canopy forest, and forests originally would have covered about 20% of the country, in the mountains and highlands and in a narrow belt along the Indian Ocean. Forests now cover only about 1.7 percent of Kenya (WRI, et al., 2007), roughly one-tenth of their original area. Most of the country's current cropland was formerly forest. Forests are thus the most poorly conserved of all of Kenya's ecosystems.

The value of the hydrological ecosystem services provided by montane and highland forests is increasingly being recognized and for this reason these forests are often called "water towers." The draft Wildlife Bill of 2011 specifically lists 19 of them as being of "national importance" (see Box 2.1).

Coastal Forests

Unique dry coastal forests, which formerly occupied a nearly continuous strip from southern Somalia to northern Mozambique, are now highly fragmented and occupy only a small fraction of their original area. The Arabuko-Sokoke Forest near Malindi, now protected in a National Forest Reserve, is said to be the largest remaining patch, at around 400 km². The unprotected Dakatcha Woodlands, also near Malindi, is another patch of this type of forest. On the south coast, a number of historical and spiritual "kaya" forests also protect examples of this habitat (see Section 3.3). Coastal forests area now highly fragmented, with over 100 patches covering an area of about 660 sq. km (Matiku, no date).

Afro-Alpine and Sub-Alpine

Above the forest zone surrounding Kenya's highest mountains, such as Mt. Kenya, a number of vegetation belts are found. Afro-alpine vegetation typically occurs above 3,400 meters and is characterized by the presence of giant senecios (*Dendrosenecio* spp.) and giant lobelias (*Lobelia* spp.). Continuous vegetation stops at about 4,500 m. There are 13 species endemic to Mount Kenya, and approximately three-quarters of Afro-alpine plant species are endemic to these ecosystems in general.

2.2.2 AQUATIC ECOSYSTEMS

Aquatic ecosystems cover about 8% of Kenya's surface area and include freshwater and saline lakes, rivers, and wetlands (NEMA and UNDP, 2009, p. 13). Except for Lakes Victoria and Naivasha, many of Kenya's inland waters are generally poor in biodiversity, particularly fish diversity. Before 1954, Lake Victoria had enormous species diversity, with over 500 species of fish, 90% of which were cichlids belonging to the genus *Haplochromis*, and a large number of which were endemic to the lake. According to Kenya's Fourth National Report to the Convention on Biological Diversity (NEMA and UNDP, 2009), Lake Victoria now has around 250 fish species. This dramatic mass extinction of Lake Victoria's endemic cichlids was caused by the deliberate introduction of an alien predator, the Nile perch, and habitat degradation from the non-native invasive water hyacinth. Lake Turkana, the second largest lake in Kenya, has 48 fish species, ten of which are endemic.

Box 2.1 Protected Water Towers of National Importance

1. Mt. Kenya Ecosystem
2. Aberdares Ecosystem
3. Mt. Elgon Ecosystem
4. Mau Forest Complex
5. Cherangani Forests
6. Shimba Hills Ecosystem
7. Chyulu Hills
8. Taita Hills
9. Marsabit Forest
10. Kibwezi Forest
11. Ngong Forest
12. Karura Forest
13. Mathews Range
14. Mua Hills
15. Loita Hills
16. Kakamega Forest National Reserve
17. Bonjoge Forest
18. Ol Donyo Sabuk National Park
19. Ndundori Hills

Source: Draft Wildlife Bill, 2011

The series of Rift Valley freshwater and saline lakes and the associated wetlands stretching from Tanzania to Ethiopia constitute vital points in migratory routes for waterbirds.

2.2.3 MARINE ECOSYSTEMS

With a coastline of approximately 536 km between the borders with Tanzania and Somalia (and an estimated 880 km when taking into account the actual coastal landscape), Kenya's territorial sea area is approximately 13,800 sq. km, and the area within its claimed 200 nautical mile Exclusive Economic Zone is approximately 230,000 km² (Ministry of Fisheries Development, 2011). This vast marine area is approximately half as large as the terrestrial area of the country, but much less understood ecologically and much less regulated, managed and conserved. By this measure, it could be argued that conserving Kenya's marine ecosystems and marine biodiversity is a high priority for the country.

Mangroves

Mangroves cover around 600 sq. km of the Kenya coast, with approximately 67% found in the Lamu District (Government of Kenya, 2009). It is estimated that around 100 sq. km of mangrove forest, or 14% of the original area, has been lost due to conversion, over-exploitation, or pollution. All nine species of true mangroves found in East Africa occur in Kenya, with *Rhizophora mucronata* and *Ceriops tagal* being dominant and represented in almost all the mangrove formations (Government of Kenya, 2009). Mangroves provide feeding, breeding, and refuge habitats for many species of fish and shellfish important in near-shore fisheries (NEMA and UNDP, 2009).

Studies suggest a symbiotic relationship between mangroves and nearby coral reefs, mediated through the sediment-trapping and nutrient-cycling ecosystem services that mangroves provide. By slowing water runoff from the land through their extensive root network, mangroves cause sediment to settle that could otherwise damage nearby reefs (Obura, 2011). These studies also suggest that nearby mangrove forests may help protect reefs from the effects of global climate change. For instance, mangroves release high levels of organic matter, such as tannins from fallen leaves, into the water. This discolored water reduces light penetration, thereby shielding corals from the combined effects of elevated water temperatures and high light intensity, which occurred in 1998 and is expected with increasing frequency due to global climate change.

Coral Reefs

Kenya's coral reefs are part of the northern end of the East African fringing reef system, decreasing in extent, size and diversity going northwards. Kenyan reefs have around 220 species of true corals. Dominant coral species include the massive reef-building coral *Porites lutea* and other *Porites* spp., regionally dominant species such as *Galaxea astreata*, and a broad diversity of species in other genera. Primary reef fish families include the herbivorous parrotfish (Scaridae) and surgeonfish (Acanthuridae), as well as predators such as snappers (Lutjanidae), sweetlips (Haemulidae) and groupers (Serranidae). Coral reefs are among the most productive of all marine ecosystems, providing habitat for numerous species, including turtles, dugongs, and whale sharks. Their ecosystem services, such as protecting the coastline from ocean waves, are irreplaceable. Kenya's two largest rivers, the Athi-Galana-Sabaki and Tana, suppress the growth of coral reefs between Malindi and Lamu by the inflow of fresh water and sediment. (Government of Kenya, 2009)

Seagrass Beds

Seagrasses occur in extensive beds that cover a large proportion of shallow reef slopes and form an important habitat for many species living in them and adjacent systems. Twelve seagrass species are found in Kenya, with *Thalassondendron ciliatum*, which forms

monospecific stands, being the dominant one. Its canopy structure provides habitat for small and juvenile fish and invertebrates. Seagrass beds are important foraging grounds for endangered species such as dugongs and marine turtles, as well as important habitats for fish species like rabbitfish, surgeonfish and parrotfish. Various species of shellfish and sea cucumbers are also found in seagrass beds. (Government of Kenya, 2009)

Beaches and Dunes

Sandy beaches are found on Kenya's coast, most notably along the parts of the coastline dominated by land-based sources of sediment and without fringing reefs, near the Tana and Athi-Galana-Sabaki Rivers and northwards towards Lamu. Some of these areas have high dunes generated by wind-blown sand from the beach. Sand dunes support a surprisingly rich diversity of flora and fauna. Beaches are important habitats for species such as sea turtles, which lay their eggs on the upper beach, as well as for resident and migratory shorebirds. (Government of Kenya, 2009)



Beach and Dunes, Kiunga National Marine Reserve, Mkokoni area, Lamu District
Photo: B. Byers, August 2011

Pelagic/Offshore Marine

Beyond the continental shelf, at depths of 200 meters and deeper, is the pelagic zone, where productivity is limited by the generally low levels of nutrients in the lighted, surface zone. Productivity is strongly influenced by the monsoons, being lower during the rough southeast monsoon and higher during the calmer northeast monsoon. Large schools of migratory pelagic

fish frequent the Kenya's pelagic zone during the SE monsoon. These include tuna, skipjack, travelly, sardinella, mackerel, marlin, sailfish and swordfish. Distinct seasonal changes in finfish catches in Kenya have been observed, with the calm NE monsoon allowing more effective operation of the pelagic fishery. Only about 18% of the total marine production in Kenya is from the pelagic fishery, however. According to the 2009 State of the Coast report, offshore pelagic fishing is conducted mainly by foreign-owned vessels (Government of Kenya, 2009). "However, surveillance of the pelagic fishery is a major problem, and it is difficult to get accurate information on catches by foreign-owned and licensed vessels. It is also likely that unlicensed fishing vessels poach within Kenya's territorial waters and exclusive economic zone" (Government of Kenya, 2009).

2.2.4 ENDANGERED ECOSYSTEMS

Kenya's draft Wildlife Bill of 2011 contains a list of "endangered and threatened ecosystems" (see Box 2.2). Although the criteria for determining the degree of vulnerability, threat, and endangerment are not explained in the Bill, the list is instructive nevertheless. One interesting point is that the least conserved ecosystem type in Kenya, montane forest, falls lower on this list than the southern savanna and lakes ecosystems. Also revealing is that, except for the Kiunga Marine Reserve, its associated mangroves, and the Mida Creek mangroves near Watamu, this list hardly considers marine ecosystems, which make up about one-third of the country by area. The low representation of marine and coastal ecosystems is undoubtedly due to the historical legacy of a focus on large terrestrial mammals in wildlife conservation in Kenya.

2.3 SPECIES

As a tropical country with a high level of ecosystem diversity, the total number of species found in Kenya vastly exceeds that of most countries. The absolute number of species, or species "richness," reflects the evolutionary history of a place and is correlated with the productivity of the ecosystem. The greatest number of species in Kenya is found in montane forests and coral reefs.

Table 2.1 provides an estimated number of species and threatened species for selected taxa.

TABLE 2.1 SPECIES DIVERSITY AND CONSERVATION STATUS FOR SELECTED TAXA						
TAXON	PLANTS	BIRDS	MAMMALS	FISH	REPTILES	AMPHIBIANS
Number of Species	6,506	1,103	407	314	261	76
Threatened species	103	28	33	29	5	4

Source: Earthtrends, 2005

Over 800 species of coastal and marine species are found in Kenya, according to Kenya's Fourth National Report to the Convention on Biological Diversity (NEMA and UNDP, 2009).

Box 2.2 Nationally Listed Endangered and Threatened Ecosystems**Critically Endangered Ecosystems**

- Mara Ecosystem, including the Mara National Reserve and surrounding group ranches
- Amboseli Ecosystem, including Amboseli National Park and surrounding group ranches
- Nairobi Ecosystem, including Nairobi National Park and the Athi-Kitengela & Kaputei Plains

Endangered Ecosystems

- Lake Nakuru Ecosystem, including Lake Nakuru National Park and its catchment
- Lake Elementaita Ecosystem, including Lake Elementaita and its catchment basin
- Turkana Ecosystem
- Tana Delta

Vulnerable Ecosystems

- Mau Ecosystem

Areas of Environmental Significance

- Baringo Ecosystem, including Lake Bogoria and Lake Baringo
- Boni-Dodori-Kiunga Ecosystem, including the Kiunga Marine Reserve, Boni and Dodori Forest reserves, and mangrove forests
- Malindi-Watamu Ecosystem, including the Arabuko-Sokoke Forest Reserve, Mida Creek, and Gede Forest
- Mt. Elgon Ecosystem, including Mt. Elgon Park
- Mt. Kenya Ecosystem, including Mt. Kenya National Park and Forest Reserve, the Laikipia Plateau, Meru National Park, Samburu Conservancies, Ewaso Ng'iro River Basin, and Lewa Wildlife Conservancy
- Marsabit Ecosystem, including Marsabit National Park and Reserve
- Lake Naivasha Ecosystem, including Hells Gate National Park
- Aberdares Ecosystem, including Aberdares National Park and Forest Reserve
- Tsavo Ecosystem, including Tsavo East and West National Parks
- Shimba Hills Ecosystem, including Shimba Hills National Park

Source: The Wildlife Bill, 2011

Of all species in Kenya, “At least 258 species are threatened and all as such have presidential protection” (NEMA and UNDP, 2009). An annex to the Wildlife Bill, 2011, lists approximately this number of protected species (Wildlife Bill, 2011), for example, Grevy’s Zebra. At least 105 species listed in the International Union for the Conservation of Nature/The World Conservation Union (IUCN) Red Data Book are found in Kenya’s coastal forests. Kenyan species listed under the Convention on International Trade in Endangered Species are listed in Annex D.



Grevy's Zebra (*Equus grevyi*), Lewa Wildlife Conservancy.
Photo: J. Hecht, August 2011

Ecologists recognize that some species have a much larger effect on ecosystem structure and function than other species. These species, with the ability to shape the structure and functioning of the ecosystems they inhabit, are known as “keystone” species. Our own species is by far the dominant keystone species on Earth today. In many of Kenya’s ecosystems, especially the savannas and woodlands, elephants were the keystone species. When a keystone species is locally extirpated, ecosystems can change dramatically, often to states from which restoration to the original ecosystem is difficult or impossible. A risk in many of Kenya’s Arid and Semi-Arid Lands (ASALs) is that loss of elephants may lead to bush-dominated systems with very little grass for livestock or grazing wildlife. Similar in some ways to keystone species, “umbrella” species are those that provide the habitat or conditions for an array of other dependent species. The reef-building corals would be an example, as would elephants. Such species are particularly important to conserve.

The term “landscape” species has been used by ecologists and conservationists to refer to species that move widely and thus link widely-separated features of an ecosystem. Marine turtles would be an example, as would, again, elephants. The term “flagship” species has generally been used by conservationists for charismatic species, often large animals such as elephants or rhinos, which serve as the “mascot” for wider conservation campaigns.

Kenya is rich in endemic species, those that are found only within the country, or a part of it, and nowhere else. Endemism relates to biogeographic history. For example, montane forests and Afro-alpine ecosystems harbor endemic species and subspecies that were isolated during periods of climate change from other populations. Coastal forests are similar. In Kenya's coastal forests, about 43% of around 4,000 plant species are endemic; 11 of 198 mammals (5.6%); 11 of 633 birds (1.7%); 53 of 254 reptiles (21%); 6 of 88 amphibians (6.8%); and 32 of 219 freshwater fishes (14.6%) (Conservation International, 2011).

Coral diversity, endemism and biogeography on the Kenya coast and in the Western Indian Ocean are not well studied or understood, but recent evidence suggests that closing of the Tethys Sea, approximately 5 million years ago, isolated Western Indian Ocean corals from Atlantic relatives, and so Kenyan reefs may have genetically distinct species and populations (Obura, 2011).

According to the Convention on Biological Diversity (CBD) Fourth National Report, "Inland waters are characterized by high endemism of freshwater species, for example, between different lakes. Currently, the national records of threatened species show that some 392 are endemic." (NEMA and UNDP, 2009)

2.4 GENETIC DIVERSITY

Genetic diversity within a single species is always present, and it allows species to tolerate a range of environments and adapt to environmental changes over evolutionary time. Such intra-specific genetic diversity is often reflected in partial genetic differentiation of populations throughout the range of a species. Subspecies of a single species are one example of this. Subspecies of more widely dispersed species are common in Kenya. Population genetic studies are often needed to reveal such underlying genetic diversity, such as in Kenya's elephant populations, which are discussed in an article in the *Journal of Heredity*, "Population Genetic Structure of Savannah Elephants in Kenya: Conservation and Management Implications" (Okello et al, 2008). Giraffes provide another example: three subspecies are found in Kenya – the Maasai Giraffe, the Reticulated Giraffe and the Rothschild's Giraffe. Kenya is thought to be the center of giraffe evolution, since it is the only country where three of the nine recognized sub-species can be found (Rothchild's Giraffe Project, 2011). A local subspecies of rock hyrax is found on Mt. Kenya, undoubtedly the result of isolation of that population from other rock hyrax populations.

To conserve biodiversity, especially in the face of possible environmental changes such as those likely to occur due to global warming, it is important to conserve the full array of genetic diversity within a species. This will provide the species with the genetic diversity necessary to survive, adapt, and evolve.

The Patas Monkey (*Erythrocebus patas*) is an example of a species that is on the edge of its range in Kenya, and Kenyan populations of this species undoubtedly have a genetic makeup different from that of the core population. The Patas Monkey occurs in a broad band across Africa between the Sahara and the equatorial rain forests. The geographic range of this species in Kenya has declined from around 89,000 sq. km to roughly 48,000 sq. km, and the gaps among populations have increased. The current geographic range is about 54% of the known historic range (De Jong, et al, 2008), so this unique genetic variation is being slowly lost.

2.5 AGRO-BIODIVERSITY

Agro-biodiversity can be defined as the diversity of cultivated and livestock species and their genetically distinct varieties, as well as wild and semi-domesticated food and medicinal plants. According to Kenya's Fourth Annual Report to the CBD (NEMA and UNDP, 2009), approximately 45 domesticated plant species and 200 wild species are used by people in Kenya. The domesticated species include cereals (indigenous sorghum and pearl and finger millets, plus introduced maize, wheat, barley), legumes (pigeon peas), tuber crops, (yams, sweet potatoes, and introduced "Irish" potatoes), oil crops (castor, sesame), and fruits. Parts of eastern and north eastern Kenya are believed to have wild relatives of coffee. Traditionally cultivated species and varieties have been selected for their tolerance of the local conditions under which they are grown or raised. Although their production may not be as high as modern varieties, they often are able to survive and produce even under harsh conditions and with low inputs, characteristics that were often more valuable to people than higher productivity. Agro-biodiversity has been rapidly lost around the world, as farmers are persuaded to grow fewer crops and employ modern, higher-yielding varieties.

According to the CBD Fourth National Report, "Although the Government normally encourages use of improved varieties whenever available to ensure sufficiency in food products, many farmers feel that traditional varieties are superior in many ways. They often grow, conserve and use certain traditional varieties because of palatability, pest resistance, or tolerance for climatic and soil conditions. Inter-cropping and growing a mixture of diverse genotypes of a given crop species is common amongst many small scale farmers." (NEMA and UNDP, 2009)

Agro-biodiversity has been a topic of some interest in Kenya. One study, for example, documented the long-term effects of sugarcane farming on indigenous food crops and vegetables in Mumias and Nzoia sugarbelts of western Kenya. Traditionally grown were: cassava, finger millet, sorghum, Bambara groundnut, groundnut, sweet potato, maize, beans, sunflower, yam, soybean, green gram, banana, arrowroot, and sesame, many of which are genetically adapted to the region. According to the authors, "These crops were relied upon for food security because they are highly nutritious, and can withstand environmental stressors such as drought and inadequate soil nutrients. They also offered variety unlike the current status where maize is a staple food crop, but whose productivity is highly dependent on adequate rainfall." (Netondo et al, 2010).

A pilot study on the use of indigenous fruit trees on the Kenya coast found about 125 species with edible fruit. A total of 71 species (56%) were entirely wild, 34 (28%) were entirely domesticated, and 11 (9%) were occasionally found in cultivation and sometimes in the wild. Among the fruits, only 17 species (for example, coconut and mango) were marketed in major cities, while 40 species (32%) were sold in local markets and 69 species (55%) were only for local consumption. Apart from being used as fruits, 115 species (92%) of these local fruit trees had other uses as well, such as: medicinal and health uses, pesticides, tools, building, wood carving, fibers, dye, bee forage, live fence, firewood, food flavorings, and ceremonial and spiritual uses. The most important indigenous fruit trees in Kilifi and Malindi Districts were *Adansonia digitata* (baobab), *Tamarindus indica* (tamarind), *Dialium orientale* (Mtumbwi and Mpepet), *Ziziphus mauritiana* (Mukunazi) and *Landolphia kirkii* (Mtoria) (Fukushima, et al. 2010).

Numerous studies have shown that farmers who maintain agro-biodiversity by growing a diversity of traditional crops and varieties, and using indigenous fruit trees, have higher food security than farmers who do not.

2.6 RELATIONSHIP OF BIODIVERSITY TO ECOSYSTEM SERVICES

Biodiversity is the source of all ecosystem services, not an “ecosystem service” itself, despite much confusion in the literature (Byers, 2008). How does biodiversity provide ecosystem services? The diverse species in a given environment interact with each other and the physical environment to create ecosystems, and ecological processes and functions emerge from these systems. Humans benefit from these system-level processes. Because biodiversity is the source of ecosystem services, it is logical to argue that conserving biodiversity is a necessary means of conserving ecosystem services. Examples of ecological functions include:

- **food webs** – energy flows from eaten to eater in complex pathways,
- **“biogeochemical” (or “nutrient”) cycles** – materials cycle through food webs and cycle back to the physical environment (e.g., water cycle, carbon cycle, nitrogen cycle), and
- **photosynthesis** – plants capture and store solar energy.

The role of species diversity in maintaining ecological processes and functions is not well understood scientifically and is an active topic of scientific research. However, studies often show a positive relationship between the number of species in an ecosystem and the level and stability of ecological processes. Research in North American grasslands has shown that greater species-level biodiversity provides greater resilience to drought (Tilman and Downing, 1994), an example of how biodiversity is important for maintaining certain ecosystem services, such as controlling soil erosion and maintaining nutrient cycling.

3.0 VALUES AND ECONOMICS OF BIODIVERSITY

Biological diversity provides social and economic benefits of three distinct kinds: ecosystem products, ecosystem services, and non-material benefits (USAID, 2005a; Byers, 2008). The values of each of these types of benefits of Kenya's biodiversity are summarized below.

3.1 PRODUCTS

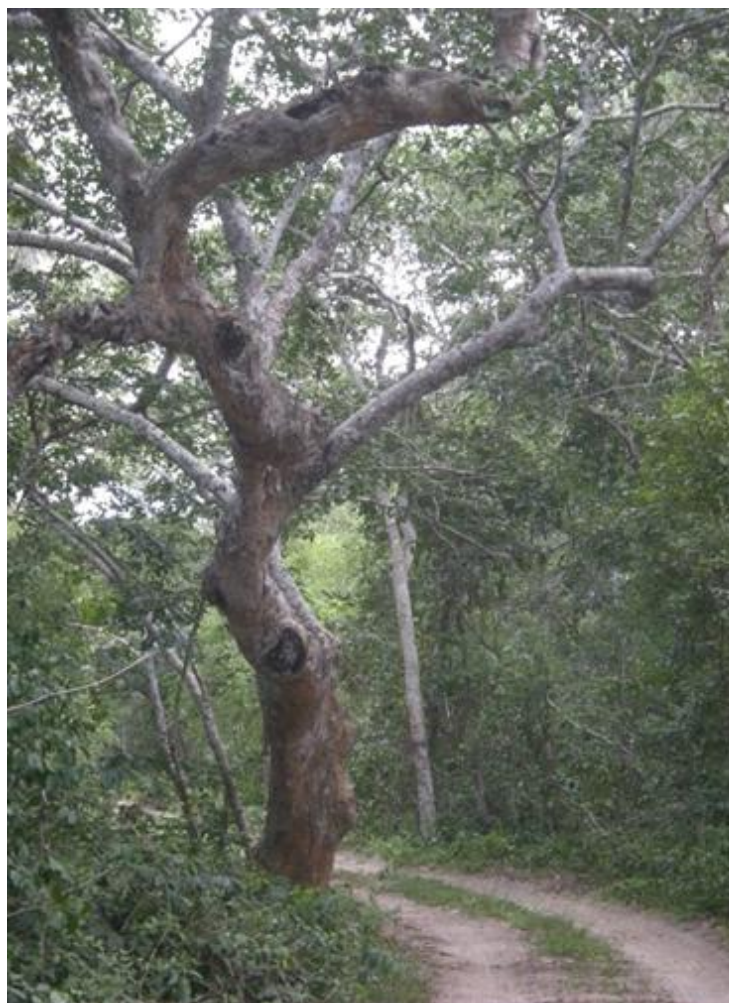
Ecosystem products are direct material benefits derived from species harvested for such things as food, fiber, building materials, medicines, fuel, and ornamental plants and pets.

Timber

The contribution of timber to the Kenyan economy (its value added, which includes labor costs plus profits but does not include the cost of other purchased inputs) was estimated at around 15 billion Kenyan Shillings (KES) in 2005 (KFS and KNBS), 2009, p. 39). Unfortunately, the study does not indicate how this was calculated, nor does it distinguish between the values of plantation products and timber from natural forests. This distinction is of interest from our perspective, since only the harvests of natural forests are products of "biodiversity." It also does not include illegal forest harvesting, so it underestimates the services provided by natural forests.

Fuelwood

Wood is a major source of energy at the household level in Kenya. According to estimates from the Kenya Forest Service and Kenya National Bureau of Statistics (KFS and KNBS, 2009, pp. 37-38), it accounts for 43% of the volume of wood used in the economy. Approximately half of this wood comes from woodlands in the ASALs regions, about 46% comes from on-farm woodlots and forests, and a small amount comes from other indigenous forests.



Afzelia quanzensis, Arabuko-Sokoke Forest; this high-value timber species was almost eliminated from the forest before its protection. Photo: B. Byers, August 2011

Charcoal

The manufacture of charcoal is also a major use of wood in Kenya, accounting for 47% of the volume of wood used in the economy (KFS and KNBS, 2009). Of this, 91% comes from ASALs woodlands, 4% each from montane native forests and on-farm forests, and the remainder from plantations (calculated from KWS and KNBS, 2009, Table 24/5, pp. 37-38).

Charcoal production, transportation and marketing are governed by the Forests (Charcoal) Regulations, 2009, which require all commercial charcoal producers to form associations and register with KFS. These associations are expected to develop and implement a code of practice, facilitate sustainable production, and ensure that members implement reforestation plans. Despite the regulations, most of the charcoal market remains unregulated, and a large share of the final purchase price of charcoal goes to pay off officials charged with enforcement. Returns at the upstream end of the supply chain are too low to permit investment in tree planting, so charcoal is produced from trees "mined" from natural forests, with severe consequences for biodiversity. A number of our key informants pointed out that with better regulation, this situation could be turned around. If the charcoal industry were well regulated, it could make financial sense to invest in more efficient production and transport systems: by eliminating bribes, more of the final cost could be returned to producers to enable them to invest in tree-planting and thus reduce their impact on natural forests. This example suggests the need to investigate the perverse incentives created by Kenya's policy framework regarding charcoal, and to create an enabling environment where economic incentives can work for, instead of against, conservation.

Mangrove Wood

Kenya's mangrove forests provide building materials and fuelwood to the surrounding communities. A recent mangrove valuation study (Kairo, no date, slide 30) valued the building materials at US\$360 per hectare and the fuelwood at US\$18 per hectare. Since we were unable to find any studies estimating sustainable harvesting levels of mangroves, the sustainable economic potential cannot be estimated.

Gums and Resins

Gums and resins are one of many non-timber forest products that could be sustainably harvested from forests, woodlands, and bushlands, and could thus provide economic incentives for conserving the habitats of the species that produce them. Gum Arabic, for example, is harvested from species of acacias, such as *Acacia senegal* and *A. seyal*, which are found in the northern ASALs of Kenya. The Assessment Team was unable to find reliable estimates of the potential value of these products.

Fisheries

Wild fisheries involve direct consumption of particular species harvested from marine and freshwater ecosystems. Total fish landings in 2010 were about 145 thousand tons, of which about 124 thousand were from freshwater ecosystems. Lake Victoria accounted for 113 thousand tons, dominating the national industry. The total value of output in 2010 was about 18 billion KES. (KNBS, 2011, p. 182, Table 9.3)

Other Ecosystem Products

Many other ecosystem-based products are also used in Kenya, including bushmeat, medicinal plants, handicraft materials, and building materials. Within the scope of this assessment, it was not possible to quantify the value of these products, although many of them are certain to be significant in the livelihoods and well-being of many Kenyans.

3.2 ECOSYSTEM SERVICES

Ecosystem services are best defined as the benefits to humans that result from ecosystem functions and processes, such as:

- Major biogeochemical and nutrient cycles (e.g., of water, carbon, nitrogen, phosphorus);
- Natural pest control by predators in food webs;
- Pollination by insects, bats, and birds;
- Decomposition of biomass, wastes, and pollution;
- Soil formation, retention, erosion prevention, and maintenance of soil fertility; and
- Climate regulation.

Watershed and Hydrological Services

The forests of Kenya's mountains and highlands protect the watersheds of the country and influence the quality, quantity, and seasonal flow regimes of water in the country's rivers. These effects depend on factors such as slope, amount of precipitation, fog or cloud moisture capture, evapotranspiration from forest vegetation, soil type, rain shadow effects, and other physical factors. Tropical forest hydrology is extremely complex and site dependent and is the subject of ongoing research worldwide (Bruijnzeel, 1990; Bruijnzeel, et al., 2010). Modeling of forest hydrology is further complicated by possible climate change effects on the seasonality, amount, and spatial distribution of precipitation and cloud cover (Famine Early Warning System Network, 2010).

Hydrological studies of some of the upper catchments of the Ewaso Ng'iro River on the northwest slopes of Mt. Kenya were first conducted in the early 1980s (Aeschbacher, 2003). Comparative analysis of these and more recent studies may allow long-term trends to be factored into current hydrological models, and to improve the understanding of the relationship between land use, water abstraction, and downstream hydrology.

A study by Mango, et al (2011) modeled the effects of several different land cover scenarios and the expected impacts of climate change on surface runoff, evapotranspiration, groundwater discharges, and total water yield in portions of the Mara River Basin. This modeling study predicted decreases in downstream water availability with conversion of forests to agriculture or grasslands, although the results are highly specific to location and assumptions.

A report by the Kenya Forest Service and Kenya National Bureau of Statistics, (2009, p. 41) states that a decrease in forest cover on the five main montane areas of Kenya will lead to a corresponding decrease in water yield: "The water provision:forest cover ratio is in all cases greater than 1, which can broadly be interpreted to mean that for every 1% loss in forest cover, the yield in the catchment system would reduce by more than 1%." (See Box 3.1 for information about Kenya's first Payment for Ecosystem Services Scheme, which seeks to enhance water quantity and water quality in Lake Naivasha.)

Given the scientific challenges of modeling forest hydrology, estimating the economic value of watershed and hydrological services adds an additional challenge. Water is an essential renewable natural resource, and one that has no substitute. It is, therefore, extremely difficult to value if only standard "market" economic methods of valuation are used. The value of water used for a given purpose will depend on the opportunity cost of not using it. In some cases, as with drinking water, this is essentially infinite, since life depends on water. In many other cases, however, we decide how much water to use based on its price and accessibility. The precise relationship between forest cover and rainfall, and between rainfall and downstream water

availability, is a subject for scientific study. The economic impact of these changes must then be estimated in the context of specific water uses, as discussed above.

Carbon Sequestration

Forests remove carbon from the atmosphere and store it in their biomass. This has obvious economic value if it mitigates costs predicted to result from CO²-induced global climate change. Global markets that value and trade this sequestered carbon are developing slowly. These markets currently are mainly voluntary, but more regulated markets under a post-Kyoto United Nations Framework Convention on Climate Change “architecture” are expected. A number of our key informants stated that Kenya should prepare to take advantage of these markets as they develop, in order to also take advantage of economic incentives to conserve and restore its forests through this type of global payment for ecosystem services mechanism.

Box 3.2 Lake Naivasha Payment for Ecosystem Services Scheme

The Lake Naivasha Payment for Ecosystem Services (PES) scheme is the first one to actually be operational in Kenya. Initiated by the World Wildlife Fund (WWF) and CARE under the WWF Integrated Water Resource Management project, it aims to address the decline in both water quantity and water quality in Lake Naivasha due to upstream agricultural practices.

The project's developers identified pilot sites in the Lake Naivasha catchment where they felt the approach might work. The sites were chosen based on hydrological assessments, land use and land cover dynamics, and the willingness of local communities to consider joining the scheme.

Payment amounts were the result of careful negotiation. The opportunity costs to upstream farmers of setting aside land for conservation and applying on-site land conservation measures was assessed; however, this proved to be more than downstream water users could pay. A series of negotiations ensued, with the final agreed-upon price being set at US\$17 per participant per year for the first three years. This money is provided in vouchers redeemable for agricultural inputs that increase yields on the land not set aside for conservation, partially compensating farmers for lost production on conservation land. Farmers who properly apply conservation practices also receive a variety of other supports to increase their yields, including technical assistance in introducing agroforestry, soil conservation, and high value crops. These services are provided by the WWF/CARE project, constituting in effect a subsidy to the start-up costs of introducing the PES scheme.

The first contracts were signed in 2009, and the first payments made in 2010. By early 2011, 565 farmers were enrolled in the scheme, and another 150 had begun applying the required conservation techniques and were expected to officially join over the year. Their average land holdings ranged from two to ten acres. Initially the project handled the payments process, but this responsibility was being transferred to local water resource users associations. The total number of participants was limited in part by the project resources available to cover their start-up costs. However, when the WWF/CARE project ends in late 2011, the system is expected to be self-sustaining, with payments continuing to flow to the farmers through the Water Resource Users Associations (WRUAs), and new agricultural practices to be routinely applied in return for those payments.

Source: Berttram, 2011.

Coastal Protection Services of Mangroves

A valuation study carried out by Earthwatch Institute and the Kenya Marine and Fisheries Research Institute (Kairo, no date) estimated a hectare of mangrove forest to be worth US\$1,587 for shoreline protection. Unfortunately, the available information about this study does not explain the derivation of this value. However, by using this value, we can estimate that the approximately 60 thousand hectares of mangroves along the Kenya coast would be worth

US\$95 million. This is an impressive figure, which –if convincingly supported– would certainly catch the attention of coastal policy makers, businesses, and communities. Its uncertainty only underscores the need for improved valuation studies for the various ecosystem services nature provides. The hundreds of kilometers of fringing reefs along the Kenya coast also contribute to coastal storm protection, of course.



Mangroves, Lamu District. Photo: B. Byers, August 2011

3.3 NON-MATERIAL BENEFITS

Besides providing direct material benefits to humans in the form of ecosystem products, and indirect material benefits in terms of ecosystem services, natural ecosystems and species also provide a range of non-material benefits that are important to human well-being and development. These include historical, cultural, spiritual, recreational, educational, and scientific benefits (Byers, 2008; USAID, 2005a).

Tourism

Tourism is a major contributor to Kenya's economy, and terrestrial and marine biodiversity are key inputs into Kenyan tourism. Total tourist expenditure in 2010 was about 75 billion KES according to the Kenya National Bureau of Statistics (2011, p. 226, Figure 13.1). Although no explanation is given as to what this figure includes, we can prorate it by location within the country based on the location of hotel bednights, as shown in Table 3.3.

TABLE 3.3 TOURIST BEDNIGHTS & EXPENDITURES BY LOCATION, 2010			
Location	Bednights, in thousands	Bednights, percent of total	Expenditures, KES millions
Coast - beach	3,243.0	48.7%	36,507.7
Coast - other	151.1	2.3%	1,701.0
Nairobi - high end	1,123.6	16.9%	12,648.8
Nairobi - other	410.7	6.2%	4,623.4
Other locations	1,733.9	26.0%	19,519.2
of which are wildlife reserves & parks:	485.5	7.3%	5,465.5
Total	6,662.3		75,000.0
Total available	17,161.8		
Occupancy rate	38.8%		

Source: KNBS 2011 (p. 232, Table 13.6; p. 235, Table 13.8; p. 226, Figure 13.1)
Tourism expenditure by location calculated based on data in tables

The expenditures of tourists staying in wildlife reserves and national parks, while only a small part of overall tourism expenditure, can safely be regarded as dependent on biodiversity. Some share of the rest of the "other locations" tourism also would be linked to biodiversity, since not all wildlife tourists stay within parks or reserves. And some portion of the beach tourism is related to biodiversity, particularly scuba diving, snorkeling, and recreational fishing.

For the tourists who are seeking biodiversity, it could be possible to estimate the role of biodiversity itself (as opposed to the quality of the hotel, the comfort of transport, or dining preferences) in their willingness to pay for the experience. This could be done by evaluating the impact of larger numbers of animals or an increased diversity of species on the amount they are willing to pay for a safari, or the impact of more pristine coral reefs on willingness to pay for dive vacations. In the absence of such information, we cannot actually estimate the value of biodiversity in the tourism experience; we can only assume it to be important.

Another tourism issue is also important. Many of the strategies for encouraging conservation of terrestrial wildlife depend on local communities earning revenues from tourism, so they will have a financial incentive to protect wildlife and natural habitats. This strategy depends in part on the extent to which the presence of more wildlife affects the willingness of tourists to spend money

on safaris. It also depends, however, on the opportunity costs of conservation to pastoral or agricultural communities. Allowing wildlife to share scarce grasslands and water, or leaving some land open to wildlife instead of grazing or farming it, reduces agricultural incomes. If these are not adequately compensated by the tourism revenues, community groups will be less or unwilling to implement them.

Spiritual and Historical Values

Kenya's "kaya" forests provide an excellent example of spiritual and historical values that can underpin the conservation of biodiversity. Kaya forests are remnant patches of dry coastal forest spread out along about 200 kilometers of the southern Kenya coast, mostly found on low hills that were former sites of fortified Mijikenda villages called "kayas." The kaya villages began to be abandoned in the early 20th Century, but the forests around the villages were protected as sacred groves and sites because they sheltered graves of ancestors, and native coastal forest was gradually restored on the former village sites. Some estimates place the total number of kaya forests as high as fifty, and most are now protected under the Antiquities and Monuments Act (Matiku, no date). Their total area is estimated to be around 28.4 sq. km, or around 4% of all coastal forests in Kenya. Eleven kaya forests have been recognized by UNESCO (United Nations Economic, Social and Cultural Organization) as a World Heritage Site – the Sacred Mijikenda Kaya Forests (<http://whc.unesco.org/en/list/1231>). The protection of kaya forests by local people is a clear demonstration that spiritual and historical values –and not only direct or indirect material values or benefits– are important, and can motivate conservation.



African Blood Lily (*Scadoxus multiflora*), Lewa Wildlife Conservancy.
Photo: B. Byers, August 2011

4.0 THREATS AND CAUSES

In this Tropical Forest and Biodiversity Assessment, we have used the “threats-based approach” to biodiversity conservation that guides USAID’s biodiversity programming as the conceptual framework for our analysis (USAID, 2005a). Using this logical framework, we identify the direct, biophysical threats to biodiversity in each of the major ecosystems of Kenya, including the five main types of direct threats to biodiversity recognized by conservation biologists:

- Conversion, loss, degradation, and fragmentation of natural habitats;
- Overharvesting or overexploitation of particular species;
- Introduced non-native species that harm native habitats or species;
- Pollution or contamination that harms natural habitats or species; and
- Macro-environmental change, such as climate change, desertification, or disruption of natural disturbance regimes (such as floods or fires).

We then describe the main causes of those direct threats. Causes can generally be described as one of three types:

- Social causes (related to, for example, cultural beliefs, lack of awareness, information, science, or technology);
- Political, institutional or governance causes; and
- Economic causes.

Once these causes have been identified, the actions needed to address, reduce, and/or remove them can be determined (USAID, 2005b).

Table 4.0 summarizes our assessment of the main direct biophysical threats and their main causes, on an ecosystem-by -basis:

TABLE 4.0 THREATS TO BIODIVERSITY AND TROPICAL FORESTS IN KENYA		
ECOSYSTEM	THREATS	CAUSES
TERRESTRIAL		
Montane Forests	<p>Loss, fragmentation, & degradation from:</p> <ul style="list-style-type: none"> • Agricultural expansion (smallholders, large commercial enterprises) • Plantations of exotic timber species • Illegal logging, charcoaling, firewood collection 	<ul style="list-style-type: none"> • Unclear land tenure and conflict over land, including ethno-political conflict • Illegal land use changes • Lack of comprehensive land use planning for montane forest “water towers” • Inadequate public understanding of the value of montane biodiversity/ ecosystems to provide ecosystem services (e.g., hydrological services) • Lack of equitable access to economic opportunities for sustainable livelihoods in forest areas
Coastal Forests	<p>Loss, fragmentation, & degradation from:</p> <ul style="list-style-type: none"> • Agricultural expansion (small and large scale) • Illegal logging, charcoaling, firewood collection • Snares for bushmeat actually harvest a range of forest species • Vegetation damage from elephants (for example, fenced-in elephants at Arabuko-Sokoke) 	<ul style="list-style-type: none"> • Insecure land tenure for traditional coastal communities and irregular/ extra-legal land allocation • Lack of on-farm trees for construction materials • Lack of sustainable charcoal/cooking fuels • Wildlife policy prioritizes elephant conservation over forests
Grassland Savanna	<ul style="list-style-type: none"> • Fragmentation of landscape through fencing and subdivision (including peri-urban expansion; e.g., Kitengela corridor) • Unsustainable grazing practices • Grazing conflicts • Poaching of elephants (a keystone/ umbrella/landscape species) • Blockage or degradation of movement corridors and wet/dry season migration routes by roads, fencing, agricultural development • Restriction of water points for wildlife and livestock, as well as poorly planned additions of these water points • Loss of river flows (e.g. Mara, Ewaso Ng’iro) from reduction & poor management of mountain forests, and upstream water abstraction & waste • Conversion to agriculture (rainfed & irrigated) • Climate change 	<ul style="list-style-type: none"> • Unclear land tenure/boundaries and traditional conflict over grazing resources and water points • Inadequate inter-ethnic and inter-stakeholder communication and inter-ethnic dispute resolution mechanisms • Inadequate resources for anti-poaching control • Deforestation & poor water management in montane “water tower” forests • Lack of alternative, higher-value diversified livelihood & economic opportunities • Global economy based on unsustainable fossil fuel energy • Lamu Port/Lamu Port-Southern Sudan-Ethiopia Transport Corridor (LAPSSET) Corridor • Nairobi Southern Bypass Road

Bushland & Woodland Savanna	<ul style="list-style-type: none"> • Same as for grassland savanna 	<ul style="list-style-type: none"> • Same as for grassland savanna
Other (alpine, etc.)	<ul style="list-style-type: none"> • Global climate change (alpine warming & vegetation zonation shifts) 	<ul style="list-style-type: none"> • Global economy based on unsustainable fossil fuel energy
MARINE		
Coral Reefs	<ul style="list-style-type: none"> • Overfishing of keystone reef species • Destructive fishing practices (e.g., dynamite, poison, small-mesh nets, beach seining) • Sedimentation from onshore activities • Destruction and degradation from development of port infrastructure (e.g., Lamu Port) • Coral bleaching & damage from global climate change (warming and ocean acidification) 	<ul style="list-style-type: none"> • Undefined/poorly defined marine resource tenure • Marine resource management agencies lack enforcement systems & capacity (boats, fuel, patrol staff) • Upstream agricultural practices cause soil erosion to rivers • Climate change from unsustainable global fossil fuel economy
Mangroves	<ul style="list-style-type: none"> • Cutting – legal but unmanaged, and illegal • Destruction and degradation from development of port infrastructure (e.g., Lamu Port) 	<ul style="list-style-type: none"> • Lack of ecological information for sustainable management • Lack of comprehensive mangrove strategy for Kenya or the region • Lack of systems and capacity for management and enforcement (Kenya Forest Service)
Seagrass Beds	<ul style="list-style-type: none"> • Physical degradation from bottom trawling for shrimp/prawns • Destruction and degradation from development of port infrastructure (Lamu Port) 	<ul style="list-style-type: none"> • Lack of ecological information underlying policy that allows bottom trawling
Beaches and Dunes	<ul style="list-style-type: none"> • Habitat degradation from tourism infrastructure and other development 	<ul style="list-style-type: none"> • Insecure land tenure for traditional coastal communities and irregular/extra-legal land allocation
Near-shore Marine	<ul style="list-style-type: none"> • Overharvesting of valuable species and by-catch 	<ul style="list-style-type: none"> • Use of illegal fishing gear (e.g., beach seines, small-mesh nets) • Use of legal fishing gear (ring nets) with high by-catch ratios
Pelagic/ Offshore Marine	<ul style="list-style-type: none"> • Overharvesting of tunas & other commercially valuable species 	<ul style="list-style-type: none"> • Unmanaged/unregulated commercial fishing by foreign fleets
Freshwater Aquatic	<p>Lakes</p> <ul style="list-style-type: none"> • Loss of inflow (e.g., Rift Valley lakes) • Invasive species (e.g., water hyacinth) <p>Rivers</p> <ul style="list-style-type: none"> • Reduced flow & changes in seasonal flow regimes • Loss of riparian vegetation <p>Wetlands</p> <ul style="list-style-type: none"> • Reduced inflows • Conversion to agricultural uses (farms, pastures) 	<ul style="list-style-type: none"> • Upstream water abstraction and forest degradation in upstream watersheds (e.g., Gibe III dam in Ethiopia)

The pending Wildlife Bill of 2011 lists the following invasive species as being of national concern:

Box 4.1 National List of Invasive Species, by Species name and Common name

Mammals

Myocastor coypus Coypu rat

Birds

Colius striatus - Speckled Mousebird

Phasianus colchicus - Ring-necked pheasant

Cygnus olor - Mute Swan

Fringilla coelebs - Chaffinch

Carpodacus mexicanus - House Finch

Acridotheres tristis - Common Indian Myna

Psittacula krameri - Rose-ringed (Ring-necked) Parakeet

Sturnus vulgaris - Common (European) Starling

Columba livia - Rock Dove (Feral pigeon)

Ptilinopus pulchellus - Beautiful fruit dove

Ptilinopus leclancheri - Black-chinned fruit dove

Ptilinopus coronulatus - Coronated fruit dove

Ptilinopus roseicapilla - Mariana fruit dove

Ptilinopus perlatus - Pink-spotted fruit dove

Ptilinopus magnificus - Wompoo fruit dove

Colius striatus - Speckled Mousebird

Corvus splendens - House Crow

Quelea quelea - Red-billed Quelea

Reptiles and Amphibians

Agama agama - Red-headed agama lizard

Sphenodon guntheri - Brother's Island tuatara lizard

Aspidoscelis hyperythra beldingi - Orange-throated whiptail lizard

Lampropholis delicata - Rainbow kopje skink

Boiga irregularis - Brown tree snake

Crotalus exsul - Red diamond rattlesnake

Geochelone platynota - Burmese star tortoise

Plants

Prosopis juliflora - Mathenge (Velvet mesquite)

Lantana camara - Tickberry

Pistia stratiotes - Nile Cabbage

Thevetia peruviana - Yellow oleander

Caesalpinia decapeltata - Mauritius thorn

Datura stramonium - Jimsonweed

Tecoma stans - Yellow bells

Argemone mexicana - Mexican poppy

Opuntia exaltata - Long spine cactus

Opuntia ficus-indica - Sweet prickly pear

Opuntia vulgaris - Drooping prickly pear

Eichhornia crassipes - Water hyacinth

Invertebrates

Acanthaster planci - Crown of thorns starfish

Source: Draft Wildlife Bill, 2011

5.0 GOVERNMENT OF KENYA POLICIES, LAWS, AND INSTITUTIONS

Legislation relating to forest and wildlife conservation in Kenya can be traced back to the broad proclamations of the British colonial government at the turn of the last century. Various ordinances relating to natural resources were issued and strictly enforced. These guided conservation practice until Kenyan independence. Acts of Parliament and accompanying regulations thereafter governed forestry and wildlife conservation and management, and created national parks, national reserves, and forest reserves. In general, a policy statement of the government's guiding principles and goals in addressing issues regarding a particular sector was the first step. Then the policy would be discussed in Parliament and, if approved, published as a Sessional Paper. A corresponding law would then be developed to give full effect to the policy. Although events have not always followed this sequence, the policy only becomes legally enforceable when the requisite law is passed by Parliament.

This is the background against which Kenya's policies, laws and institutions that deal with forests and biodiversity have evolved. A common feature of the many laws and institutions related to natural resource management (notably wildlife, forests, fisheries, and the environment in general) has traditionally been their state-centeredness and preoccupation with the utilization of resources.

The Constitution

The Kenyan Constitution has an overarching role in determining the access, use and sustainability of natural resources. This Tropical Forests and Biodiversity Assessment is being completed at a critical time when Kenya is just beginning to consolidate into a new order after the new Constitution was adopted in August, 2010. The Constitution provides for devolution as a fundamental principle of governance, with the counties as key operational units. This has significant implications for the legal and institutional context for forest and biodiversity conservation. There is now a "once in a lifetime" opportunity for strategic interventions to shape the evolution of land and Natural Resources Management (NRM) policy and legislation and their implementation.

Over the coming years, the most important shift in the context of conservation will be with respect to security of land rights. The Constitution places a heavy premium on sustainable and productive management of land resources. These principles will be implemented through the National Land Policy (Sessional Paper no. 3 of 2009), and they will be developed and reviewed regularly by the national government through legislation.

Legislation dealing with land is expected to involve the revision, consolidation, and rationalization of existing land laws to bring them in line with the new Constitution. Sectoral land use laws will also be revised in accordance with the principles set out in Article 60 (1) of the Constitution. New legislation will be enacted to regulate how land may be converted from one category to another and to protect and provide access to all public land.

The new Constitution commits the GOK to ensure sustainable exploitation, utilization, management, and conservation of the environment and natural resources, and the equitable sharing of benefits. There is also a commitment to achieve and maintain a tree cover of at least 10% of the land area. In turn, Parliament is supposed to enact legislation to implement these provisions.

5.1 POLICIES AND LAWS

The following are the policies and laws most relevant to forest and biodiversity conservation and management in Kenya:

Forest Legislation

The earliest legal provisions on forestry in Kenya are found in the Ukamba Woods and Forest Regulation of 1897, which aimed to ensure fuel supplies for railway locomotives after the construction of the Kenya-Uganda railway. This regulation placed forests within one mile of the railway line under the control of the railway administration, and other forests were placed under the local government administration (Ofcansky, 2004).

The East African Forestry Regulations published in 1902 were designed to curtail forest destruction caused by shifting cultivation and livestock grazing. These set the foundation for the establishment of forest reserves, which initially targeted the potentially productive forest areas, before emphasis shifted to watershed catchment protection. The Forest Ordinances of 1911-1916 made provisions for the recruitment of forest guards and honorary forest officers from among farmers interested in forestry. Another ordinance (in 1941) provided for the creation of nature reserves within the forest reserves, areas where no consumptive use of forest resources was permitted.

Kenya's first forest policy was formulated in 1957 and, with few revisions, was published as Sessional Paper No.1 of 1968. It gave significant powers relating to ownership of, and access to, forest resources to the minister responsible for natural resources. The Forests Act (Cap 385, revised 1962, 1982) lacked mechanisms for public approval and redress in its judicial and administrative procedures. It gave no room for collaborative forest management, and did not take the lifestyles of forest-dwelling communities into consideration. It continued many provisions of the 1957 policy that concentrated on the watershed and timber production functions of forests.

Until the enactment of a new Forest Law in 2005, Kenya's forestry was guided by the 1968 policy and the Forests Act (CAP 385, 1962 and its 1982 and 1992 revisions), which were weak in their ability to protect land designated as forest reserves. CAP 385 empowered the Minister to alter forest boundaries and even to degazette forest reserves. Since all forest reserves were classified as government lands, the combined impact of the Forests Act (CAP 385) and land laws was rapid forest loss. Weaknesses in the law created room for politically motivated excisions, causing further deforestation.

The 1994 Kenya Forest Master Plan recommended a shift from an exclusionist to a more participatory approach to forest management. The Plan sought to address the problems of poor governance, policy failure, low institutional capacity, inadequate community participation, and corruption in the forest sector.

The Forest Policy of 2005 (Sessional Paper No.9) sought to address the threats to Kenya's forests by promoting participatory approaches to forest management. It facilitated the formation of Community Forest Associations (CFAs), giving local people user rights and security of tenure in order to encourage investment in better farming practices. The policy also emphasized the aspiration to increase the area of Kenya under forest cover to an internationally acceptable level of 10%.



Assessment Team meeting with members of the Kiptunga Community Forest Association, Mau Forest.
Photo: B. Byers, August 2011

The 2005 Forests Act established the Kenya Forest Service (KFS) as a successor to the Forest Department. KFS formally came into existence in 2007, after the 2005 Forests Act entered into force. The Act embraced the concept of participatory forest management and gave particular consideration to the formation of CFAs. Another provision was for the formation of Forest Conservation Committees (FCC) to advise the KFS Board on all matters relating to management and conservation of forests and each forest conservancy area (see Box 5.1 for more information about FCCs and CFAs). The Forests Act opened up commercial plantations to lease arrangements when the KFS Board 'is satisfied that all or part of a state forest which is a plantation forest may be efficiently managed through a license, concession, contract or, joint agreement.' The 2005 Forests Act is currently under review in order to bring it into line with the new Constitution, and to streamline other areas, including the operations of CFAs and FCCs.

Wildlife Legislation

Early wildlife regulations aimed at controlling hunting were enacted between 1898 and 1906 and largely targeted traditional hunting methods, creating resentment among local communities. The Game Ordinance proclaimed by the colonial government in 1909 established a Game Department and formed the Southern and Northern Game Reserves, which basically covered the sprawling, wildlife-rich landscapes outside the high potential agricultural central highlands and Lake Victoria basin. The establishment of a Game Policy Committee in 1938 led to

recommendations as to where and how to establish a system of national parks. This was followed by Ordinance 9 of 1945 (later changed to the Royal National Parks Ordinance) that established a Board of Trustees to administer land set aside as parks. Nairobi National Park was created in 1946, followed by Tsavo in 1948, Mt. Kenya in 1949, and the Aberdares in 1950.

Since the establishment of the first parks, Kenya's wildlife policy relied on top-down tactics and an array of economic incentives. This was embodied in the Sessional Paper No. 3 of 1975 entitled "A Statement on Future Wildlife Management Policy in Kenya," which identified the primary goal of conservation as the optimization of returns. Traditional hunters were relentlessly pursued by

government. The government controlled access to parks and the nature and pace of development within them. The Wildlife (Conservation and Management) Act (CAP 376 of 1976) set out the legal provisions for the implementation of the Wildlife Management Policy. It amalgamated the Game Department and the Kenya National Parks to form the Wildlife Conservation and Management Department.

The rapid growth of tourism supported a vast secondary industry of arts and crafts, tanning, and trophy preparation. An elaborate compensation scheme existed for wildlife-related damage to life and property, but this was abandoned when it became too costly, ineffective, and overrun by high-level corruption. Meanwhile, heavy poaching of high value species such as elephant and rhinoceros led to a presidential ban on all forms of hunting in 1977. The ban, which remains in effect, prohibits all consumptive uses of wildlife and the associated trade in products.

A 1989 amendment to CAP 376 created the Kenya Wildlife Service (KWS), replacing the Wildlife Conservation and Management Department with a new institutional and administrative structure. Since the 1989 amendment, several attempts have been made to revise both the wildlife policy and law. These have been controversial due to differences in stakeholder views, and strong lobbies, especially revolving around the large, wildlife-rich tracts of land outside of protected areas. Pressure remains to complete the revision process, and provisions for community and private conservancies and sanctuaries still need to be developed. Stakeholder consultations are currently taking place on a draft policy and draft bill that attempt to address outstanding issues and make them compatible with the new Constitution.

Box 5.1a Community Forest Associations and Forest Conservation Committee

Community Forest Associations (CFAs) may be registered under the Societies Act (CAP 108), after which they may apply to the Director of the Kenya Forest Service (KFS) for permission to participate in the conservation and management of a particular state forest or local authority forest. This was a radical departure from previous practice, in which the government assumed full management responsibilities of gazetted forest reserves. CFA members are predominantly local resource users seeking to diversify their income-generating activities through forest-based enterprises.

Forest Conservation Committees (FCCs) report and provide strategic direction to the KFS Board. FCC members are drawn from relevant organizations and groups, and approved by the Board to advise it on the ideas, desires, and opinions of the people within their respective forest conservancy areas. They assist the Board to monitor the implementation of Forests Act and other forest regulations; review and recommend license applications and renewals; assist local communities to benefit from royalties and other rights derived from flora or fauna traditionally used or newly discovered by such communities; and identify areas of un-alienated land to be set aside for the creation of forests.

Source: Kenya Forest Service, 2009a

Legislation Related to the Role of Local Authorities

The Local Government Act (Cap 265, originally enacted in 1963, and revised in 1998 and again in 2010) provided for the establishment of authorities for local government and broadly defined their functions. In its various revisions, it conferred responsibility for administering many national reserves, forest reserves, and leisure parks to county councils. Local authorities were empowered to “take such measures as may be necessary or desirable for the preservation or protection of wildlife, and provide amenities for the observation of wildlife, within...its area.” County councils can establish and maintain wildlife and forest reserves, including accommodation for visitors in them. A new law is being developed to reflect the devolved government structure introduced by the new Constitution.

Land-Related Laws

Laws relating to land are tightly linked to the conservation and management of biodiversity and forests. The most relevant legislation includes the Government Lands Act (Cap 280), Land (Group Representatives) Act (Cap 287), Trust Lands Act (Cap 288) and the Registered Lands Act (Cap 300). Under the old constitutional order, the most controversial of these with regard to forest and biodiversity conservation was the Government Lands Act (Cap 280). In vesting near-absolute power in the President to allocate rights to forests and wildlife lands, the law severely undermined the notion of secure public land tenure. This led to widespread allocations of public land to private individuals with no consideration of the public interest. Legal scholars argue that the description of “government land” under the Government Lands Act had grave implications in practice, as it gave the erroneous impression that the government owned the land and could do with it as it wished, like any other private entity or owner.

The Land (Group Representatives) Act (Cap 287 of 1968) introduced a system of group ownership as a compromise between individual tenure and the need for wider access to resources in arid and semi-arid lands. Under this law, communal lands that were previously recognized as trust lands were registered in the names of group ranches belonging to members with proven communal customary rights over the land in question. Group representatives are elected, and members of the group have voting and decision-making rights. These group ranches have encountered serious challenges over resource governance, and various options have been explored to address such problems, including having them register as trusts, community-based organizations, or self-help groups. Over the past two decades, many group ranches, especially in southern Kenya, have subdivided their land and leased or sold it to individuals who are free to use it in any way permitted by law. This has greatly altered the dynamics of conservation in parts of the formerly expansive group ranches.

The Trust Lands Act (Cap 288) gave to county councils the authority to hold land in trust and for the benefit of people residing in their jurisdictions. Constitutionally, trust lands referred to those that were occupied by native communities during the colonial period and that had not been taken over by government, consolidated, adjudicated, and registered in the names of either individuals or groups. Trust lands could be alienated by the Commissioner of Lands under powers delegated by the President. In most cases, these were also rich with wildlife and some contained substantial forest cover.

Another important statute relating to land is the Registered Land Act (Cap 300), which offered broad protection to the rights of individual owners. By making a first registration non-challengeable, this statute has been the source of conflict, pitting communities against government, individuals, or groups. Used alongside either the Government Lands Act or Trust Lands Act, a new registered owner could legally evict anybody who may have occupied a given piece of land previously, even over long periods of time. It also had significant implications for

conservation, since it allowed the transfer of government or trust lands with significant forests and biodiversity to individuals.

Under the Registered Land Act, land is held privately by individuals or legal entities such as corporations in the form of freehold or leasehold interests. Such interests are established through a process of adjudication, consolidation, and titling. Freehold proprietorship is absolute and can be transferred over generations, whereas leasehold tenure is limited in time but renewable. Previously, some leases extended to 999 years, but these have now been constitutionally limited to a maximum of 99 years.

None of Kenya's land tenure precludes the government from limiting property rights to any land. The Constitution provides for compulsory acquisition or imposition of land use regulations. Compulsory acquisition may be for purposes of public interest such as defense, public safety, or land use planning. The acquisition of land for purposes of wildlife conservation outside protected areas was provided for in the Wildlife (Conservation and Management) Act, which empowers the government, through the minister responsible for wildlife, to declare an area a national park. In the case of private land, the process requires parliamentary approval before the requirements of the Land Acquisition Act (1968) can apply. In the case of compulsory acquisition, the owner is entitled to compensation at what the government determines is market value. Any attempts at compulsory acquisition for these purposes would likely be resisted strongly, and a great deal of resentment persists about the way Kenya's protected areas were established through compulsory land acquisition.

The laws discussed above are all poised for review to align them with Kenya's Constitution or to repeal them altogether, and new ones are in drafting stages.

National Land Policy

Until 2009, land ownership and management in Kenya has faced serious challenges, including inequitable ownership, unplanned fragmentation, and poor administration. Through Sessional Paper No. 3 on National Land Policy, the country marked a turning point in the efficient, sustainable, and equitable use of land. The National Land Policy heavily influenced the new Constitution, and together they are expected to herald a new resource management and legal structure.

Agricultural Laws

Most of the land classified as "agricultural" outside of protected areas is prime forest and wildlife land. Ownership of, and transactions involving, agricultural land are controlled by the Land Control Act (1967). The Agriculture Act (Cap 318, 1963) aimed to promote and maintain agricultural productivity, conserve soil and soil fertility, and prevent soil erosion. A 1986 revision made significant provisions for the management of watershed catchments. It vested in the Minister for Agriculture the authority to prohibit land use systems that contribute to soil erosion and deforestation, and to protect sloping zones and catchment areas. Specific rules seek to prevent the destruction of vegetation on lands with slopes exceeding 35%, and prohibit cultivation in slopes between 12% and 35% unless the soil is protected from erosion. Policy analysts concede that the Agriculture Act has been unsuccessful in curtailing land degradation, partly because of failure to involve communities in enforcement.

Agricultural land also includes arid land primarily used by pastoralists, as well as game ranching within the provisions of the Wildlife (Conservation and Management) Act. The livestock sub-sector, which contributes at least 10% of the Gross Domestic Product (GDP) and supports about 30% of Kenya's population, is a particular concern. Soon after independence, Kenya

pursued an industrialization-first development policy that was more beneficial to crop production than to livestock. Range conditions have been declining over decades due to increasing human and livestock populations.

Environmental Law

The Environmental Management and Coordination Act of 1999 (EMCA) provides for the legal and administrative coordination of diverse sectoral initiatives involved in the conservation and management of the environment in general, including biodiversity. It provides the legal framework for management of the environment, which is broadly defined to include plants, animals, land, water, atmosphere, and other physical and biological factors. Before this Act, different aspects of the environment were governed by laws specific to each sector. EMCA provided a new approach to environmental management and recognized modern environmental principles and concepts such as public participation, international cooperation, environmental conflict resolution, and the precautionary principle.

EMCA contains several provisions that could be used to promote the conservation of forests and biodiversity, including conservation easements, restoration orders, and environmental impact assessment. Easements under the Act can require landowners to forego certain land use options, including prohibiting the erection of fences or barriers that would otherwise impede wildlife movement, conversion to housing development or cultivation, and keeping of livestock at densities above a level compatible with conservation goals. The process operates through the courts and is not necessarily voluntary. If a court imposes an easement, the landowner is entitled to compensation commensurate with the lost value, payable by the person to whom the easement was awarded, or by the government. To encourage the use of voluntary easements, the EMCA should be amended or some other legislation developed to allow for these easements.

Strategic Environmental Assessment (SEA) is covered under regulation 34 in the subsidiary legislation and the guidelines prepared in 2011. SEA aims to address the broader, cumulative, synergistic, secondary and long term impacts of policies, programs and plans that would not be captured by Environmental Impact Assessments on specific projects.

Kenya embarked on a far-reaching initiative towards a comprehensive national environmental policy as elaborated in the Sessional Paper No. 6 of 1999, which advocated for the integration of environmental concerns into national planning and management processes and provided related guidelines. The process has faced serious challenges, especially regarding how to critically link the implementation framework with other statutory bodies, and it has yet to be completed.

Box 5.1b Policies and Laws Most Relevant to Forest and Biodiversity Conservation

1915	Government Lands Act. CAP 280 (revised, 1984)
1939	Trust Land Act. CAP 288, Laws of Kenya (revised 1970)
1957	Forest Policy (White Paper No.1 of 1957, revised as Sessional Paper No.1 of 1968)
1962	Forests Act. CAP 385, Laws of Kenya (revised 1982, 1992)
1963	Registered Land Act. CAP 300, Laws of Kenya
1963	Agriculture Act. CAP 318, Laws of Kenya
1963	Local Government Act. CAP 265, Laws of Kenya (revised 1998)
1967	Land Control Act. CAP 302, Laws of Kenya
1968	Land Adjudication Act. CAP 284, Laws of Kenya
1968	Land (Group Representatives) Act. CAP 287, Laws of Kenya
1968	Land Acquisition Act. CAP 295, Laws of Kenya
1975	Statement on the Future of Wildlife Management Policy in Kenya (Sessional Paper No. 3 of 1975)
1976	Wildlife (Conservation and Management) Act. CAP 376, Laws of Kenya (amended 1989)
1989	Fisheries Act. CAP 378, Laws of Kenya (revised 1991)
1999	Environmental Management and Co-ordination Act No. 8, Laws of Kenya
2002	Water Act. CAP 372, Laws of Kenya
2005	Forests Act. Number 7, Laws of Kenya
2005	Forest Policy (Sessional Paper No. 9 of 2005)
2005	Draft National Policy on Water Resources Management and Development (Sessional Paper No. 1 of 1999) Fisheries Policy
2009	National Land Policy (Sessional Paper No. 3 of 2009)
2009	Trustees (Perpetual Succession) Act. CAP 164, Laws of Kenya
2011	Draft Wildlife Policy
2011	Draft Wildlife Bill (Sessional paper No. 6 of 1999 on Environment and Development)

For additional information regarding forestry policy and law, please refer to Ludeki et al, 2006.

The Water Act

The Water Act (CAP 372, 2002) provided for the protection of water bodies and catchments, prohibiting various harmful activities and requiring permits for certain others. For example, it criminalized obstruction or diversion of water without authority under the Act and imposed stiff penalties for violations. It defined the “reserve,” in relation to a water source, as that quantity and quality of water required to “protect aquatic ecosystems in order to secure ecologically sustainable development and use.”

The Act introduced comprehensive and radical changes in the sector with provisions for the separation of administration, management, and regulation from the provision of water resources; decentralization of functions to lower level state organs; and participation of non-governmental entities. The Act created decentralized water service boards and recognized the role of local water users’ associations. These act as fora for conflict resolution and cooperative management of water resources.

The Act also established the Water Resources Management Authority, whose mandate is to:

- develop guidelines and procedures for water allocation;
- monitor and reassess the national water management strategy;
- receive and determine application for permits for water use;
- regulate and protect water resources from adverse impacts; and
- manage and protect catchments.

Laws Related to Fisheries and Marine Resources

The principal legislation related to fisheries is set out in the Fisheries Act (CAP 378, 1989; revised 1991). The stated objective of the fisheries policy recognizes the need for sustainable resource exploitation and for providing optimal and sustainable benefits. The law applies to both marine and inland fisheries. The Fisheries Act broadly empowers the Director of Fisheries to regulate the sustainable development and management of fisheries and aquaculture. Actions to ensure sustainability may include declaring closed seasons or no-fishing areas, access limitations, and restrictions on fishing methods and gear. The type and characteristics of fish that may or may not be caught can be specified under the law, which also provides for penalties that may be levied for violating rules. The law contains provisions against the capture of marine mammals.

The Maritime Zones Act (1989) consolidated the laws relating to the territorial waters, and the Coast Development Authority Act (1990) set up the legal framework for oversight and planning in the implementation of coastal and Exclusive Economic Zone (EEZ) development projects. EMCA (1999) acknowledges the central role of Integrated Coastal Zone Management.

The coastline is characterized by mangroves, fringing coral reefs, and sea grass beds, some of which are protected in various Marine Protected Areas. These areas were established under the Wildlife (Conservation and Management) Act. Two categories of Marine Protected Areas are recognized: Marine National Parks, in which there is total protection from any type of consumptive utilization, and Marine National Reserves, in which traditional harvesting of resources is allowed alongside research and tourism.

Laws Regarding Cultural and Natural Heritage

The Museums and Heritage Act (2006) empowers the National Museums of Kenya to collect, preserve, study, document and present Kenya's cultural and natural heritage. This enables the National Museums of Kenya to undertake research and act as a repository for biodiversity information. Furthermore, the Antiquities and Monuments Act (CAP 215) defines "antiquity" to include "any human, faunal or floral remains which may exist in Kenya that was in existence before 1895". Since the act places restrictions on how land can be used, it has led to incidental conservation of biodiversity in relatively small sites such as Gede and Olorgesailie. This Act has important implications for conservation of the coastal "kaya" forests discussed in Section 2.2.1.

The Societies Act (CAP 108)

CFAs and Conservancy Management Committees are registered under this Act. Under the Act, a "society" includes any club, company, partnership or other association of ten or more persons established in Kenya, organized and having its headquarters or chief place of business in Kenya. Foreign companies, trade unions, co-operative societies, and organizations or corporations registered under other written laws do not qualify as societies.

5.2 INSTITUTIONS

The following are the key institutions engaged in forest and biodiversity conservation and management in Kenya:

5.2.1 NATURAL RESOURCE MANAGEMENT AGENCIES

National Land Commission

The Land Policy proposed the establishment of the Commission, which was subsequently embedded in the Constitution (Article 67). The National Land Commission is yet to be formed by Parliament, but when that occurs, it will be charged with managing public land on behalf of the national and county governments and with oversight of land use planning throughout the country. The Commission will have a strong role in natural resources conservation and management through its role as the trustee for all public lands in Kenya.

Kenya Forest Service

The Kenya Forest Service (KFS) was established in 2007 (under the Forest Act of 2005) with the mandate to conserve, develop, and sustainably manage forest resources for Kenya's social and economic development. KFS's management structure is organized into 10 conservancies and 76 zonal forest offices, 150 forest stations, and 250 divisional forest extension offices. In a significant departure from the previous arrangement, forest-adjacent communities have registered groups to facilitate their participation in forest management, and currently more than 300 such groups exist.

KFS is responsible for the approximately 1.7 million hectares that are gazetted as forests, including montane forests (e.g., Mt. Kenya and the Aberdares), tropical rainforest (Kakamega), dryland forests (e.g., Matthews Range), and coastal forests (e.g., Arabuko-Sokoke). The Forests Act provided for the development of tourism as a way of adding value to the forests and supporting forest conservation. Many plans are currently being made for the development of tourist infrastructure in forest reserves, including lodges, campsites, nature trails, and canopy walkways.

Kenya Wildlife Service

KWS was created in 1989 by an amendment to the Wildlife (Conservation and Management) Act of 1976 as a State Corporation replacing the Wildlife Conservation and Management Department. KWS has an overall mandate to conserve and manage wildlife, with sole jurisdiction over national parks and a few national reserves, and supervisory responsibility over most of the other national reserves, community and private conservancies, and sanctuaries. KWS is responsible for providing security for visitors and wildlife within protected areas and wildlife outside of protected areas, a role that it performs either exclusively or in partnership with other national security agents such as the Kenya Police.

KWS is the designated national authority for a number of environmental conventions and protocols to which Kenya is a signatory. It is also empowered to license, control, and regulate all wildlife conservation and management outside of protected areas. In this regard, KWS is responsible for the management and protection of critical water catchments areas (e.g., Mt. Kenya, the Aberdares, Mt. Elgon, Chyulu, and Marsabit), and it shares responsibility with other stakeholders in the restoration of the Mau Forest Complex. Outside gazetted forest reserves, KWS has the responsibility for conserving biodiversity.

Because of limited capacity, KWS is required to collaborate with other stakeholders in biodiversity conservation. It has a strong community wildlife program that encourages

communities living on wildlife-rich lands, wildlife corridors, and dispersal areas to avoid land use practices that would harm wildlife.

Wildlife Training Institutions

KWS also provides conservation education and training through the Kenya Wildlife Service Training Institute, one of its two training facilities. The Naivasha training facility offers diploma and certificate courses in various fields. It was established in 1985 with World Bank support and was originally intended to provide training in both wildlife and fisheries, operating under the then-Ministry of Tourism and Wildlife. Its establishment was one of the policy recommendations of Sessional Paper No. 3 of 1975. The institute has broadened the scope of its courses through linkages with other local and international tertiary institutions.

The Manyani Field Training School provides specialized training to security personnel, including for community conservancies and other institutions. Located within Tsavo West National Park, it was previously an anti-poaching camp but was turned into a paramilitary training facility upon the establishment of KWS. It was established to standardize the quality of preparation offered by different police and military training institutions and to also teach wildlife conservation concepts.

Wildlife Research

Research is undertaken by a small team within KWS, in collaboration with a number of local and foreign academic institutions. KWS is also the scientific and management authority for some biodiversity-related conventions to which Kenya is a party, such as the Convention on International Trade in Endangered Species (CITES).

Conservancy Management Committees

The management of the community conservancies in Kenya has been entrusted to elected committees of up to 12 members. These committees are registered under the Societies Act (CAP 108). Each Conservancy Management Committee has an Executive Committee with a chairperson, vice-chair, and other executive officers. Each conservancy also has a Grazing Committee, responsible for grazing management. This assessment found that in most cases Conservancy Management Committees have limited representation of women and youth.

Kenya Rangelands Coalition

A number of progressive landowner and wildlife associations have developed in Kenya over the last two decades. These have generally been motivated by the need to address threats to pastoralist livelihoods and wildlife, as well as tap into new opportunities such as ecotourism and natural resource-based enterprises. Examples include the Northern Rangelands Trust, the South Rift Association of Land Owners, the Amboseli Ecosystem Trust, the Laikipia Wildlife Forum (LWF), and others around the Mara, Taita, and elsewhere. The Kenya Rangelands Coalition was recently launched to articulate and advance the interests of these associations, and to mobilize the support of national and county governments, the private sector, NGOs and donors. Among the opportunities the coalition intends to target are renewable energy, the development of carbon markets, and conservation easements and leases.

The National Environment Management Authority

NEMA was established in 2002 under the EMCA as the main agency for the implementation of all policies related to the environment. NEMA has a number of core functions, the main one being coordination of environmental management activities of all other agencies. Other main responsibilities include environmental education and public awareness, advice and technical

support to other agencies, and preparation of an annual report on the State of the Environment in Kenya.

National Environment Tribunal

The Tribunal was established by the EMCA to review administrative decisions made by NEMA regarding the issuance, denial, or revocation of licenses and permits. The National Environment Tribunal has powers to make or change an order regarding environmental issues in dispute.

EMCA also set up three other bodies, namely: the National Environment Tribunal, Public Complaints Committee and National Environment Council, under Sections 125(1), 32(a) and 4(1) respectively.

Public Complaints Committee

The Committee was established by the EMCA to investigate and report on allegations and complaints of cases of environmental degradation. It is also required to prepare and submit periodic reports of its activities to the National Environment Council, and information in these reports are used in the annual State of the Environment Report.

National Environment Council

The Council was established by the EMCA to set national goals and objectives for the protection of the environment and to formulate policies. It is expected to determine priorities and promote cooperation among public departments, local authorities, the private sector, and NGOs.

5.2.2 PARENT MINISTRIES AND RESEARCH INSTITUTES

Ministry of Forestry and Wildlife

This ministry is the parent ministry for KFS, the Kenya Forestry Research Institute (KEFRI) and KWS. It is responsible for implementing policies affecting forests and wildlife and for overseeing forests management, reforestation, and agroforestry. It is also responsible for conservation of water catchment areas.

Ministry of Environment and Mineral Resources

The mission of the Ministry of Environment and Mineral Resources is to promote, monitor, conserve, protect and sustainably manage the environment and mineral resources. Its core functions are policy formulation, analysis and review, and oversight of NEMA. The departments of Resource Surveys and Remote Sensing, Mines and Geology, and the Kenya Meteorological Department fall under this ministry.

Ministry of Fisheries Development

The Department of Fisheries within this ministry is responsible for the conservation, development, and management of fisheries resources. It is supposed to maximize the contribution of fisheries to the achievement of national development objectives.

Ministry of Tourism

This ministry is charged with making Kenya a destination of choice for domestic and international tourism and to facilitate the Kenya Tourist Board. The Kenya Tourist Board was formed in 1997 when the GOK recognized that an independent marketing authority was needed.

Ministry of Agriculture

Among the many functions of the Ministry of Agriculture are developing agricultural policies and services, including phytosanitary services. This ministry hosts the Kenya Agricultural Research Institute.

Kenya Forestry Research Institute

Established in 1986 under the Science and Technology Act (CAP 250), KEFRI is entrusted to forest research. It is an autonomous state corporation under the Ministry of Forestry and Wildlife.

The growing of Eucalyptus species is a controversial issue in Kenya because of concerns over their role in drying up watercourses. Eucalyptus are attractive because of their rapid growth rates and ability to coppice after cutting or lopping. Research continues, and both KEFRI and KFS have developed guidelines for growing of eucalyptus (Kenya Forest Service, 2009b).

Kenya Marine and Fisheries Research Institute

Research in marine and fresh water fisheries is undertaken by this institute, a state corporation established in 1979 by the Science and Technology Act (CAP 250). Kenya Marine and Fisheries Research Institute's research mandate covers all Kenyan waters, including Kenya's EEZ in the Indian Ocean. Significant fisheries research is also conducted by academic institutions.

Interim Coordinating Secretariat for the Mau

The Interim Coordinating Secretariat (ICS) was established in late 2009 in the Office of the Prime Minister following recommendations of the Mau Task Force Report, through Kenya Gazette Notice No. 12058 (November 2009). The ICS is supposed to: (a) coordinate the implementation of the recommendations of the Mau Task Force on the Conservation of the Mau Forests Complex by the relevant ministries; and (b) develop the framework for long-term measures to restore and sustainably manage the Mau Forests Complex and other "water towers." It was initially established for two years, but its mandate was extended for 18 months, beginning August 26, 2011. The ICS's administrative headquarters are in Nairobi, and it has a field office in Nakuru. A number of committees advise the ICS on specific issues such as communication and outreach, restoration and rehabilitation, and legal matters relating to the Ogiek community.

5.2.3 ISSUES RELATED TO MULTIPLE MANDATES FOR BIODIVERSITY CONSERVATION INSTITUTIONS

The overlapping mandates of some of the institutions discussed above create a number of weaknesses in environmental policies and their implementation. For example, the overlap between KFS and KWS responsibilities in forest reserves and national reserves has not been adequately resolved in law. In the forestry sector, FCCs need to be brought in line with other institutions such as the catchment areas committee under the Water Act (2002). Local governments are legally empowered to manage forests on trust land, although most do not have the requisite management or technical capacity. There are many unresolved issues regarding the role of communities under the new Constitution.

Biodiversity forms the backbone of Kenya's important tourism industry, making both KWS and KFS key agencies for implementing Vision 2030 flagship projects, which fall under the Ministry of Planning (Government of Kenya, 2007). Tourism accounts for about 10% of Kenya's GDP, according to the Ministry of Tourism's current strategic plan, with a large multiplier effect in other industries such as agriculture, horticulture, transport, and communications. Wildlife-based tourism includes wildlife viewing, bird watching, sport fishing, and many coastal and marine

activities. In some cases, the forests managed by KFS also have good tourism potential. By protecting the critical water catchments of Mt. Kenya, the Aberdares, Mt. Elgon, Chyulu, and Marsabit, and through efforts to restore the Mau Forest, both KFS and KWS are critical for safeguarding the sources of 70% of Kenya's hydroelectric generation capacity.

5.3 LAND TENURE

Under the Constitution, Kenya's land is classified as public, community, or private. These three types of land tenure affect the responsibilities and obligations of both the state and citizens regarding the conservation and management of natural resources on those lands. Public land includes government forests other than those lawfully held by specific communities and managed as community forests, grazing areas, or shrines. National parks and reserves, water catchment areas, and wildlife sanctuaries are also public lands. All rivers, lakes and other water bodies, the territorial sea, EEZ, sea bed, continental shelf, and all intertidal land (between the high and low water marks) is also categorized as public land. According to the Constitution, public land is held by the national or county government, in trust for the people, and administered on their behalf by the National Land Commission.

Community land is land registered in the name of group representatives or transferred to a specific community by any process of law, and declared to be community land by an Act of Parliament. Land lawfully held by specific communities as community forests, grazing areas, or shrines, the ancestral lands traditionally occupied by hunter-gatherer communities, and some trust land held by county governments is also classified as community land. Most community conservancies are located on community lands.

Private land consists of that registered and held by any person under any freehold or leasehold tenure, or declared private under an Act of Parliament.

5.4 PROTECTED AREAS

Kenya's Protected Area System includes landscapes and seascapes falling in eight categories:

- national parks,
- marine national parks,
- national reserves,
- marine national reserves,
- forest reserves,
- sanctuaries,
- community conservancies, and
- private conservancies.

The first six types of Protected Areas (PAs) are state, or government-level, PAs. Each category falls predominantly under one competent government authority, though their management sometimes overlaps between two or more agencies. The last two types of PAs are organized on community or private lands, and are discussed below. All types of PAs are shown on the map in Figure 5.4.

The national, community, and private protected areas each have strengths and weaknesses when it comes to their ecological, social, political, and economic effects and outcomes. In many cases, community, private, and national PAs may share the same ecological landscape and often have common borders. Information obtained by the Assessment Team suggests that national, community, and private PAs are complementary and contribute to better conservation

Figure 5.4 Protected Areas in Kenya (Draft)



5.4.1 NATIONAL PROTECTED AREAS

National parks (both terrestrial and marine) are IUCN Category II protected areas in which recreational, educational, and some scientific uses are the main types of human use (IUCN Protected Area Management Categories, 2011). National parks are managed by KWS.

National reserves, marine national reserves, and forest reserves are generally managed as IUCN Category VI protected areas, with multiple uses allowed under specific conditions included in regulations agreed to by the requisite authority responsible for each reserve at the time of gazettelement. Exploitation in the form of seasonal water rights and grazing by pastoralists is usually permitted in such areas, and artisanal fishing is typically allowed in marine national reserves. Except for a few cases, such as the Shimba Hills National Reserve, national reserves and marine national reserves are managed by the local authorities of the area in which they are found. Forest reserves in many cases include provisions for harvesting of native forest species and plantation forestry, and in most cases (except, for example Arabuko-Sokoke Forest Reserve) these are now managed by the Kenya Forest Service. The Maralal and Kisumu Impala Game Sanctuaries are examples of IUCN Category IV protected areas, sometimes called habitat or species management areas, which are set aside mainly to protect habitats of particular wildlife species.

TABLE 5.4.1 NATIONAL PROTECTED AREAS

NATIONAL PARKS	NATIONAL RESERVES	NATURE RESERVES
Aberdare Amboseli Arabuko-Sokoke Central Island Chyulu Hell's Gate Kora Lake Nakuru Malka Mari Meru Mount Elgon Mount Kenya Mount Longonot Nairobi Ol Donyo Sabuk Ruma Saiwa Swamp Sibiloi Tsavo East Tsavo West	Arawale Bisanadi Boni Buffalo Springs Dodori Kakamega Kamnarok Kerio Valley Laikipia Lake Bogoria Losai Marsabit Masai Mara Mwea Nasolot Ndere Island Ngai Ndethya North Kitui Rahole Samburu Shaba Shimba Hills South Kitui South Turkana Tana River Primate	Arabuko-Sokoke Cheptugen-Kapchemutwa Kaimosi Forest Kaptagat Forest Karura Katimok Kabarnet Langata Mbololo Nandi North South-Western Mau Uaso Narok

MARINE NATIONAL PARKS	MARINE NATIONAL RESERVES	GAME SANCTUARIES
Kisite Malindi Mombasa Watamu	Diani Kiunga Malindi Mombasa Mpunguti	Kisumu Impala Maralal
UNESCO-MAN AND BIOSPHERE RESERVES	WORLD HERITAGE SITES	WETLANDS OF INTERNATIONAL IMPORTANCE (RAMSAR SITES)
Amboseli Kiunga Malindi-Watamu Mount Elgon Mount Kenya Mount Kulal	Lake Turkana National Parks Lamu Old Town Mount Kenya National Park/Natural Forest	Lake Baringo Lake Bogoria Lake Naivasha Lake Nakuru

Source: World Database on Protected Areas, Kenya Wildlife Service

5.4.2 COMMUNITY CONSERVANCIES

Community conservancies have been established over the last two decades through various supportive national and customary laws. They were developed to involve local people, who often felt alienated by a centralized, top-down conservation approach. These community-managed PAs help to conserve important wildlife habitat and forests. Most are managed by local Conservancy Management Committees, which were discussed above. Some community conservancies share borders with national parks or reserves, such as those adjacent to Tsavo East and Tsavo West National Parks. Others are located in important wildlife dispersal areas or migratory corridors, such as around the Maasai Mara and Amboseli.

There is an emerging trend towards linking up conservancies through collaborative institutions. Good examples include the Northern Rangelands Trust (NRT) which has operated as an umbrella organization for communal conservancies since 2004. The South Rift Association of Land Owners has similar objectives.

Recent research has demonstrated that livelihoods in some of the NRT conservancies, such as Namunyak and West Gate, improved when compared with non-participating communities, with benefits occurring at both the household and community levels (Glew et al., 2010). Increasing physical security and access to transportation were the most important benefits for households. Some direct financial benefits also occurred in the form of educational scholarships, medical care, and paid employment, which were mainly related to wildlife tourism. Ecological effects of conservancies were also evaluated in this study. Images from remote sensing showed an increase in green vegetation and leaf litter between 2000 and 2007 in community conservancies when compared to baseline sites, indicating improved habitat condition for both wildlife and livestock.



Kalama Community Wildlife Conservancy entrance sign with logo “Milking the Elephant”
Photo: E. Mwangi, August 2011

5.4.3 PRIVATE CONSERVANCIES

Private conservancies are operated by individuals or corporations. Many have evolved from previous land uses, such as livestock grazing or farming, and are managed largely along similar lines, except with a new focus on wildlife. Most private conservancies are run by a specialized team of managers and conservation professionals. Examples include Lewa, Ol Pejeta, and Soysambu. A unique case is Haller Park, which occupies land that was once a limestone quarry. A number of companies have established woodlots and tree plantations.

Despite the diversity of objectives and motivations, private conservancies have significant ecological, social, and economic benefits for various stakeholders. These include securing more area for wildlife, generating employment, reducing operating expenses, winning public goodwill, and creating new income streams from tourism or the sale of carbon credits.

5.5 TREATIES

Kenya has ratified the following international conventions and protocols with direct relevance to the conservation of forests and biodiversity:

TABLE 5.5 TREATIES TO WHICH KENYA IS A PARTY	
CONVENTION/ AGREEMENT/ TREATY/ PROTOCOL	RATIFICATION DATE
Convention on Biological Diversity (CBD)	July 26, 1994
United Nations Convention to Combat Desertification	June 24, 1997
United Nations Framework Convention on Climate Change (UNFCCC)	August 30, 1994
Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar)	June 5, 1990
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	December 13, 1978
Protocol on Biosafety (Cartagena Protocol)	January 24, 2002
Regional Convention/Agreement on the Organization for Indian Ocean Marine Affairs (IOMAC)	September 7, 1999
Convention for the Establishment of the Lake Victoria Fisheries Organization	May 24, 1996
Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region	May 30, 1996

6.0 NON-GOVERNMENTAL INSTITUTIONS AND ACTIVITIES

Primary responsibility for conserving biodiversity and tropical forests in Kenya lies with the government, whose activities were discussed in the preceding chapter. Their work is supported in a variety of ways by other organizations, including bilateral and multilateral foreign aid donors, international and Kenyan NGOs, and the private sector. This chapter discusses the work of these contributors to the conservation of forests and biodiversity in Kenya.

6.1 BILATERAL AND MULTILATERAL DONORS

Foreign aid donors are a major source of funding for biodiversity conservation in Kenya. Their funds are allocated in several different ways. Some money is essentially turned over to another organization (usually a government agency or NGO) to use in carrying out its activities. Sometimes there may be some discrete activities within that organization associated with a specific donor, but in general the funds are provided to enable that institution to accomplish its goals. Other funds are used to create a stand-alone project, operating as a (relatively) independent institution in partnership with both Kenyan and international players. In the former case, the donor projects are mentioned here but discussed more fully as part of the discussion of the institution carrying out the work, either in this chapter or in the preceding one on government activities. In the latter case, the project activities are discussed in this section, since there is no one other institution taking full responsibility for their implementation.

African Development Bank, Green Zones Development Support Project

US\$24 million from the African Development Bank plus US\$6.47 million from government in support to KFS and the Nyayo Tea Zones Development Corporation through the Ministry of Agriculture; 2006-2011 (www.afdb.org/en/projects-and-operations/project-portfolio/project/p-ke-aad-004/).

This project supports work on forestry conservation, watershed management, and work with communities adjacent to 48,000 hectares of gazetted indigenous forest land on Kenya's five water towers.

African Development Bank, Ewaso Ng'iro North Natural Resources Conservation Project

US\$16.5 million from the African Development Bank plus US\$4.26 million from government in support to the Ewaso Ng'iro North Development Authority; began in 2006 (www.afdb.org/en/projects-and-operations/project-portfolio/project/p-ke-c00-001/). This project works on water resources development through Water Resource Users Associations (WRUAs) and participatory catchment conservation, as well as by providing support for capacity building in the Ewaso Ng'iro North Development Authority.

Joint Danish-Swedish Environmental Support Programme

KES 2,230 in support for the Ministry of Environment and Natural Resources, NEMA, and the Community Development Trust Fund; 2006-2011, although this is expected to be the start of a fifteen-year program (www.ambnairobi.um.dk/en/menu/Development/Environment/OverallInformationOnEnvironmentalSupportProgramme/). The Policy Development Component builds the capacity of the Ministry of Environment and Natural Resources to incorporate environmental concerns into the work and sector policies of other ministries, and ensure the availability of information to facilitate linking poverty and environment. The strategic management component will support NEMA in work on strategic environmental assessments, decentralized environmental management and integrated coastal zone management, as well as building NEMA's capacity for institutional and financial management. The community development

component will support the European Union Community Environment Facility program through the Community Development Trust Fund; see below.

European Union with Joint Danish/Swedish Environmental Support Program funding, Community Environmental Facility

KES 2.0 billion to the Community Development Trust Fund; 2010-2014 (www.cdtfkenya.org/programmes/ongoing/CEF2/; www.ambnairobi.um.dk/en/menu/Development/Environment/Community+development+component/). This program supports community projects designed to link poverty reduction, improved livelihoods, and conservation of natural resources, promoting enhanced environmental management and governance. It is working on local projects distributed throughout the country.

Japan International Cooperation Agency Forest Preservation Programme

US\$13,414,634 to KFS and KEFRI; 2009-2011 (kenyaforests.blogspot.com/2010/03/japan-extends-to-kenya-sh-14-billion.html; there is no mention of this program on the Agency's website.) This project will work on conservation in the Mau Forest and afforestation in AFALS, as well as providing equipment and consultancy services to KFS and KEFRI.

Japan/World Bank Support to Community Based Farm Forestry Enterprises Project

(using Japan Social Development Fund) US\$1,936,375 in support to KFS; 2009-2013 (www.kenyaforestservice.org/index.php?limitstart=30; there is no mention of this project on the Japan International Cooperation Agency's website). This project will support ASAL farmers in launching tree-planting enterprises with low-cost loans and other financial incentives and technical assistance.

United Nations Food and Agriculture Organization, National Forest Program Facility

Support to KFS to provide grants to a number of other forestry organizations; 2005-? (www.nfp-facility.org/map/en/). The National Forest Program Facility is a Food and Agriculture Organization-managed program to support the development and implementation of forest programs in participating countries by funneling grants directly to civil society and other organizations to fund their implementing activities called for by the Facility. The Facility began work with Kenya, through KFS, in 2005. Since then, it has awarded fourteen grants to groups undertaking work such as community forestry, tree planting, educational activities, and so on.

USAID, Green Belt Movement

US\$526,138 to the Green Belt Movement (GBM); begun 2008 (kenya.usaid.gov/programs/economic-growth/1023). USAID is providing support to GBM's ongoing work in the Aberdare Mountain Range; see discussion of GBM in NGO section below.

USAID, Kenya Civic Society Strengthening Program

US\$32,769,685 to Pact and Pact/Kenya (discussed below in NGO section); 2006-2012 (kenya.usaid.gov/programs/democracy-and-governance/958). The Kenya Civic Society Strengthening Program is an umbrella program providing grants to civil society organizations working in the areas of peace-building and conflict mediation, natural resource management, market-based approaches to conservation, and advocacy for reform. Sixty-four have grants have been awarded under the program to date.

USAID, Promara Program

US\$7 million to ARD, Inc. (now Tetra Tech ARD); 2010-2012 (kenya.usaid.gov/programs/environment/395). Promara works with community forest associations in the Mau Forest on

forest management, tree planting, soil and water conservation, watershed management, land tenure and resettlement, and other key issues in the region.

USAID, SECURE Project

US\$1.2 million to ARD, Inc. (now Tetra Tech ARD); 2009-2012 (kenya.usaid.gov/programs/environment/476). SECURE works with indigenous groups in the coastal areas near Lamu to improve the security of their land tenure, reduce conflict over access to land and natural assets, support co-management (with KWS) of wildlife and other resources, and serve as a test case for implementation of the new National Land Policy.

USAID, TIST (The International Small Group & Tree Planting Program)

US\$7.52 million to TIST, 2006-2014 (kenya.usaid.gov/programs/economic-growth/1016, www.tist.org/). TIST is a US-based organization founded by the Clean Air Action Corporation, a private firm that provides technical services related to air pollution reduction. TIST organizes tree-planting programs in six countries around the world, while Clean Air Action helps them through the procedures of offering carbon credits for sale on global markets. TIST works in central and western Kenya and has helped around 7,000 small groups plant trees. In May of 2011, the carbon offsets provided by TIST in Kenya were validated and verified by two different systems, the Verified Carbon Standard and the Climate, Community & Biodiversity Standards, enabling them for the first time to market the carbon credits generated by their tree planting work in Kenya. Once these are sold, the profits will flow back to the farmers themselves, so they will see a direct financial return to their tree-planting work.

World Bank, Natural Resources Management Program

US\$68.5 million to the Ministry of Water and Irrigation and the Ministry of Environment and Natural Resources; a significant portion is going to support the work of KFS; 2008-2014 (search for "World Bank Report No: 37982-KE project appraisal document" to find information online). This program works in three substantive areas; water management and irrigation, forest management, improving livelihoods in the Upper Tana catchment. It works to support the KFS in watershed rehabilitation and with the WRUAs in preparing and implementing watershed management plans.

World Bank/Global Environment Facility, Coastal Development Project

US\$35 million from World Bank and US\$5 million from the Global Environment Facility (GEF) to support the Ministries of Fisheries Development, Regional Development Authorities, Forestry and Wildlife, Lands, and Development of Northern Kenya and other Arid Lands; 2011-2017 (Search for "World Bank Report No: 54486-KE" to obtain Project Appraisal Document online). This program aims to improve management of coastal and marine resources, and to enhance sustainable use of coastal and marine biodiversity. It will strengthen policy and governance in the fisheries sector, improve coastal and marine NRM and biodiversity conservation, support alternative livelihoods including the development of bio-enterprises, and build management capacity among stakeholders.

World Bank, Forest Carbon Partnership Facility

US\$3.6 million in support to KFS; 2010-2013 (www.forestcarbonpartnership.org/fcp/node/70). This program provides funding for Kenya to do the background work needed to lead into the development of REDD+ (Reducing Emissions from Degradation and Deforestation plus conservation, sustainable management of forests and enhancement of forest carbon stocks in reducing emissions) projects, and to position the country to be able to offer carbon credits for sale on international markets. It involves developing a baseline scenario for forest degradation,

carrying out forest mapping to provide baseline data and build a monitoring system, and related activities.

World Bank, Nairobi National Park Ecosystem Wildlife Conservation Lease Project

US\$750 thousand to The Wildlife Foundation (kenyamaasaiwildlife.blogspot.com/). This project, which is also supported by The Nature Conservancy and KWS, is developing mechanisms to lease land from Maasai landholders south of Nairobi National Park, to ensure that wildlife corridors will remain open in that area.

6.2 NON-GOVERNMENTAL ORGANIZATIONS

This section describes some of the major NGOs working on conservation in Kenya. There are dozens, if not hundreds, of other organizations working on conservation in the country. Links to NGOs not mentioned here may be found by consulting the list of organizations who blog through Wildlife Direct (discussed below), the recipients of grants through the Kenya Civil Society Support Program (discussed below under Pact), the individual conservancies working through the Northern Rangelands Trust (discussed below) or affiliated with the Laikipia Wildlife Forum, and other sources.

African Conservation Centre (www.conservationafrica.org; in the US they are the African Conservation Fund): The African Conservation Centre is a Kenyan NGO dedicated to developing excellence in managing conservation and wildlife in Africa. Its programs focus on research, conservation enterprises, climate change and land use, biodiversity informatics (the development of methods to organize and use knowledge at the organism level, making full use of current information technology to access data back to the earliest work in natural history), and cross-cutting themes. Their work focuses in rangeland ecosystems, collaborating with pastoral communities to help them build conservation and wildlife tourism into their activities. The Centre is currently funded by the Dutch government, the Ford Foundation, and other private philanthropies; in the past they have also received support from USAID, the European Union, the United Nations Development Programme (UNDP), and other sources. They have sixteen staff in their Nairobi office.

African Wildlife Foundation (www.awf.org): AWF is an international NGO working on wildlife conservation issues in a number of African countries. Their work focuses on "heartlands," large regions that combine protected and non-protected areas, all of which are essential for wildlife survival. The Kilimanjaro heartland spans Kenya and Tanzania, while the Samburu heartland is entirely in Kenya. Their work has three major thrusts; conserving wildlife, protecting land, and engaging people. The direct conservation work involves research on specific key species at risk in the heartlands. The land protection work focuses on linking support for protected areas, working with local communities on land use planning to ensure conservation of key resources, and creating land trusts outside of protected areas in which resources can be managed for both people and wildlife. In particular, this component of their work has led to the planting of 25,000 trees in the Mau Forest, in a collaborative venture with KFS, KWS, and the Interim Coordinating Secretariat. Their work with the local people focuses on education and on the development of conservation enterprises through which they can earn money from conservation. AWF is a partner with LWF in the creation of Desert Edge, a bio-enterprise company discussed below. It has been the recipient of substantial USAID support through the Conservation of Resources through Enterprises (CORE) and Conservation of Biodiversity Resource Areas (COBRA) programs.

Coastal Oceans Research and Development in the Indian Ocean / East Africa (www.cordioea.org): This is a regional organization supporting research and monitoring on

Indian Ocean ecosystems, and programs to help adjoining communities manage them sustainably. Their East African operations are based in Mombasa, where they have thirteen staff and three students working with them. Their major funders include multilateral and bilateral donors, international NGOs, and private foundations. They are the recipient of a \$100 thousand grant from the USAID-funded Kenya Civic Society Strengthening Program to support their work developing regulations that ensure sustainable and responsible methods in Kenya's artisanal marine fishery.

East African Wildlife Society (EAWLS, <http://www.eawildlife.org/>): EAWLS was created as a membership organization in 1961 through the merger of the Kenyan and Tanzanian wildlife societies, bringing in conservationists from Uganda as well. The Society implements programs in various parts of the region and serves as the secretariat for the Kenya Forests Working Group. It undertakes communications initiatives, including publication of SWARA (which means antelope in Swahili), a glossy quarterly magazine on conservation. It is planning to create an advocacy unit; however, this is not yet operational (according to its website). However, according to information provided by USAID, EAWLS and the Kenya Forests Working Group are beneficiaries of a UNDP credit of US\$1.3 million to support advocacy work in the forestry sector including aerial surveys to produce data used for advocacy, covering the period from 2004 to 2012. EAWLS has also received a US\$100 thousand grant from the Pact-led Kenya Civil Society Support Program to support their work on enactment of the new wildlife law. Their website does not give any indication of the size of their budgets or staff.

Forest Action Network Kenya: the Forest Action Network is an advocacy and implementing organization working on forest management issues. It played an active role in developing the 2005 Forest Law. Its activities fall into three program areas – farm and community-based forestry, policy and research, and strengthening environmental awareness and information – but it is not clear from the website how much work is actually funded and underway at present. The organization manages a resource center in Njoro, providing environmental information to local communities. It is also linked to other organizations managing a dozen or so similar resource centers elsewhere in the country. The Forest Action Network is receiving USAID support for natural resources management work through the Kenya Civil Society Strengthening Program, led by Pact.

Green Belt Movement (www.greenbeltmovement.org): The Green Belt Movement (GBM) is the environment group created by Wangari Maathai in 1977 as a women's group seeking human rights and democratic reform through planting trees to protect the environment. Their work has focused on Mt. Kenya, the Aberdares, and the Mau Forest complex, and they planned (as of their most recent 2008 annual report on their website) to expand into the other two water towers as well. Their annual revenues between 2006 and 2008 (the latest year for which data are available on their website) have been between US\$715 thousand and US\$2.5 million; the highest value, in 2007, was an exception due to one unusually large grant received in that year (GBM 2006, 2008). For the period from 2010 to 2012, they are the recipient of a US\$560,000 grant from USAID to support their tree-planting and community-based natural resources management (CBNRM) work in the Aberdares; they also regularly receive support from at least a dozen other major international donors.

Kenya Forests Working Group (www.kenyaforests.org): The Group, founded in 1995, is a forum of individuals, organizations and institutions (government and non-government, local and international) and grassroots community organizations engaged in advocacy and project implementation in support of sound forest management. Its membership makes it one of the leading advocacy groups on forest issues in the country; its board includes KWF, KFS, KEFRI,

IUCN, EAWLS, and Nature Kenya, among other major players in the field. Kenya Forests Working Group is also directly engaged in implementing forest management activities for other projects, monitoring forests on the five water towers, running environmental education and awareness programs, and other activities. Since its founding, the Group has received funding from a number of multilateral and bilateral donors including USAID, through Pact.

Laikipia Wildlife Forum (www.laikipia.org): LWF is a network of organizations and individuals concerned with conservation in the district of Laikipia, formed in 1992. Its programs fall into eight areas: forest management, water management, rangeland rehabilitation, security, environmental education, wildlife conservation, tourism support, and conservation enterprises. Each program collaborates with other partners; for example, wildlife conservation works with KWS, while the conservation enterprise program is a joint venture with AWF – and receives funding from a variety of sources. LWF has benefited from substantial support from USAID, including a US\$300,000 subgrant through Pact, from the USAID CORE project. LWF has sixteen staff members, nine of them providing liaison to sub-regions within Laikipia and the others at the main office.

Nature Kenya (www.naturekenya.org): Nature Kenya (also called the East Africa Natural History Society) is a membership organization engaged in advocacy and programs. It is the Kenya partner to Birdlife International, and its work has a particular emphasis on birds. Its executive committee members are primarily researchers, writers, and academics, rather than representatives of organizations or government agencies. It has been engaged in advocacy work related to the proposed Dakatcha jatropa plantation, ecosystem issues on Lake Naivasha, flamingo survival on Lake Natron, and commercial agriculture pressures on the Tana Delta. The Society coordinates working groups addressing a range of specific conservation issues and the problems of specific species groups. It operates out of the Kenya National Museums in Nairobi.

Northern Rangelands Trust (www.nrt-kenya.org): NRT is an organization created in 2004 by the Lewa Wildlife Conservancy to support the establishment of community-based wildlife conservancies in the ASALs north and west of Mt. Kenya. Its approach is based on giving communities the right to manage the wildlife on their lands, and assisting them in establishing wildlife-dependent enterprises (largely tourism, but also sale of natural products, crafts, bird hunting, livestock fattening, and other activities), a portion of whose revenues go to the communities and to the operations of the conservancies. NRT works with its 17 member conservancies to help them offer services to their communities that should further create an incentive for conservation. Among the conservancies visited by the assessment team, one of these services, the provision of security to reduce cattle theft, was uniformly mentioned as the most valuable benefit of being part of the conservancy. The revenues derived directly from conservation were not mentioned. Although they knew they were receiving NRT assistance in return for conservation activities, it is not clear whether the economic returns the conservancies can generate will be sufficient to make conservation a financially attractive option. At present, all of NRT's 17 member conservancies depend on funding other than that generated by their economic activities. NRT itself is funded by a number of foundations and foreign aid donors, including the now-completed USAID CORE and COBRA projects.

Pact & Pact/Kenya (www.pactworld.org): Pact is a US-based NGO working on development projects throughout the world. The group began working in Kenya in 1998, and from 1999 to 2004 carried out the USAID-funded Conservation of Resources through Enterprises project in collaboration with the East Africa Wildlife Society and the African Conservation Centre. In 2001-2002, Pact implemented USAID's Kenya Coastal Management Initiative, in collaboration with

the Kenyan Coast Development Authority. In 2002, the Kenyan staff of Pact created an independent NGO, Pact Kenya. Since 2006, the two organizations have been collaborating on the USAID-funded Kenya Civil Society Strengthening Program, which runs until 2012. This program gives grants to civil society organizations; among the objectives to be achieved in the awarding of grants is improved capacity to manage biodiversity and natural resources and to engage in advocacy work related to the environment. This program has funded a number of other Kenyan conservation NGOs, including the Forest Action Network, EAWLS, and Nature Kenya.

Wildlife Clubs of Kenya (www.wildlifeclubsofkenya.org): Wildlife Clubs of Kenya is an organization committed to education about conservation. Its members include some 2,000 educational institutions at all levels, and about 200,000 individuals. It focuses on conducting educational programs for school groups at regional centers in many parts of the country and using a mobile educational unit that travels to remote schools. It also offers a two-year diploma program on wildlife tourism at its Center for Tourism Training and Research, affiliated with Moi University.

Wildlife Direct (wildlifedirect.org): Wildlife Direct is a Kenyan and US NGO supporting field-based conservationists by facilitating their use of the internet and blogs to disseminate information about their work. They are based in Nairobi, and most of their bloggers (about eighty) are working in this region, though they also support blogs from other parts of the world. Their annual budget (based on their 2009 annual report) runs to about US\$500 thousand per year, largely from private foundations and individual donations. Their board is primarily American and European; Richard Leakey is the only Kenyan member. In 2009 they had eight staff members.

World Wildlife Fund (WWF, www.panda.org/earpo): WWF's work in Kenya focuses on marine and coastal ecosystems and in the Mara watershed and the eastern arm of the Rift Valley. They have established Kenya's first (and perhaps only) Payment for Ecosystem Services scheme, in which horticulturalists on Lake Naivasha pay upstream farmers to implement soil and water conservation techniques that will ensure the availability of the clean water needed for irrigation. In savannah ecosystems they are also working on the conservation of key species including rhino and elephants. On the coast, their program focuses on coastal forests and marine protected areas, working with local communities on sustainable fishing practices, participatory management of marine resources, and supporting the policy and legal frameworks for resource management.

6.3 PRIVATE ENTERPRISE APPROACHES

Several private-enterprise-oriented approaches to conservation are growing in importance in Kenya and receiving considerable attention in non-governmental conservation activities. Only one, green labeling, is being undertaken by private companies who do not benefit from foreign assistance or other subsidies. The others, bio-enterprises and tourism, are all at least partially dependent on subsidies. Nevertheless, because these strategies offer the possibility of being financially sustainable if start-up costs are subsidized, they are worth considering in this context.

6.3.1 GREEN LABELING

"Green labeling" refers to systems through which the production of a product is certified by an independent body to be carried out in a way that protects the environment or social groups. The resulting goods can be sold at a premium to consumers who are willing to pay extra to know that their purchases are not harming the environment, producers, workers, or other groups.

Globally, such certification systems have been developed for all kinds of products; in Kenya, coffee, tea, and flowers are the most commonly certified agricultural products.

Certification systems typically include a set of principles for certification, usually pertaining broadly to environmental protection and working conditions; for example, Table 6.3.1 shows the principles of Rainforest Alliance's Sustainable Agriculture Network. Within the principles, the

TABLE 6.3.1 SUSTAINABLE AGRICULTURE NETWORK PRINCIPLES

1. Social and Environmental Management System
2. Ecosystem Conservation
3. Wildlife Protection
4. Water Conservation
5. Fair Treatment and Good Working Conditions for Workers
6. Occupational Health and Safety
7. Community Relations
8. Integrated Crop Management
9. Soil Management and Conservation
10. Integrated Waste Management

Source: Sustainable Agriculture Network, 2010, p. 5

program sets out specific criteria. Some of these are mandatory, while others are optional. For each criterion met, the applicant receives points; a total score must be achieved in order to be certified. The performance of the certified grower must be audited regularly to ensure that the criteria continue to be met. The certification process itself (monitoring, audits, and other transactions costs of compliance) can impose significant costs on growers, above and beyond the costs of meeting the requirements themselves, so a hefty price premium may be needed to make this an economically viable option.

Several certification systems are in relatively widespread use in Kenya (this overview relies heavily on Craves, undated, a very useful blog on coffee and conservation):

Rainforest Alliance's Sustainable Agriculture Network: This program covers community relations and treatment of workers as well as ecological issues. It includes optional biodiversity-related criteria through which a grower can improve his/her score when applying for certification, but these are not among the requirements for certification. At present, eighteen Kenyan coffee growers, twelve tea growers, and one flower grower hold Rainforest Alliance certification (a current list may be found at http://sustainablefarmcert.com/certified_farms.cfm?id=certified_farms). The small number of tea growers belies an impressive accomplishment, however; one of them is Unilever, the producer of Lipton Tea, which has set a goal of having all Lipton tea sold worldwide be certified by 2015.

Fair Trade (www.fairtrade.net): Fair Trade certification focuses primarily on addressing poverty and equity considerations in international trade. Their environmental requirements are relatively weak. They call for good practices but do not set quantifiable measures by which they can be evaluated, and often allow for exceptions (Craves, 2009; the generic standards themselves are available at http://www.fairtrade.net/fileadmin/user_upload/content/Jan_2009_EN_Generic_Fairtrade_Standards_SPO.pdf). Eight Kenyan coffee growers, twenty tea growers, and twenty-four flower growers now hold Fair Trade certification (an updated list can be obtained at <http://www.fairtradeafrica.net/producers-products/producer-profiles>). At the retail level, the Dorman's café chain offers Fair Trade certified Kenyan coffee at a premium price, as part of their corporate social responsibility program (described on their website at http://www.dorman.co.ke/index.php?option=com_content&view=article&catid=41:about-us&id=86:csr%20%96).

Utz Certified (<http://www.utzcertified.org>): Utz is a Netherlands-based certification program that focuses on supply chain traceability and efficient farm management, including sound environmental practices. Their certification system includes specific criteria pertaining to biodiversity and conservation, although some of them are difficult to quantify, such as using shade trees "whenever this is compatible with the local practice and takes into consideration the productivity" (Utz 2009, cell B285). Seven Kenyan coffee growers and six tea growers hold UTZ certification (an up-to-date list can be obtained at <http://www.utzcertified.org/en/products>).

Organic: Products sold as organic in the United States or the European Union must be certified by organizations recognized in the destination countries. Kenya has no certification systems of its own but as of 2008, five international certification organizations were operating in the country to meet the needs of thirty-five certified growers (Kledal et al, 2009, p. 4). Organic certification systems typically focus on agrochemical use, soil management, and practices to separate organic and inorganic products, so their impacts on biodiversity are likely to be indirect.

In addition, two certification systems are only available for coffee, the **Bird-Friendly** certification developed by the Smithsonian Migratory Bird Center and the **Starbucks C.A.F.E** standard. In biodiversity terms, bird-friendly certification is by far the strongest of the coffee labeling systems. Certified coffee must be grown under a canopy at least 12 meters high, must have at least 40% shade cover, at least 11 species of shade tree, and must be certified organic. However, there are no bird-friendly certified coffee growers in Kenya, according to the Smithsonian website (http://nationalzoo.si.edu/scbi/MigratoryBirds/Coffee/search_farms.cfm). The Starbucks system (http://www.scsccertified.com/retail/starbucks_documents.php), in addition to addressing erosion, stream buffers, and agrochemical use, also give points for shade and other biodiversity concerns, although it is not as rigorous as the Smithsonian system. The African Wildlife Foundation launched a Starbucks-certified coffee program in Samburu, but for reasons unrelated to the certification system itself, it was discontinued.

In addition to these well-known certification systems, the **Certified Wildlife Friendly** (<http://www.wildlifefriendly.org>) program and the **FairWild** standards (www.fairwild.org) are worth mentioning. Wildlife Friendly is a small individualized certification program that reviews and approves products sold by individuals or communities as wildlife friendly. The criteria (not available in detail on their website) focus on direct links to on-the-ground work to conserve animals on the IUCN Red List, bringing economic benefit to the local economy, production being carried out by people who live with wildlife, and having a clear monitoring and enforcement system to ensure that conservation goals are met. Thus, it fits very closely with the growing bio-enterprise activities being established through many wildlife conservancies and other projects. There is currently one Wildlife-Friendly-certified producer in Kenya, the Anne K. Taylor Fund (http://aktaylor.com/ak_fund/akfund.htm), a small NGO working on conservation in the Maasai Mara and selling beaded handicrafts.

The FairWild standards apply to items made from plant materials collected in the wild; they do not cover animal products such as honey. They are aimed to ensure that wild materials are harvested sustainably, in ways that are equitable, respect traditional practices, do not employ children, and so on. At present, there are no FairWild products certified in Kenya; however, this may be appropriate for some of the products being offered by developing bio-enterprises.

6.3.2 BIO-ENTERPRISES

"Bio-enterprise" is the term used in Kenya to refer to the sale of products whose availability directly depends on biodiversity conservation, and whose revenues support the local

communities who actually undertake conservation activities. This includes a variety of natural products such as honey, gum Arabic, essential oils, aloe, and other items harvested from sustainably managed ecosystems. In some institutions, including Northern Rangelands Trust Trading and the products of the Wildlife-Friendly-certified Anne K. Taylor Fund, this label is also extended to include beadwork and other handicrafts that are not manufactured from locally harvested products. The manufacture of such products is not always associated with biodiversity conservation; additional start-up investment and possibly operating costs are required in order to ensure that bio-enterprise products actually do support conservation. Because of these additional costs, most bio-enterprises are being launched with subsidies from foreign aid donors or environmental NGOs, who are willing to put in the start-up costs if they can lead to financially sustainable conservation in the future.

Desert Edge, a private non-profit company created by the African Wildlife Foundation and the Laikipia Wildlife Forum, offers perhaps the clearest example of how such enterprises can work. Desert Edge has placed a strong emphasis on the need to identify all of the ways in which a proposed bio-enterprise may be more risky than a commercial venture launched by a private investor. This risk stems from many factors (Ifejika Speranza & Wren, 2011):

- the business skills of the producers;
- their ability to maintain the quantity and quality of their outputs;
- their knowledge of how to find markets for their goods;
- their ability to scale up from artisanal production for local consumption to more streamlined production for more demanding customers;
- their understanding of the processing and packaging necessary for new markets;
- greater difficulty in obtaining financing; and
- the need for marketing that stresses the community and conservation benefits of the products in order to attract buyers in a competitive field and perhaps induce them to pay a premium.

Moreover, since bio-enterprises are frequently community ventures, the community must have the ability to work together in a collaborative way that gives everyone a voice and benefits all, rather than only benefiting the most dynamic, articulate, or powerful individuals. Dealing with these risks requires strong support for the new enterprises throughout the entire value chain; this implies a much higher start-up cost than would be required of an experienced commercial entrepreneur who did not seek to support community development and conservation.

One strategy that Desert Edge uses in providing this support is to seek international certification through systems such as FairTrade, the Forest Stewardship Council's certification of non-timber forest products, organic certification or the FairWild standards. By introducing these standards as the enterprises are built, Desert Edge ensures not only that they will benefit from eco-labeling premium prices but also that the new businesses will grow with the internal control systems in place to enable them to routinely track their own operations. With these certifications, both consumers and the businesses themselves can be sure that they are actually providing the conservation and community benefits on which their marketing strategies and pricing depend.

Desert Edge is not covering its costs from these enterprises, nor does it ever expect to do so. The high start-up costs for these ventures, especially for training and capacity-building, are being supported by the donors who fund LWF and AWF. Revenues are not yet even covering the operating costs of the enterprises, as they are still too new to have moved beyond the costly start-up process (personal communication, Susie Wren, Director and Technical Advisor Desert Edge, August 16, 2011). However, the company's staff expect that in time, the different

activities will cover their operating costs, leaving Desert Edge free to move on to launching new enterprises and supporting their start-up. In a context where virtually all conservation is subsidized, being able to at least cover the operating costs will be an accomplishment.

6.3.3 ECOTOURISM

Tourism, particularly the development of lodges, is becoming a major source of income to wildlife conservancies. In some respects, it is analogous to the bio-enterprise work, in that it is a commercial activity whose financial success depends on the conservation of wildlife in the adjacent areas. It raises some of the same challenges with respect to building the human capacity needed to ensure that the lodges are run efficiently and guests can be sure of receiving high-quality services. Most lodges (the one at Il Ngwesi being the major exception) bring in a professional manager, and hire local community members for as many of the other jobs as possible, which addresses many of the human capacity issues.

Unlike the bio-enterprises, funds from the lodges flow not to individuals engaged in producing resource-based products, but to the conservancies to fund their operations and to the communities to fund social programs such as security, health, education or other community facilities. A key question, therefore, is whether the benefits they receive from participation in the conservancies are sufficient to compensate them for foregone livestock income, especially given that the benefits do not flow to the individual households who might lose income by virtue of losing access to some natural resources.

At present, we don't have the answer to that question. In discussions with NRT conservancy representatives, they immediately identified improved security as the most important benefit of their participation in the program. Improved security means less livestock theft, which means greater income security, higher incomes, and fewer resources wasted on fighting their neighbors. If we could quantify them, these benefits might actually be significantly higher than any revenues they might get from lodges or bio-enterprises. However, they do not depend on conservation, except to the extent that someone is paying for a security system because the community has agreed to conserve wildlife. If, in fact, they poach wildlife or maintain herds too large to leave resources for wildlife, this will not automatically affect the security system, in the way that, say, converting acacias to charcoal would eliminate their revenues from gum Arabic. More information, and more time, will therefore be needed to assess how effectively tourism activities contribute to long-run incentives for conservation.

7.0 ACTIONS NEEDED TO CONSERVE BIODIVERSITY

The language of FAA Sections 118 and 119 calls for an assessment to identify the actions necessary in a country to conserve tropical forests, and biological diversity, respectively. These “actions necessary” will address and reduce the causes of threats to biodiversity, including tropical forests, which were discussed in Section 4 of this report. These actions will thus include, in general, actions to address social causes; political, institutional, and governance causes; and economic causes.

7.1 ACTIONS NEEDED AS IDENTIFIED BY THE GOVERNMENT OF KENYA

The Assessment Team started with Kenya’s own official view of what actions it considers necessary to conserve biodiversity in the country. In seeking to understand this view, the Team first reviewed Kenya’s *Fourth National Report to the Convention on Biological Diversity*, (NEMA and UNDP, 2009). Box 7.1 summarizes the “actions necessary” implied in that report.

Box 7.1 Actions Needed, according to Kenya Report to the Convention on Biological Diversity

- | | | |
|-----|---|--|
| 1) | The political will within the Government of Kenya (GOK) to implement needed biodiversity conservation actions. | Social Actions |
| 2) | Greater opportunities for public participation and stakeholder involvement in biodiversity conservation and natural resources management. | Political/Institutional/Governance Actions |
| 3) | Mainstreaming and integration of biodiversity issues into other sectors, such as through use of tools like environmental impact assessments. | Economic Actions |
| 4) | Better capacity for public outreach and engagement by GOK agencies responsible for biodiversity and forest conservation, including Kenya Wildlife Service, Kenya Forest Service, and the Department of Fisheries Development. | |
| 5) | Improvement of human resources (e.g., education, training) in relevant Natural Resources Management (NRM) and biodiversity conservation agencies. | |
| 6) | Ongoing applied scientific research to inform biodiversity conservation practices. | |
| 7) | Improved access to and use of the already-established National Biodiversity Data Base. | |
| 8) | Improved efforts and more resources for public education and awareness of the values and benefits of conserving biodiversity and ecosystem services at all levels. | |
| 9) | Better integration and utilization of both scientific and traditional knowledge in biodiversity conservation activities. | |
| 10) | Provision by GOK of adequate financial and human resources for biodiversity conservation and NRM, which GOK has not provided to date. | |
| 11) | Development by GOK of economic incentive measures and a benefit-sharing framework and policies to motivate participation in biodiversity conservation and sustainable NRM. | |
| 12) | Development of more environmentally-sustainable economic opportunities in poor communities dependent on benefits derived from biodiversity for their livelihoods. | |
| 13) | Development of better mechanisms of coordination and collaboration among conservation actors at the local, national, and international levels. | |
| 14) | Establishment by GOK of the various sectoral laws and policies that deal with environment and biodiversity issues, and make certain that they are adequate and harmonized. | |
| 15) | Development of adaptation strategies to deal with the predicted effects of climate change on biodiversity and natural resources. | |

This list is derived from Kenya’s Fourth National Report to the Convention on Biological Diversity, pp. 30-32 (NEMA and UNDP, 2009) and implies certain “actions necessary,” although they are not specified by that term. The items above are a summary of the list, rephrased into the language of the FAA Sections 118 and 119.

Next, the Team reviewed the *Kenya State of the Coast Report* (NEMA 2009). Box 7.2 summarizes the list of “actions necessary” to conserve coastal and marine biodiversity given in that report.



Hagengia abyssinica, an indigenous species found in montane forest, planted in the Kiptunga Reforestation Project at the headwaters of the Mara River, Mau Forest Complex.
Photo: B. Byers, August 2011

Box 7.2 Actions Needed, according to Kenya State of the Coast Report**Social Actions****Political/Institutional/Governance Actions****Economic Actions**

- 1) Broad public awareness of, and education about, coastal and marine biodiversity and Natural Resources Management (NRM) issues.
- 2) Political will in GOK to adequately address coastal and marine biodiversity and NRM issues.
- 3) Specific coastal and marine legislation, incorporating many components already covered in various sectoral laws, the Environmental Management and Co-ordination Act (EMCA, 1999), and relevant international and regional conventions to which Kenya is signatory.
- 4) A single agency with dedicated/core competency to deal with coastal and marine issues, compared to the current situation, in which overlapping and uncoordinated jurisdictions among various institutions and ministries hinder implementation.
- 5) Restoration of degraded coastal/marine ecosystems and ecologically/socio-economically monitor restoration progress.
- 6) Prevention or mitigation of threats to coastal and marine ecosystems from land-based activities through improved applied research on land-based impacts on the coastal and marine environment and how to mitigate such impacts, as well as increased awareness of land-based impacts among policy makers, planners, and resource managers.
- 7) Development of the capacity of the mass media (radio, TV, print media) and journalists to report on coastal and marine biodiversity and NRM issues, including in local languages.
- 8) Development of strategies, systems, and capacity for sustainable management of near-shore/pelagic fisheries w/in EEZ.
- 9) Development of local economic alternatives in coastal/marine dependent communities, such as through community-based coastal ecotourism, environmentally-sustainable aquaculture, increased value of marine products through improved marketing.
- 10) Promotion of sustainable fishing practices in sea grass/coral reef habitats, and control of destructive and illegal fishing.
- 11) Prevention/control of destructive fishing practices including use of dynamite, fish poisons, beach seines, small-mesh nets, and ring nets, through more active and effective enforcement.
- 12) Strengthened fisheries regulations and increased enforcement capacity.
- 13) Further applied research on the ecological and socio-economic effects of bottom trawling (esp. Ungwana Bay), which appears to have many negative consequences according to current understanding.
- 14) Ensure secure beach access routes for artisanal fishing communities, through mapping all current beach access points, strengthening community rights to beach access, and preventing private allocation of land that blocks traditional beach access.
- 15) Regulate commercial pelagic fisheries within Kenya's EEZ, much of which is currently unregulated, unreported, and illegal, through improved surveillance, monitoring, and enforcement.
- 16) Build capacity and human resources for Integrated Coastal Zone Management (ICZM) through capacity building and financing support for existing national centers for ICZM research, education, and training.
- 17) Provision by GOK of adequate and sustainable funding for effective coastal and marine management.
- 18) Control of sediment loads from the Tana and Athi-Galana-Sabaki Rivers through improved river basin management, and better upstream land use planning, management, and practices.
- 19) Improved integration of traditional knowledge into coastal resource management.
- 20) Improved opportunities for women to participate in coastal and marine NRM and biodiversity conservation.

Continued on next page...

Box 7.2 Actions Needed, according to Kenya State of the Coast Report Continued....**Social Actions****Political/Institutional/Governance Actions****Economic Actions**

- 21) Improvement of solid waste management, sewage systems, and other pollution control in coastal communities, towns, and cities.
- 22) Conduct applied research aimed at improved management of coastal groundwater resources.
- 23) Development of models of sustainable and conservation-friendly aquaculture for both freshwater and marine species on the Kenyan coast that does not destroy or degrade natural habitats, and which may reduce pressure on wild-harvested stocks.
- 24) Clarification and regularization of the legal definition of the area and extent of beaches in Kenya, and provision of clear legislation governing the development of structures along the shoreline, in order to prevent land-use conflicts in beach and dune ecosystems.
- 25) Include in the Agriculture Act provisions to regulate chemical and fertilizer usage at the coast, and in other parts of the country from which runoff would carry it, to prevent damage to coastal and marine ecosystems.
- 26) Development and implementation of environmentally-friendly methods of salt manufacturing in coastal areas, including construction of evaporation ponds w/o destroying mangroves, and protection of mangroves from excessive salinity from pond effluents.
- 27) Ensure that proper environmental protection measures, as provided for in EMCA and other regulations, protect coastal and marine ecosystems from any oil and gas exploration and any eventual drilling.
- 28) Ensure that any new port development follows an Environmental Management Plan that prevents and/or mitigates coastal and marine biodiversity impacts.
- 29) Incorporation of management of risks associated with climate change –such as sea level rise, erratic weather patterns, weather extremes and storms– into Kenya’s ICZM strategy and plan.
- 30) Modernization of Kenya’s Marine Protected Areas based on more integrated models and best practices from elsewhere in the world that include adjacent and interlinked ecosystems such as mangroves, and encompass a greater diversity of marine habitats.
- 31) Establishment of transboundary Marine Protected Areas.
- 32) Establishment of a long-term monitoring and evaluation (M&E) system for Kenya’s coastal and marine ecosystems.

This list is derived from the “Recommendations for Integrated Coastal Zone Management (ICZM)” given in Section 8.2, pp. 74-48, of the Kenya State of the Coast Report (Government of Kenya, 2009) and implies certain “actions necessary,” although they are not specified by that term. The above is a summary of that list, rephrased into the language of FAA Sections 118-119.

7.2 ACTIONS NEEDED AS IDENTIFIED BY THE ASSESSMENT TEAM

The Assessment Team gathered information about “actions necessary” to conserve biodiversity and tropical forests from the diverse sources described in the Introduction to this report. From our interviews with key informants, ranging from the Minister of Forestry and Wildlife to mangrove cutters in Lamu (see Annex C: Persons Contacted), we compiled a list of 116 “actions necessary” as stated by this wide range of biodiversity “stakeholders.” This list, presented in Annex E, is instructive for a number of reasons and one of the main things to note is that a number of “actions necessary” were given repeatedly. The Team used this informal sampling process to identify what we believe are the more universal, high-priority actions needed. The list is also instructive because it demonstrates that there are some very specific actions needed that are associated with particular ecosystems, and others that apply to more than one ecosystem. Given Kenya’s ecological, economic, and cultural diversity, there can be no such thing as “one size fits all” conservation.

In identifying some of the key “actions necessary” for conservation, our analysis also followed the logical framework of this assessment – actions needed are those actions that remove or reduce the social, political, and economic causes of the threats to biodiversity. Table 7.2 presents a summary of some of the key actions needed to address causes of major threats across the range of ecosystems in Kenya.

TABLE 7.2 ACTIONS NEEDED BY CAUSE, THREAT, AND ECOSYSTEM			
ECO-SYSTEM	THREATS	CAUSES	ACTIONS NEEDED
Terrestrial			
Montane Forests	Loss, fragmentation, & degradation from: <ul style="list-style-type: none"> • Agricultural expansion (smallholders, large commercial enterprises) • Plantations of exotic timber species • Illegal logging, charcoaling, firewood collection 	<ul style="list-style-type: none"> • Unclear land tenure and conflict over land, including ethno-political conflict • Illegal land use changes • Lack of comprehensive land use planning for montane forest “water towers” • Inadequate public understanding of the value of montane biodiversity/ ecosystems to provide ecosystem services (e.g., hydrological services) • Lack of equitable access to economic opportunities for sustainable livelihoods in forest areas 	<ul style="list-style-type: none"> • Regularize and clarify land tenure • Enforce land law and stop irregular/extra-legal land allocation • Develop comprehensive plan for conserving montane watershed forests and allocating water • Conduct policy-relevant research on eco-hydrology of all major montane forests • Raise public and parliamentary awareness of montane forest biodiversity and hydrological services • Improve equitable access to economic opportunities • Improve conservation-friendly land uses on private and community lands • Improve co-management mechanisms on public lands
Coastal Forests	Loss, fragmentation, & degradation from: <ul style="list-style-type: none"> • Agricultural expansion (small and large scale) • Illegal logging, charcoaling, firewood collection • Snares for bushmeat actually harvest a range of forest species • Vegetation damage from elephants (for example, fenced-in elephants at Arabuko-Sokoke) 	<ul style="list-style-type: none"> • Insecure land tenure for traditional coastal communities and irregular/extra-legal land allocation • Lack of on-farm trees for construction materials • Lack of sustainable charcoal/cooking fuels • Wildlife policy prioritizes elephant conservation over forests 	<ul style="list-style-type: none"> • Secure land tenure for traditional coastal communities and stop irregular/extra-legal land allocation • Support small-scale farm forestry/agroforestry • Develop/promote alternatives to charcoal/firewood and fuel-efficient stoves • Create elephant corridor out of Arabuko-Sokoke to Tsavo and/or relocate some Arabuko-Sokoke Forest elephants

Grassland Savanna	<ul style="list-style-type: none"> • Fragmentation of landscape through fencing and subdivision (including peri-urban expansion; e.g., Kitengela corridor) • Unsustainable grazing practices • Grazing conflicts • Poaching of elephants (a keystone/umbrella/landscape species) • Blockage or degradation of movement corridors and wet/dry season migration routes by roads, fencing, agricultural development • Restriction of water points for wildlife and livestock, as well as poorly planned additions of these water points • Loss of river flows (e.g. Mara, Ewaso Ng'iro) from reduction & poor management of mountain forests, and upstream water abstraction & waste • Conversion to agriculture (rainfed & irrigated) • Climate change 	<ul style="list-style-type: none"> • Unclear land tenure/boundaries and traditional conflict over grazing resources and water points • Inadequate inter-ethnic and inter-stakeholder communication and inter-ethnic dispute resolution mechanisms • Inadequate resources for anti-poaching control • Deforestation & poor water management in montane "water tower" forests • Lack of alternative, higher-value diversified livelihood & economic opportunities • Global economy based on unsustainable fossil fuel energy • Lamu Port/Lamu Port-Southern Sudan-Ethiopia Transport Corridor (LAPSSET) Corridor • Nairobi Southern Bypass Road 	<ul style="list-style-type: none"> • Transform traditional pastoral tenure and dispute resolution mechanisms through improved communication • Increase systems and capacity for anti-poaching control • Improve conservation and management of montane forests and water • Diversify economic opportunities in pastoral areas through increased tourism, handicrafts, commercial meat sales, beekeeping, and bio-enterprises for native plant products • Strengthen the National Environment Management Authority to ensure that major infrastructure projects prevent and/or mitigate negative impacts on ecosystems and species
Bushland & Woodland Savanna	<ul style="list-style-type: none"> • Same as for grassland savanna 	<ul style="list-style-type: none"> • Same as for grassland savanna 	<ul style="list-style-type: none"> • Same as for grassland savanna
Other (alpine, etc.)	<ul style="list-style-type: none"> • Global climate change (alpine warming & vegetation zonation shifts) 	<ul style="list-style-type: none"> • Global economy based on unsustainable fossil fuel energy 	<ul style="list-style-type: none"> • Promote a low-emission development strategy for Kenya • Develop carbon sequestration projects in restoring montane and coastal forests

Marine			
Coral Reefs	<ul style="list-style-type: none"> • Overfishing of keystone reef species • Destructive fishing practices (e.g., dynamite, poison, small-mesh nets, beach seining) • Sedimentation from onshore activities • Destruction and degradation from development of port infrastructure (e.g., Lamu Port) • Coral bleaching & damage from global climate change (warming and ocean acidification) 	<ul style="list-style-type: none"> • Undefined/poorly defined marine resource tenure • Marine resource management agencies lack enforcement systems & capacity (boats, fuel, patrol staff) • Upstream agricultural practices cause soil erosion to rivers • Climate change from unsustainable global fossil fuel economy 	<ul style="list-style-type: none"> • Regularize marine resource tenure and expand traditional systems (“tengefu”) & locally-managed marine areas • Provision of adequate support by the Government of Kenya to fulfill enforcement mandates • Conduct Strategic Environmental Assessment for Lamu Port and make findings public • Support further scientific research on reef resilience to ocean warming and acidification in Kenya • Develop comprehensive strategy for coral conservation involving also up-stream stakeholders
Mangroves	<ul style="list-style-type: none"> • Cutting – legal but unmanaged, and illegal • Destruction and degradation from development of port infrastructure (e.g., Lamu Port) 	<ul style="list-style-type: none"> • Lack of ecological information for sustainable management • Lack of comprehensive mangrove strategy for Kenya or the region • Lack of systems and capacity for management and enforcement (Kenya Forest Service) 	<ul style="list-style-type: none"> • Develop ecologically-based management plans for major mangrove areas • Develop and implement comprehensive mangrove conservation and management strategy
Seagrass Beds	<ul style="list-style-type: none"> • Physical degradation from bottom trawling for shrimp/prawns • Destruction and degradation from development of port infrastructure (Lamu Port) 	<ul style="list-style-type: none"> • Lack of ecological information underlying policy that allows bottom trawling 	<ul style="list-style-type: none"> • Evaluate ecological impacts of shallow bottom-trawling for prawns and review policy and permitting
Beaches and Dunes	<ul style="list-style-type: none"> • Habitat degradation from tourism infrastructure and other development 	<ul style="list-style-type: none"> • Insecure land tenure for traditional coastal communities and irregular/extra-legal land allocation 	<ul style="list-style-type: none"> • Secure land tenure for traditional coastal communities and stop irregular/extra-legal beach-front land allocation

Near-shore Marine	<ul style="list-style-type: none"> • Overharvesting of valuable species and by-catch 	<ul style="list-style-type: none"> • Use of illegal fishing gear (e.g., beach seines, small-mesh nets) • Use of legal fishing gear (ring nets) with high by-catch ratios 	<ul style="list-style-type: none"> • Develop systems and capacity for near-shore fisheries monitoring, enforcement, and management
Pelagic/ Offshore Marine	<ul style="list-style-type: none"> • Overharvesting of tunas & other commercially valuable species 	<ul style="list-style-type: none"> • Unmanaged/unregulated commercial fishing by foreign fleets 	<ul style="list-style-type: none"> • Develop systems & capacity for near-shore fisheries monitoring, enforcement, and management
Freshwater Aquatic	<p>Lakes</p> <ul style="list-style-type: none"> • Loss of inflow (e.g., Rift Valley lakes) • Invasive species (e.g., water hyacinth) <p>Rivers</p> <ul style="list-style-type: none"> • Reduced flow & changes in seasonal flow regimes • Loss of riparian vegetation <p>Wetlands</p> <ul style="list-style-type: none"> • Reduced inflows • Conversion to agricultural uses (farms, pastures) 	<ul style="list-style-type: none"> • Upstream water abstraction and forest degradation in upstream watersheds (e.g., Gibe III dam in Ethiopia) 	<ul style="list-style-type: none"> • Regulate and enforce water abstraction in watersheds • Conserve and restore native montane forest catchments • Promote riparian conservation • Develop and/or enforce policy to prevent or mitigate conversion of permanent or ephemeral wetlands



Underpass for elephants under Highway A-2 between Lewa Wildlife Conservancy and Ngare Ndare Forest Reserve and Mt. Kenya. Photo: B. Byers, August 2011

8.0 CONTRIBUTION OF PROPOSED USAID ACTIVITIES

8.1 SUMMARY OF CURRENT AND PROPOSED USAID PROGRAMS

Environment and Natural Resources Management

Because Natural Resources Management is one of USAID-Kenya's Development Objectives, it makes directly relevant contributions to meeting some of the actions necessary for conserving biodiversity and tropical forests in Kenya. NRM is not a large part of the Mission's portfolio, however. In FY 2009, the NRM Program received about US\$5.5 million, approximately 12% of the Mission's budget. Relative to the total cost of "actions needed" – which are mainly the responsibility of the GOK in any case – USAID NRM funding can only support a few of the actions needed, and, hopefully, catalyze further government and non-governmental investments.

USAID/Kenya's current Environment and Natural Resources Management Program has 12 discrete activities (USAID/Kenya, 2010a):

PROGRAM	IMPLEMENTING ORGANIZATION	END DATE
Aberdares Forest Conservation Project	Green Belt Movement	Dec. 2011
Butterfly House Project	National Museums of Kenya	Sept. 2011
Kenya Civil Society Strengthening Program	Pact, Pact Kenya	Sept. 2012
Kitengela Conservation Program	African Wildlife Foundation	Dec. 2011
Laikipia Rangeland And Watershed Conservation Program	Laikipia Wildlife Forum	June 2013
Land Policy Implementation	Ministry of Lands	June 2012
Mau Forest Boundary Marking	Ministry of Lands	June 2012
ProMara: Mau Forest Initiative	Tetra Tech ARD	Sept. 2012
Northern Rangelands Trust (NRT)	Lewa Wildlife Conservancy	Dec. 2011
Securing Land Tenure and Property Rights in Support of Livelihoods and Biodiversity Conservation (SECURE)	Tetra Tech ARD	Feb. 2012
The International Small Group and Institute for Tree Planting Program (TIST)	Institute for Environmental Innovation	Mar. 2014
Wildlife Conservation Program	Kenya Wildlife Service	June 2012

Agriculture, Business and Environment

USAID/Kenya's Agriculture, Business and Environment Office, of which the Environment and Natural Resources Management Program outlined above is a part, has supported a range of agricultural development and marketing activities in the country, including (USAID/Kenya, 2010a):

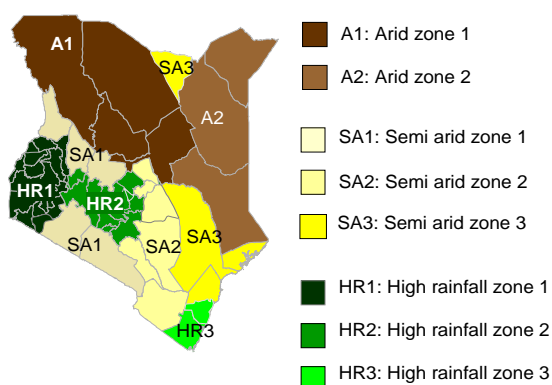
- Kenya Agricultural Biotechnology Program
- Kenya Dairy Sector Competitiveness Program

- Kenya Drylands Livestock Development Project
- Kenya Horticulture Competitiveness Project
- Kenya Maize Development Program Follow-On Activities
- Kenya Staple Food Crops Program
- Kenya Access To Rural Finance

Feed the Future Program

The Agriculture, Business and Environment Office is responsible for the Feed the Future (FTF) Program. USAID/Kenya's draft FTF Strategy of June 2011, proposes a geographical focus for the program in two areas, labeled on the map in Figure 8.1 as HR1 and SA2 (USAID/Kenya, 2011a).

Figure 8.1 Feed The Future subregions in Kenya



Source: USAID/Kenya Feed the Future Multi-Year Strategy 2011-2015 (USAID/Kenya, 2011a)

Given this geographic focus for FTF, there is overlap with areas that are among the highest priorities for biodiversity and tropical forest conservation, to be discussed in Chapter 9. The area designated HR1 includes Mt. Elgon, the Cherangani Hills, the Mau Forest Complex, Kakamega Forest, North and South Nandi Forests, Saiwa Swamp National Park, and the shores of Lake Victoria. Mt. Elgon, the Cherangani Hills, and Kakamega Forest are among the “water towers” of national importance listed in the draft Wildlife Bill of 2011 (see Box 2.1 in Section 2 for list of such water towers), and there is significant biodiversity in these areas. The government has plans to develop tourism in particular areas as part of a western Kenya tourist circuit. The hydrological linkages between forests, agriculture, and tourism in this area is of critical importance, and a better understanding of these linkages will be important in designing and implementing specific FTF activities.

Another area of overlap between FTF focal areas and biodiversity conservation priorities occurs in the area designated as SA2 on the map shown in Fig. 8.1. The area designated as SA2 includes southern savanna ecosystems to the northeast of Amboseli National Park and includes Tsavo East and Tsavo West National Parks.

In addition to areas of geographic overlap between FTF and priority areas for biodiversity and forest conservation, two of the value chains targeted for strengthening in the FTF strategy can also be linked to conservation. The FTF draft strategy (USAID/Kenya, 2011a) discusses the fact that “drought tolerant crops,” such as sorghums and millets, as well as a range of legumes, are largely indigenous to Africa (unlike maize) and well adapted to arid and semi-arid

ecosystems. These were discussed in Chapter 2 of this report as examples of agro-biodiversity, and their importance to food security was discussed there also. The FTF strategy states: “To bolster food security and mitigate risks in SA2, USAID/Kenya will promote *drought tolerant crops (sorghum/millet and root crop systems)* as well as *horticulture*, which are more nutritious foods than maize and whose production and marketing is largely dominated by women. The non-cereal crops, including pulses, are also regarded as “women’s crops”, commonly grown in home gardens or as intercropped and are often the only food available during the lean seasons or when the main harvest fails. In a majority of cases, women have greater control over income from these crops.”

Indigenous fruit trees were also discussed as an example of agro-biodiversity in Chapter 2, and these fit within another value chain targeted in the FTF strategy, “fresh fruit and vegetable value chains.” In this case, there could be significant synergy between biodiversity conservation objectives and FTF objectives. In addition to conserving native biodiversity, any tree crops, such as most fruits, can contribute to several of the actions necessary identified in this assessment, including increasing on-farm tree cover (thereby supporting the ecosystem services of watershed protection, soil conservation, and carbon sequestration).

Democracy and Governance

According to USAID/Kenya’s Democracy and Governance strategy (USAID/Kenya, 2011b), “USAID’s five-year (FY11-FY15) strategy objective is to ensure substantial implementation of the constitution and key provisions in it. Those provisions particularly relate to the establishment of a functioning county system of governance, an effective set of checks and balances, and enhanced participation of citizens in governance.” (USAID/Kenya, 2011b)

The Democracy and Governance (DG) Strategy, like the FTF draft strategy, uses its own set of filters to select areas of geographic focus: “In addition to working on national programs, USAID will also focus geographically on volatile areas and in selected counties. The former might include Nairobi slums, Mombasa, multi-ethnic counties, and the Rift Valley.” These DG filters provide potential linkages with a number of high priority areas for biodiversity and forest conservation (to be discussed in Chapter 9). For example, the Rift Valley could include some of the important montane “water tower” forests such as the Mau Forest Complex and the Cherangani Hills. “Multi-ethnic counties” mentioned in the DG strategy could include the Samburu and Isiolo areas, and the Lamu District, areas of priority from a biodiversity and forest conservation viewpoint.

In addition to areas of geographic overlap, there is a close linkage between DG and natural resources policy, institutional, and governance issues. An analysis of the lists of “actions necessary” presented in Chapter 7 shows that a majority of actions needed are related to politics, institutions, and governance – traditionally the focus of DG. The DG Strategy says one objective is, “Ensuring the passage of key bills before the 2012 elections” – the Land Bill, Forest Bill, and Wildlife Bill are relevant here. Civil society and media are cross-cutting themes in the DG Strategy, and both figure in “actions needed” for biodiversity conservation.

In terms of devolution, the strategy says that, “For the remainder of the strategy period, USAID will... continue to strengthen the capacity of select national institutions involved in devolution” (p. 43). One way to link this aspect of the USAID/Kenya DG Strategy with biodiversity and forest conservation would be for USAID to select one or more of the key NRM agencies, such as KFS or KWS, for support under this program.

The USAID/Kenya DG Strategy also places emphasis on conflict mitigation – and each of the highest priority areas for biodiversity and forest conservation in Kenya are areas of land and resource conflict, from the Mau Forest, to the northern coast, to the northern and southern ASAL savanna rangelands. Thus, there are large opportunities for synergy between USAID's NRM and DG programs related to managing and mitigating land and natural resource conflicts.

Education and Youth

A significant number of the actions necessary for biodiversity and forest conservation that the Assessment Team identified relate to improved awareness of, and education about, the values and benefits of forests and biodiversity. This finding provides an opportunity for synergies between the Environment and Natural Resources Program and the Education Office in the development of future activities, as reflected in their 2011-2015 Education Strategy (USAID/Kenya, 2011c).

USAID/Kenya has formally launched a new program:

Yes Youth Can! supports youth-led recovery and development in areas that experienced post-election violence or are at risk to experience violent conflict in the future. This US\$45-million program aims to encourage youth voice, youth entrepreneurship, and youth leadership. Yes Youth Can! is being designed to empower Kenyan youth to achieve a greater voice in national reform and create new livelihood opportunities. (USAID/Kenya website, Education and Youth Program, Yes Youth Can! - <http://kenya.usaid.gov/programs/education-and-youth/47>)

The program will support the creation of effective national and local networks of youth leaders to advocate peacefully for meaningful reforms of the government and economy. The program will fund grass-roots community development and empowerment projects implemented by youth and youth organizations.

According to information the Assessment Team received from USAID/Kenya, some of the Yes Youth Can! activities will involve natural resources management, including tree nursery management, tree planting, forest patrols, and environmental conservation awareness campaigns.

Health

The Assessment Team reviewed the “USAID/Kenya Five Year Implementation Framework for the Health Sector (2010-2015) (USAID/Kenya, 2010b). We believe that significant opportunities exist to link health sector interventions with biodiversity and forest conservation, and we recommend that they be thoroughly explored for future programming. We recommend that not only thematic linkages be explored but that specific geographic linkages also be considered, such as co-locating future NRM and health activities in the same communities.

The USAID/Kenya health strategy considers the importance of family planning and reproductive health, maternal, neonatal, and child health, and nutrition. All of these are factors that enable a country to pass through the demographic transition to a stable population. The Health Sector Implementation Framework states:

Family Planning will be a key component of the USAID/Kenya health program given the high unmet need for services. The focus will be on eliminating barriers to and increasing the quality, access and demand of integrated services to meet enormous unmet need for family planning in Kenya. Service and behavior change interventions will enable couples to have

healthy timing and spacing of their children and careful design will ensure full voluntary choice.

Although it is sometimes stated that population growth is a threat to biodiversity and forests, this claim is not technically correct. Population growth is not one of the direct threats to biodiversity or forests (see Chapter 4) and not even necessarily a direct cause of these biophysical threats. However, population growth often acts as a “root cause,” or “driver,” underlying other social, political, and economic causes of direct threats to biodiversity. If it is not addressed and the population not ultimately stabilized, actions necessary to address the social, political, and economic causes of threats to biodiversity will be all the more difficult to carry out.

Kenya has yet to go through the demographic transition, and its population growth rate is estimated at 2.7%, leading to a population doubling time of 26 years (Population Reference Bureau, 2010). Any opportunity to hasten the demographic transition through improvements in maternal and child health, nutrition, family planning services, and improved water supply and sanitation will have the indirect benefit of reducing some of the causes of the threats to biodiversity and tropical forests.

USAID/East Africa Regional Program

USAID/East Africa is the Nairobi-based regional mission that promotes economic growth and trade, environmental conservation, conflict reduction and improved governance, and improved health and health systems. In terms of environment and natural resources management,

USAID also supports the conservation of key transboundary natural resources, such as water within the Masai Mara-Serengeti ecosystem, provides guidance to African partners on carbon markets to mitigate global climate change, and helps smallholder farmers and pastoralists adapt to climate uncertainties. (USAID website - www.usaid.gov/locations/sub-saharan_africa/countries/redso/)

The Assessment Team identified a number of regional and transboundary issues related to biodiversity and tropical forest conservation in Kenya that are relevant to the regional mission. These include:

- Gibe III Dam on the Omo River in Ethiopia, which could affect flows to Lake Turkana;
- Mara River flows and catchment protection in the Mau Forest Complex;
- East Africa Marine Ecoregion and the Western Indian Ocean, including coastal zone, coral reef, and pelagic fisheries coordination, cooperation, and enforcement;
- Security related to conservation, sustainable coastal development, and tourism in the Lamu District;
- Effects of drought and conflict in Somalia on rangelands and wildlife in northeastern Kenya; and
- Regional transport and development corridors such as the LAPSSET Corridor.

USAID/East Africa has a program addressing the hydrology of the Mara River in the Mau Forest Complex and has worked with the governments of Kenya and Tanzania. The information generated in the USAID/East Africa Mau program informed the development of the current USAID/Kenya ProMara Program.

Working in FTF region HR1 (discussed above) will require close collaboration with the Lake Victoria Basin Commission, responsible for coordinating the sustainable development agenda of

the Lake Victoria Basin, and this could provide a link between USAID/Kenya and the regional mission's transboundary interests.

8.2 EXTENT TO WHICH USAID'S PROPOSED PROGRAMS COULD CONTRIBUTE TO ACTIONS NEEDED

Based on the summary of current and proposed USAID programs given in Section 8.1 above, Table 8.2 suggests relevant linkages between current and proposed programs at USAID/Kenya that could contribute to some of the identified actions needed in this assessment. Note that because the Environment and Natural Resources Management program has not yet developed a new strategy, the table reflects current activities being implemented by this program but not potential future activities. Recommendations for how future NRM activities could be designed to support priority actions necessary will be discussed in Section 9.2.

TABLE 8.2 POTENTIAL CONTRIBUTIONS OF USAID'S PROPOSED PROGRAMS			
ECOSYSTEM	ACTIONS NEEDED	USAID PROGRAMS IMPLEMENTING RELEVANT ACTIONS	USAID PROPOSED PROGRAMS AND ACTIVITIES RELEVANT TO ACTIONS NEEDED
Terrestrial			
Montane Forests	<ul style="list-style-type: none"> Regularize and clarify land tenure 	ProMara, Land Policy Implementation, Mau Forest Boundary Marking	Democracy and Governance (DG) Program
	<ul style="list-style-type: none"> Enforce land law and stop irregular/extra-legal land allocation 	ProMara, Land Policy Implementation, Mau Forest Boundary Marking	DG Program
	<ul style="list-style-type: none"> Develop comprehensive plan for conserving montane watershed forests & allocating water 	ProMara	Feed The Future (FTF) in western montane forests
	<ul style="list-style-type: none"> Conduct policy-relevant research on eco-hydrology of all major montane forests 		USAID/East Africa Regional (Mara River); FTF in western montane forest watersheds
	<ul style="list-style-type: none"> Raise public and parliamentary awareness of montane forest biodiversity and hydrological services 	ProMara	Yes Youth Can! to raise public awareness among youth
	<ul style="list-style-type: none"> Improve equitable access to economic opportunities 	ProMara	FTF in western montane forest watersheds
	<ul style="list-style-type: none"> Improve conservation-friendly land uses on private and community lands 	ProMara	FTF in western montane forest watersheds
	<ul style="list-style-type: none"> Improve co-management mechanisms on public lands 	ProMara	FTF in western montane forest watersheds
Coastal Forests	<ul style="list-style-type: none"> Secure land tenure for traditional coastal communities and stop irregular/extra-legal land allocation 	SECURE	DG Program
	<ul style="list-style-type: none"> Support small-scale farm forestry/agroforestry 		FTF

	<ul style="list-style-type: none"> Develop/promote alternatives to charcoal/firewood & fuel-efficient stoves 		
	<ul style="list-style-type: none"> Create elephant corridor out of Arabuko-Sokoke to Tsavo and/or relocate some Arabuko-Sokoke Forest elephants 	Northern Rangelands Trust (NRT)	
	<ul style="list-style-type: none"> Transform traditional pastoral tenure and dispute resolution mechanisms through improved communication 	NRT	DG Program
	<ul style="list-style-type: none"> Increase systems and capacity for anti-poaching control 	NRT	
	<ul style="list-style-type: none"> Improve conservation and management of montane forests and water 	ProMara, Aberdares Forest Conservation Project	FTF in western montane forests
Grassland Savanna	<ul style="list-style-type: none"> Diversify economic opportunities in pastoral areas through increased tourism, handicrafts, commercial meat sales, beekeeping, and bio-enterprises for native plant products 	NRT, Laikipia Rangeland and Watershed Conservation Program	FTF in southern savannas
	<ul style="list-style-type: none"> Strengthen National Environment Management Authority to ensure that major infrastructure projects prevent and/or mitigate negative impacts on ecosystems and species 		Agriculture, Business and Environment Office Program
Bushland & Woodland Savanna	<ul style="list-style-type: none"> Same as for grassland savanna 		
	<ul style="list-style-type: none"> Promote a low-emission development strategy for Kenya 		
Other (alpine, etc.)	<ul style="list-style-type: none"> Develop carbon sequestration projects in restoring montane & coastal forests 	The International Small Group and Institute for Tree Planting Program (TIST)	
Marine			
	<ul style="list-style-type: none"> Regularize marine resource tenure & expand traditional systems ("tengefu") & locally-managed marine areas 	SECURE	DG Program
	<ul style="list-style-type: none"> Provide adequate support from Government of Kenya to fulfill enforcement mandates 		
Coral Reefs	<ul style="list-style-type: none"> Conduct Strategic Environmental Assessment for agricultural development strategy for LAPSET Corridor and Northern arid and semi-arid lands & Lamu Port, and make findings public 		Agriculture, Business and Environment Office Program

	<ul style="list-style-type: none"> • Support further scientific research on reef resilience to ocean warming and acidification in Kenya 		
	<ul style="list-style-type: none"> • Develop comprehensive strategy for coral conservation, also involving up-stream stakeholders 		
Mangroves	<ul style="list-style-type: none"> • Develop ecologically-based management plans for major mangrove areas 		
	<ul style="list-style-type: none"> • Develop and implement comprehensive mangrove conservation and management strategy 		
Seagrass Beds	<ul style="list-style-type: none"> • Evaluate ecological impacts of shallow bottom-trawling for prawns and review policy and permitting 		
Beaches & Dunes	<ul style="list-style-type: none"> • Secure land tenure for traditional coastal communities and stop irregular/extra-legal beach-front land allocation 	SECURE	
Near-shore Marine	<ul style="list-style-type: none"> • Develop systems and capacity for near-shore fisheries monitoring, enforcement, and management 		DG Program
Pelagic/ Offshore Marine	<ul style="list-style-type: none"> • Develop systems and capacity for pelagic fisheries monitoring, enforcement, and management 		
Freshwater Aquatic	<ul style="list-style-type: none"> • Regulate and enforce water abstraction in watersheds 		
	<ul style="list-style-type: none"> • Conserve and restore native montane forest catchments 	ProMara, Aberdares Forest Conservation Project	FTF in western montane forests
	<ul style="list-style-type: none"> • Promote riparian conservation 		FTF in western montane forests
	<ul style="list-style-type: none"> • Develop and/or enforce policy to prevent or mitigate conversion of permanent or ephemeral wetlands 		

9.0 RECOMMENDATIONS

The recommendations below emerged from analysis of the information presented above. At the first level of analysis, information about the severity and extent of threats to the various ecosystems of Kenya (Chapter 4) suggests priorities for conservation. The causes of those threats, and actions needed to address them (Chapters 4 and 7) suggest that certain issues, or themes, are the most important. An informal content analysis of the lists of “actions necessary” given in Chapter 7 and Annex E led us to propose the priority themes below.

9.1 PRIORITY ECOSYSTEMS AND THEMES

9.1.1 ECOSYSTEMS

Montane Forests

Montane forests stand out as a high priority for conservation because:

- These forests are the ecosystem with the greatest percentage of total area lost of any ecosystem in Kenya, with only about 10% of their original coverage remaining;
- Montane forests provide irreplaceable ecosystem services at the national level, in particular as the watershed catchments for all of the rivers of Kenya, and have higher potential for carbon sequestration than any other ecosystem;
- This ecosystem has relatively high levels of endemic species; and
- The demand for agricultural land, and conflicts over it, still threaten even the remaining small fraction of this ecosystem.

The central core of mountains and highlands that includes Mt. Kenya, the Aberdares, the Mau Forest Complex seems to be the most important area of focus to the Assessment Team, in part because it contains the headwaters of the majority of rivers that cross the ASALs to the north, east and south, and supplies drinking water to a large percentage of Kenya’s people, including to the city of Nairobi. However, Mt. Elgon and the Cherangani Hills also feed rivers that flow through ASALs (e.g., the Turkwel that flows into Lake Turkana). These western highlands also provide surface water for agricultural and domestic uses from the rivers flowing into Lake Victoria. Indeed, a strong case could be made that any and all montane forests, and indeed in any forested hill ranges that provide important local water catchments (e.g., the Matthews Range) would be priority ecosystems from the point of view of conserving irreplaceable ecosystem services. Restoration of montane forests, their biodiversity, and the ecosystem services they provide is of high national value, and should be a priority for conservation.

Coastal and Marine Ecosystems

The ecosystems of Kenya’s coastal and marine zone, from its beaches, mangroves, and coral reefs out to the edge of its 200-mile Exclusive Economic Zone in the western Indian Ocean stand out as a high priority for conservation because:

- This zone accounts for a large proportion of the species in Kenya, although it is much less studied than terrestrial ecosystems;
- The ecosystem services of this zone, in particular nutrient cycling, and the protection of the coast from storms, are irreplaceable and undervalued;
- Coastal natural resources support the livelihoods of coastal communities, and there is conflict for access and use rights; and

- The pelagic marine ecosystem of the open ocean is almost one-third the area of Kenya, but its living resources are almost unmanaged and are not contributing nearly what they could to the country's well-being.

For these reasons, the Assessment Team recommends that empowering the GOK and communities to sustainably manage coastal and marine resources is an important priority.

Savanna/Woodland/Bushland Ecosystems

The dynamic ecological mosaic of savanna grassland, woodland, and bushland in the ASALs of Kenya are a high priority for conservation because:

- They cover approximately 80% of the country;
- They are threatened with loss and degradation from unsustainable grazing and fragmentation caused by corridors for large-scale movements of both wildlife and livestock;
- These ecosystems support the big, charismatic mammals that are a major factor drawing international tourists to Kenya;
- They also support traditional pastoral communities who live in areas unsuitable for significant crop production.

The Assessment Team believes that promoting secure livelihoods in the ASALs through compatible systems of management of both livestock and wildlife is a priority. Given their somewhat different ecological, cultural, political, and economic settings, strategies for this kind of development may differ in the northern ASALs and the southern tier ranging from Tsavo to the Masai Mara.

Coastal Forests

The unique coastal dry forests of the East African coastal lowlands, including those found in Kenya, are a high priority for conservation action because:

- They contain an unusually high proportion of endemic species of plants and other taxa;
- Significant areas of these forests have been cleared for agriculture because they are found in a zone with sufficient precipitation for rainfed crops; and
- They are now highly fragmented, and are still being degraded and converted.

The Assessment Team believes that finding ways of stopping further degradation and fragmentation of these forests through collaborative actions of all stakeholders, from local communities to GOK agencies, is a high priority.

9.1.2 THEMES

The informal content analysis of the "actions necessary" that the Assessment Team gathered from all sources leads us to recommend the following five thematic areas as the highest priorities for biodiversity and forest conservation in Kenya:

- Devolution, decentralization and CBNRM
- Land and NRM policy and legislative reform to create the enabling environment for CBNRM and biodiversity-based economic opportunities
- Enhanced livelihoods and economic opportunities
- Applied science, environmental information, and monitoring
- Public awareness and education and capacity of NGOs for advocacy

The priority ecosystems and priority themes we propose here can be arrayed in a matrix that could be used as a conceptual framework for designing strategies and programs to conserve biodiversity and tropical forests.

Table 9.1 Theme by Ecosystem Matrix

Theme	Ecosystem			
	Montane Forests	Coast-Marine	Savannas, Bushland	Coastal Forests
Devolution, decentralization and CBNRM				
Policy and legislative reform to create enabling environment for CBNRM and economic opportunities				
Livelihoods and economic opportunities				
Applied science, environmental information, and monitoring				
Public education and NGO advocacy				

9.2 DESIGNING AN NRM PROGRAM TO MAXIMIZE SUPPORT FOR PRIORITY ACTIONS NECESSARY

The matrix can provide a structure for selecting hypothetical combinations of ecosystems and themes to consider for possible strategies and programs. Three examples are provided below, with each having potential strengths and weaknesses. Although this assessment is not meant to be a program design exercise, we present these because they flow naturally from the analytical process we used for this assessment.

Table 9.2 shows a hypothetical type of program that would emphasize the theme of devolution, decentralization, CBNRM, and policy and legislative reform in four types of ecosystems. This type of program design would allow piloting of methods and models across ecosystems to identify common principles and enhance generalization through cross-ecosystem learning. USAID/Kenya's NRM programs have been doing this, to a certain extent.

Table 9.2 Program Design Using a Thematic Cross-Cut in Several Ecosystems

Theme	Ecosystem			
	Montane Forests	Coast-Marine	Savannas, Bushland	Coastal Forests
Devolution/decentralization & CBNRM				
Policy and legislative reform to create enabling environment for CBNRM & economic opportunities				
Livelihoods & economic opportunities				
Applied science, environmental information, & monitoring				
Public education & NGO advocacy				

Table 9.3 shows a hypothetical type of program design that would emphasize all key themes in two kinds of ecosystems only. This type of program design would allow for integration of activities to address the multiple causes of threats in a given ecosystem, and the integration might create synergies that would lead to greater impacts in a shorter amount of time.

Table 9.3 Program Design Using an Ecosystem Cross-Cut in Several Thematic Areas

Theme	Ecosystem			
	Montane Forests	Coast-Marine	Savannas, Bushland	Coastal Forests
Devolution/decentralization & CBNRM				
Policy and legislative reform to create enabling environment for CBNRM & economic opportunities				
Livelihoods & economic opportunities				
Applied science, environmental information, & monitoring				
Public education & NGO advocacy				

Table 9.4 shows a hypothetical type of program design that mixes themes and ecosystems in a less systematic way, such that all themes are not covered in any ecosystem, and certain themes are only featured in certain ecosystems. This type of program design may allow more diverse program activities, but a risk of higher management burden, some loss of focus, and perhaps less likelihood of measurable impact on biodiversity conservation indicators and targets.

Table 9.4 Program Design Mixing Ecosystem and Thematic Cross-Cuts

Theme	Ecosystem			
	Montane Forests	Coast-Marine	Savannas, Bushland	Coastal Forests
Devolution/decentralization & CBNRM				
Policy and legislative reform to create enabling environment for CBNRM & economic opportunities				
Livelihoods & economic opportunities				
Applied science, environmental information, & monitoring				
Public education & NGO advocacy				

9.3 OPPORTUNITIES FOR CROSS-SECTORAL LINKAGES IN PLANNED USAID/KENYA ASSISTANCE PORTFOLIO

The thematic priorities given above suggest some areas of cross-sectoral overlap between USAID/Kenya's NRM objectives and those of the Democracy and Governance, Education and Youth, Health, and Agriculture, Business and Environment (including Feed the Future) programs. These were discussed in Section 8.1. The thematic areas of devolution, decentralization, and CBNRM, as well as policy and legislative reform, ought to link closely with the Democracy and Governance objectives of the Mission. The livelihoods and economic opportunities theme likewise should synergize with objectives of the agriculture, competitiveness, and food security aspects of the Mission's portfolio. Public education and NGO advocacy link logically with Education and Youth, as well as DG objectives.

9.4 RECOMMENDATIONS FOR AVOIDING NEGATIVE IMPACTS ON BIODIVERSITY

A number of the development goals promoted in Kenya Vision 2030 (Government of Kenya, 2007) have significant potential to harm ecosystems and species unless properly carried out, including mining and oil and gas development, development of resort cities, construction of transportation corridors and by-pass roads. In particular, many of our key informants raised concerns about the proposed development of the Lamu Port and the LAPSET Corridor. One clear "action needed" was stated as: "Need transparent information on plans for Lamu Port and LAPSET Corridor and a Strategic Environmental Assessment."

The Assessment Team learned that the Ministry of State for Development of Northern Kenya and Other Arid Lands, and the ASAL Secretariat within that ministry, are taking the lead in assessing the social, ecological and economic impacts of the LAPSET Corridor, with support from the World Resources Institute and the International Livestock Research Institute. It is not clear whether sufficient funding has been made available to the ministry by the GOK for such an assessment.

These issues raise the general question of USAID environmental compliance. For specific activities supported by the Agency, Title 22 of the Code of Federal Regulations, Part 216 (22 CFR 216 - http://www.usaid.gov/our_work/environment/compliance/reg216.pdf) requires environmental impact assessment procedures to be applied. However, sometimes the scale and context into which these specific activities fit may not have been reviewed thoroughly from an environmental impacts point-of-view before proceeding to the lower level of specific activities. Sometimes a higher-level, “strategic” environmental assessment is needed to look at potential large-scale, indirect environmental impacts of a development policy, strategy, or large-scale plan. The case of the Lamu Port and the LAPSSET Corridor seems to the Assessment Team to be a clear example of a situation in which a Strategic Environmental Assessment is needed.

Without taking the large-scale, long-term view, some of USAID/Kenya’s activities may have the potential for unforeseen negative effects on biodiversity. With the information now available to the Assessment Team, we cannot make a clear determination on this matter at this time. However, for example, the Team learned that the Ministry of Agriculture is interested in assistance from international donors such as USAID to develop an “agricultural strategy” for the LAPSSET Corridor. This proposed corridor would pass through the northern ASALs from Lamu, through somewhere near Isiolo, to the border with South Sudan. This part of Kenya does not receive enough precipitation for rainfed agriculture and, as has been discussed elsewhere in this report, its fragile ecosystems are already under stress from unsustainable pastoral systems. Any “agricultural strategy” for the region would have to be extremely sophisticated and well-planned to avoid significant negative effects on the natural resources of the region. For this reason, the Assessment Team would like to see participation by USAID with the GOK in developing such an agricultural strategy for the LAPSSET Corridor as a prime opportunity to support the GOK in the use of modern environmental planning measures, such as the use of Strategic Environmental Assessments.

ANNEX A: BIOGRAPHICAL SKETCHES OF THE ASSESSMENT TEAM

Team Leader – Bruce Byers is a biodiversity conservation and natural resources management specialist with more than 25 years of experience in this field. His work combines an academic background in ecology and conservation biology with extensive practical experience in both applied ecology and social sciences. Dr. Byers has had extensive field experience in Asia, Africa, Europe, and Latin America; he has worked professionally in more than 30 countries. He has served as team leader for seven major evaluations, assessments, and strategic planning exercises for USAID and international NGOs, and served as a team member on many other assessment and evaluation teams, including the ***FAA Section 119 Biodiversity Analysis for Ukraine*** in 2011. He was the lead consultant and author of the 2005 USAID publication ***Tropical Forestry and Biodiversity (FAA 118 and 119) Analyses: Lessons Learned from Recent USAID Experience and Guidelines for USAID Staff***, which was based on a review of more than 30 USAID FAA 119, FAA 118/119, and ETOA reports. In 2008, he led the final evaluation of the USAID Global Conservation Program.

Social Scientist – Joy Hecht is an environmental economist with more than twenty years of experience in the field. She holds a bachelor's degree in economics with specialization in environmental economics and a doctorate in urban and regional planning with an emphasis on economic development. Her consulting includes assignments related to valuation of the natural environment, economic analysis of conservation strategies, strategic environmental assessments, design of mechanisms to finance conservation activities, assessment and development of environmental accounting systems, creation of environmental and sustainable indicators systems, and analysis of data needs for environmental management. Dr. Hecht has worked extensively in sub-Saharan Africa, the Maghreb and Middle East, and South and Southeast Asia, and is fluent in English and French.

Natural Resources Management Specialist – Evans Mwangi holds a PhD in ecology and MSc in conservation biology. He has more than 20 years of experience in research, consulting and academia, and he teaches ecology and environmental studies at the University of Nairobi. He is also an independent consultant in natural resources management and conservation biology. Dr. Mwangi is widely experienced in Kenya, and has significant experience elsewhere in Africa, South Asia, and the northeastern United States. He has undertaken more than 25 consulting assignments for local and international conservation NGOs and NRM projects supported by various funders. His skills include applied knowledge of the impact of Kenyan legislation and policies on biodiversity conservation and management, especially as they relate to wildlife, land use, agriculture, forestry, water resources, tourism and infrastructure.

ANNEX B: STATEMENT OF WORK FOR ASSESSMENT

C.I BACKGROUND

The environmental requirements of USAID Operational Plans and Country Assistance Strategies are specified in ADS 201.3.8.2, Mandatory Technical Analysis for Developing Strategic Plans, Environmental Analysis, and are derived from the Foreign Assistance Act and 22 U.S. Code of Federal Regulations 216. The Foreign Assistance Act addresses tropical forests and biodiversity in Sections 118 “Tropical Forests” and 119 “Endangered Species.” These sections require all country plans to include an analysis of the actions necessary to conserve biological diversity and tropical forests of the country in question and require a description of the extent to which current and proposed USAID actions meet those needs. Section 118/119 analyses are requirements of all USAID Operational Plans and Country Assistance Strategies and should be conducted in preparation for the strategic planning process. These assessments identify biodiversity and forestry assets within a country, discuss the impact of USAID activities there, and determine ways for current and future USAID programs to promote biodiversity conservation and sustainable forest management.

C.II PURPOSE AND OBJECTIVE

The purpose of this task is to conduct an assessment of: (1) the current state of biodiversity and forest conservation in Kenya; (2) the actions necessary in Kenya to conserve tropical forests and biological diversity, and (3) the extent to which the actions proposed for support by USAID/Kenya meet or could meet the needs thus identified.

This assessment is intended to serve as a planning tool to assist USAID/Kenya in better integrating environmental concerns into on-going and proposed programs in the short- and medium-term future. The assessment is also necessary for the purposes of complying with sections 118 and 119 of the Foreign Assistance Act of 1961, as amended, as well as critical to informing the Strategic Framework for Foreign Assistance and country strategy guidelines under ADS 201.3.4.11 and ADS 204.5.

C.III BRIEF COUNTRY PROFILE

Kenya abounds in environmental diversity including coral reefs and mangroves along the Indian Ocean coast, arid shrub land in the north, thick mountain forests of the Aberdares, Mt Elgon and Mt Kenya, and the inland shores and waters of Lakes Victoria and Turkana. Endowed with a rich biodiversity heritage (second highest among African countries in bird and mammal species richness and home to 35,000 known species of flora and fauna) and having more than 50 protected areas that include prestigious Biosphere Reserves and World Heritage Sites; ironically, Kenya has a low natural forest cover (1.7% of the country’s total land area). With a growing population (2.8 percent growth rate), pressure on natural resources is already intense and growing. Thirteen percent of Kenya’s total surface area is currently under protected area status and Kenya’s game parks and spectacular wildlife attract nearly two million tourists each year

(UN-Water 2006). Biodiversity conservation is in essence a high priority and underpins economic vitality.

Fuelwood availability is a major issue. About 70% of the energy biomass based, 95% of which is derived from forests and protected areas. The necessity of finding alternative, clean energy sources is urgent. Forests and protected areas control the health of the country's five "water towers": the Mount Kenya, Aberdare Range, Mau Forest Complex, Mount Elgon, and Cherangani Hills that are the, five largest forest blocks in the country. These "water towers" are sources of water for irrigation, agricultural production, wildlife management, industrial processes, as well as to the hydro-power plants, which produce about 60 per cent of Kenya's electricity output. Protection of these towers is extremely important from the perspective of better natural resources. They guarantee a better health of watershed and, ultimately, ensure the quantity and quality of the drinking water availability downstream.

It is estimated that 530,000 forest-adjacent households (approximately 2.9 million people living within five kilometres from forests) derive direct benefits from indigenous forests. Statistics from recent wildlife counts and studies estimate that the total wildlife population in Kenya is in the range of 650,000 – 700,000. Of this total population, 12 – 25% are found within parks, 12 - 20 % within reserves and 40 -50% within community and private lands. Evidently, the proportion of wildlife within parks is a small fraction of the total national population of wildlife in Kenya, yet, there are few incentives for landowners to conserve wildlife so those who bear the costs are not entitled to benefits (the KWS and up to six local authorities derive over 60% of their revenue from wildlife-based tourism). The government through KWS has a limited area under wildlife management but, there exists more opportunities to negotiate for more space for wildlife with landowners from a mutually beneficial management and governance standpoint. Resource scarcity, population growth, suboptimal economic growth is and can be a continued source of conflict over control of resources. The projected threats from Global Climate Change are expected to be serious both on natural resources as well as the populations depending directly and indirectly on them, compounding the already scarce resource availability.

The livelihoods of about 80% of Kenyans depend on direct access to land. In Kenya, questions revolving around land tenure and property rights command pivotal positions in the country's social, economic, legal and political fabric. In the remote rural settings, land use and management rights for the communities living in and around protected area landscapes and who draw their livelihoods from the resources therein lack clear-cut status in the country's natural resources and protected area management system. Overall, the system of land administration has deteriorated over the years necessitating the enactment and implementation of a new policy and legal regime to match the current social, economic and political aspirations of Kenya.

Kenya has numerous policies, laws, and agencies to address environmental problems. More than 70 different laws either directly or indirectly apply to natural resources management. The Environmental Management and Coordination Act (EMCA, 1999) serves as Kenya's principal legal instrument on the environment, but there is no umbrella policy on the environment. The country has more than 20 government institutions and departments dealing with environmental matters. Since independence Kenya has ratified and joined a number of international

conventions, treaties and protocols concerned with environmental conservation. However, the sector is plagued with contradiction and/or overlap of policies and implementation of policies.

The importance of challenges facing biodiversity is increasingly recognized in conservation circles. In response, the Government has, through Vision 2030 and the new constitution addressed these biodiversity related issues in Chapter 5 of the constitution; Forest Act 2009; Land Policy of Kenya of 2009; Climate Change Policy and the National Climate Change Strategy 2009; and the draft Wildlife Policy and bill of 2009. The natural resources sector is envisioned to be a crucial driver in addressing and implementation of these legal and policy instruments geared at inclusive and sustainable conservation. Several projects are underway to inventory Kenya's biodiversity, value its worth, assess the environmental risks and define a comprehensive conservation framework including: KWS and conservation agencies species conservation strategies, mapping of selected taxa and development of minimum viable conservation areas; KFS development of a forest inventory; National Museums of Kenya digitization of animal and plant collections and, land use mapping exercises by International organizations.

USAID/Kenya has a long history of supporting the Government of Kenya (GOK) and the citizens of the country in improving natural resources management, particularly in the wildlife, marine and forestry managements sector. USAID/Kenya Environment and Natural Resources Management program activities aim to: facilitate policy and legal reforms in the conservation sector; diversify rural economies through sustainable nature-based enterprises and, build institutional capacity at the government, CSO and CBO levels for improved accountability and NRM. The program revolves round developing proper incentives and effective structures whereby communities and government entities can conserve tropical forests and biodiversity.

USAID/Kenya anticipates that the momentum of the land reform in Kenya, if steered right and strategically, will have positive impacts on community-based natural resources management. Achieving the envisioned 10% sustained growth in national GDP will require a similar rate of growth (estimated 7% growth for Agriculture sector) in rural areas. Poverty alleviation among natural resource dependent rural communities must therefore be a primary agenda. The Forest Act (2005) provides a solid basis for community empowerment in the management of forests and protected areas and accrues benefit in the process, while the draft wildlife management policy and bill of 2009 sets out an inclusive and collaborative framework for biodiversity conservation.

C.IV USAID/KENYA'S STRATEGY

USAID launched the 2006-2011 Country Strategic Plan in December 2005. The Strategy Statement maintained a high degree of continuity with the previous country strategy (2001 -2005) and retained five, previously approved Strategic Objectives. USAID Kenya program has six Strategic Objectives (SOs). These SOs are consistent with the priorities identified by the Government's Economic Recovery Strategy and are influenced by the programs and activities of other development partners. Under the strategic framework for U.S. foreign assistance, USAID/Kenya operates in four of the five priority objectives; namely, Peace and Security, Governing Justly and Democratically; Investing in People; and Economic Growth.

Kenya is categorized as Developing Country, which is a state with low or lower-middle income, not yet meeting performance criteria related to effective and democratic governance, investments in people and economic freedom. USAID/Kenya programs support activities that strengthen institutions of governance and civil society; improve access to and quality of basic education; enhance the environmental and economic benefits from improved agricultural productivity and community-based natural resource management; and improve the health status of the population. A new special objective on Youth development was introduced to the Mission's portfolio with a view to addressing the special issues and needs of that demographic cohort.

USAID/Kenya participates in U.S. Government initiatives addressing the important challenges of HIV/AIDS, good governance, economic growth and food security, and education. Specifically, as Kenya is a President's Emergency Plan for AIDS Relief (PEPFAR) focus country, these resources contribute significantly to the Mission's program to expand the prevention, care, and treatment of people affected by HIV/AIDS. The Africa Bureau's Anti-Corruption Initiative, the Women's Justice Empowerment Initiative and the Millennium Challenge Account Threshold Program contribute to addressing governance issues within the Kenya context. Similarly, the Mission participates in the Initiative to End Hunger in Africa (IEHA) and the African Competitive Growth Initiative (ACGI) and now Feed the Future (FtF) strategy which facilitate the Mission's efforts to address economic growth and food security issues. Finally, the African Education Initiative contributes to the Kenyan program through the efforts to strengthen Kenyan teacher and managerial capacity within the Ministry of Education, Science and Technology and through the Ambassador's Girls Scholarship Program. The Mission pursues the Agency-wide Operational Goal of providing humanitarian assistance when required based on the criterion of urgent need. This assistance, provided in collaboration with the Offices of Foreign Disaster Assistance and Food for Peace, contributes to USAID's programs in Kenya and helps address vulnerability that might impede development gains or increase fragility.

USAID/Kenya is an active member of the Environment Donor Working Group. As such, USAID works with other donors in undertaking the relevant environmental assessments including Section 118/1199 Analysis. Several donors in the environment sector, particularly the European Commission (EC) and UNDP, have undertaken assessments leading to the production of a 'Country Environmental Profile'.

Other donors – Danida, Finland, France, the Netherlands and the World Bank - are engaged in finalizing plans and projects that support decentralized environmental action plans, watershed management, advancing environmental policy and engaging the Forestry and Wildlife sub-sectors. These donors have accumulated and processed a wealth of 'background' environmental information and have identified a range of opportunities for intervention.

USAID/Kenya Environment and Natural Resources Management program activities aim to: facilitate policy and legal reforms in the conservation sector; diversify rural economies through sustainable nature-based enterprises and, build institutional capacity at the government, CSO and CBO levels for improved accountability and NRM. The program revolves round developing proper incentives and effective structures whereby communities and government entities can conserve tropical forests and biodiversity.

C.V GENERAL TASK

Under the direction of a Team Leader, the assessment team shall evaluate biodiversity and tropical forest concerns in Kenya. The focus of all activities taken under this assignment is two-fold:

- 1) Assess the conservation status of biodiversity and forests in Kenya to identify actions necessary to better conserve biodiversity and tropical forests, and
- 2) To describe how and to what extent actions proposed in the country operational plans meet, or could meet, the biodiversity and tropical forest needs thus identified.

The assessment team shall perform the following activities:

A) Data Collection:

1. Pre-travel informational meetings and information gathering. Prior to traveling to the field, the contractor is expected to:

- Hold meetings with the Bureau Environmental Officer (BEO) in the appropriate USAID Washington bureau to ensure full understanding of USAID environmental procedures, the role of the regional bureau in environmental compliance, and purpose of this assignment.
- Gather and get acquainted with existing background information on Kenya such as the country's natural resources, geographical, ecological and biological specificities, current status of environment and biodiversity, institutional organization on entity and state level, key stakeholders and donors in environment and biodiversity, legislation related to the environment and biodiversity, and other relevant information required for the country assessment.
- Meet or speak with key stakeholders or managers at the World Bank, USDA Forest Service, and U.S.-based NGOs including World Wildlife Fund, World Resources Institute, and Wildlife Conservation Society, or other organizations involved in biodiversity conservation in Kenya or relevant regional efforts.

2. Meet with USAID/Kenya to get a solid understanding of Mission program goals and objectives under its proposed updated strategy statement; ongoing sectoral assessments, program goals and objectives under its proposed strategy; perspectives of this assignment and specific interests for the team, including advice and protocol on approaching USAID partners and host country organizations with respect to this assignment.

3. Obtain, review and analyze existing documentation on biodiversity conservation (and tropical forest conservation) in Kenya, such as that prepared by government agencies, bilateral donors, and national and international NGOs. Available online materials will be gathered prior to the country visit.

4. Meet with relevant ministries and agencies, donor organizations, international NGOs, and other organizations which are involved in forest and biodiversity conservation, cross-cutting issues, or which are implementing noteworthy projects, and gather relevant information.

5. Conduct one to three priority site visits, if necessary, to supplement the understanding gained from interviews, literature, and other second-hand sources. *For example, a trip to a landscape of “biological significance”.* Short side trips to local governments, agricultural lands, and protected areas will be incorporated as feasible.

B) Analysis: Summarize the status of biodiversity and tropical forests in Kenya

Assess and summarize the needs for biodiversity and tropical forestry conservation in Kenya based on key threats and analysis of country, donor and NGO responses to meet these needs. The analysis shall include:

- *The current status of biodiversity, tropical forests, and water resources in Kenya* based on current and available information.
- *Major ecosystem types*- highlight important, unique aspects of the country’s biodiversity, including important endemic species and their habitats.
- *Descriptions of natural areas of critical importance to biodiversity conservation*, such as forests and wetlands critical for species reproduction, feeding or migration, if relevant. It will also summarize how current land tenure arrangements affect conservation in Kenya.

An overview table and map of the status and management of protected area system in Kenya. This will include an inventory of all declared and proposed areas. In addition, an overview of the major threats and challenges facing protected areas in Kenya, including vulnerability of areas affected by changes in climate, and a brief summary of any recognized economic potential of these areas.

- *Descriptions of plant and animal species that are endangered or threatened with extinction.* Endangered species of particular social, economic or environmental importance should be highlighted and described, as should their habitats.
- *Recent, current, and potential primary threats to biodiversity*, whether they are ecological, related to human use, or institutional or trans-boundary issues, as appropriate. These should emerge from a general assessment of national policies and strategies and their effectiveness, issues related to institutional capacity, trade, private sector growth, participation in international treaties, and the role of civil society.
- *Conservation efforts, their scope and effectiveness.* This section should include recent, current and planned activities by donor organizations that support biodiversity and tropical forestry conservation, identification of multilateral organizations, NGOs, universities, and other local organizations involved in conservation, and a general description of responsible government agencies.

- *Analysis of the current legislation related to the environment and biodiversity.* This section should include identification of laws related to protection and management of biological resources and endangered species. It should also point out any differences in laws that require further harmonization. This section should also review international treaties signed and ratified, as well as those that Kenya needs to sign in order to conserve and manage its biological resources more efficiently.
- *An overview of the major biodiversity and tropical forest conservation activities of the commercial private sector* to identify ways to better foster private sector alliances. Of interest are the norms and standards followed by those commercial entities most engaged in management and use of Kenya's tropical forests and tracts near protected areas, including tourism developers and coffee producers.
- *An assessment of how USAID's program and proposed country strategy meets the needs for biodiversity and tropical forestry conservation*, consistent with Mission program goals and objectives, through strategic objectives other than environment. The assessment shall include recommendations on where U.S. comparative advantages and capabilities are likely to have the greatest impact. These issues and recommendations should be prioritized to identify those requiring the most immediate attention.

C) Report:

Prepare a report on the status of biodiversity conservation efforts in Kenya and implications for USAID or other donor programming that shall define the actions necessary for conservation. This report shall clearly meet the legal requirement of FAA Sec 118 and 119 and should conform to the following structure:

Title Page, including the date of completion of the analysis report

Table of Contents

List of Acronyms

Executive Summary

Background

Findings

Part 1: State of Tropical Forest & Biodiversity

i) Introduction, describe the purpose of the analysis and methods used in conducting it, including the timing of the analysis in relation to the timing of USAID strategy development.

ii) An overview of the social, economic, legislative, and political context for sustainable natural resources management and the conservation of biodiversity and forests in Kenya.

iii) An overview of the status of tropical forests and terrestrial and marine biodiversity in Kenya, including ecosystem diversity, species diversity, threatened & endangered species, genetic diversity, agricultural biodiversity, ecosystem services, and protected areas. Economic importance and potential values of biodiversity will also be included.

iv) A summary of government, NGO, and donor programs and activities that contribute to conservation and sustainable natural resources management, including a brief assessment of their effectiveness, strengths, and weaknesses.

Part 2: Major threats to biodiversity and forest conservation

An assessment of the threats to tropical forests and biodiversity, including direct threats and indirect threats or root causes of the direct threats

Part 3: Actions Necessary and Planned to Conserve Tropical Forests and Biodiversity

i) Strategic options for addressing underlying threats to biodiversity, forests and ecosystems including programmatic actions necessary to conserve biodiversity and forests in Kenya.

ii) Capacity of Government of Kenya institutions to address threats.

iii) Capacity of USAID/Kenya to address threats within existing portfolio.

iv) Integration of environment into USAID/Kenya activities

v) Opportunities for partnerships.

vi) Recommendations and conclusions

Part 4: References and Annexes

i) All references used and cited in the report, including web URLs.

ii) Report Annexes will include: the SOW for the analysis, biographical sketches of analysis team members, a list of persons contacted and their institutional affiliation, and other background or supporting material as needed, including maps and photographs. Copies of key documents, relevant maps and images, and copies of photographs obtained during the assessment should also be appended in a CD ROM with electronic versions of all written materials.

C.VI DELIVERABLES

There shall be four deliverables under this activity:

1. Preliminary Work Plan and Schedule: The Contractor shall provide USAID with a work plan and schedule prior to traveling to Kenya.

2. In-Country Mission Exit Briefings: The team shall meet with USAID/Kenya to provide them with a brief of the report findings. The exit brief shall be accompanied by a short written summary of initial key findings and recommendations.
 3. Draft Report: The Contractor shall submit a draft report to the Natural Resources Management Office. The draft report shall follow the generic outline discussed above, as refined during the course of the contract in consultation with USAID.
 4. Final Report: The final report is due no later than two weeks after receiving USAID/ Kenya comments on the first draft report.
- The Contractor will furnish electronic file versions of all submissions (first draft and final report) in English, and one photocopy ready version of the final report. Copies of key documents, including maps and photographic material, will be appended on a CD ROM.

C.VII REQUIRED EXPERTISE

A three-four person team with the following composition and expertise is desirable to conduct this analysis as follows:

International Technical Assistance (3 persons)

- a) Team Leader who is a senior Level Specialists will have an advanced degree in conservation biology, wildlife biology, conservation management or related specialization with no less than seven years of experience in international conservation. The person should have solid team leadership and evaluation experience and should have experience leading similar biodiversity and forestry conservation analyses in Africa. Other key characteristics will include excellent communication skills (oral and written), analytic skills, and strong interpersonal skills. The Team Leader will have Knowledge of USAID Strategic Planning process related to Tropical Forestry and Biodiversity (FAA Sections 118 and 119). Familiarity with USAID programs is strongly preferred.
- b) The team should include a Biodiversity specialist with experience in tropical ecology and conservation. Minimum MSc in Conservation related subject with extensive understanding of biodiversity management, water management, coastal and/or marine experience within the Sub-Saharan region.
- c) The team should include a social scientist with a NRM background with at least a MSc/MA level with experience on issues related to natural resource economics, enterprise/business development, resource governance, conflict dynamics and policy dynamics.

Local Technical Assistance (1 person)

Senior Level Natural Resource Management Specialist with demonstrated experience in Kenya environmental law, the policy and legal frameworks governing environmental management in Kenya and the analysis of relevant policies. Good contacts within Kenya government agencies, NGOs, international donors, and private sector preferred.

Specialists will also have knowledge of and be responsible for providing information related to protected areas, USAID economic growth and natural resource management activities biodiversity conservation, and the policy and legal frameworks governing environmental management in Kenya.

C.VIII SCHEDULE AND LOGISTICS

Estimated LOE for International Technical Assistance includes: A level of effort of five weeks (35days) will be required to accomplish this activity as follows:

- Meetings in Washington, DC, will take place from August 01 to 05, 2011. The Mission will assist the team by providing key references and contacts as well as logistical support where necessary.
- Within one week of the TO being awarded the Consortium leader and Key Personnel will hold a teleconference with the USAID/Kenya MEO to discuss the TO and agree on expectations and site visit criteria and deliverable formats.
- Within 2 days of holding a teleconference with the USAID/Kenya MEO, the TO Key Personnel will deliver a preliminary work plan and schedule for the 118/119 analysis. Key personnel and MEO will discuss and finalize.
- Implement agreed upon methodology for the analysis, including appropriate document reviews, interviews, 2-4 site visits and associated data analysis. Site visits may include USAID participation.
- Deliver two presentations of findings, one for an internal USAID audience and one to a broader body of Global Conservation Program and conservation partners.
- Prepare draft report for review by MEO, USAID staff, and host country partners. It is expected that USAID will review the draft focusing on sensitivities and overall focus and not comment on specific technical findings. USAID will allow five days for review and feedback and the USAID NRM Team will coordinate and collate the comments/input from various partners.
- Incorporate necessary edits and prepare final report and associated presentation materials.

ANNEX C: PERSONS CONTACTED, THEIR INSTITUTIONAL AFFILIATION, AND CONTACT INFORMATION

NAME	INSTITUTION
Washington, DC	
Tim Resch	Africa Bureau Environment Officer, USAID
Mary Rowen	Wildlife and Biodiversity Advisor, USAID Bureau for Economic Growth, Agriculture and Trade
Karol Boudreaux	Africa Land Tenure Specialist, USAID
Julie Escalona	Country Development Officer, USAID
Alexandra Montenegro	Environment Officer, USAID
Matthew A. Brown	Conservation Director The Nature Conservancy Africa Region Arusha, Tanzania
James C. Deutsch	Executive Director, Africa Program Wildlife Conservation Society
George Ledec	Lead Ecologist, Africa Region, World Bank
Robert Winterbottom	Director, Ecosystem Services Initiative, People and Ecosystems Program, World Resources Institute
Norbert Henninger	Senior Associate, People and Ecosystems Program, World Resources Institute
Adam Henson	Technical Director, Fauna & Flora International
Nairobi, Kenya	
Azharul Mazumder	Team Leader, Environment & Natural Resources Management Mission Environment Officer USAID/Kenya
Enock Kanyanya	Forestry & Environmental Management Specialist, USAID/Kenya; Contracting Officer's Technical Representative for this Report
Charles Oluchina	Biodiversity & Natural Resources Management Program Specialist, USAID/Kenya
Erna Kerst	Mission Director, USAID/Kenya
Mark Meassick	Program Officer, USAID/Kenya
Mervyn Farroe	Director, Agriculture, Business and Environment Office, USAID/Kenya

NAME	INSTITUTION
Charles Signer	Contracting Officer, Regional Acquisition and Assistance Office, USAID/Kenya
Noah Wekesa	Minister, Ministry of Forestry and Wildlife
Josphat Koli Nanok	Assistant Minister, Ministry of Forestry and Wildlife
M.A.M. Wa-Mwachai	Permanent Secretary, Ministry of Forestry and Wildlife
Gideon Gathaara	Conservation Secretary, Ministry of Forestry and Wildlife
Stephen Manegene	Director Wildlife Conservation, Ministry of Forestry and Wildlife
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Jane Wamboi	Research Scientist, Forest Program, Kenya Wildlife Service
James Mathenge	Research Scientist, Forest Program, Kenya Wildlife Service
David Mbugua	Director, Kenya Forest Service
Kefa Wamichwe	Senior Assistant Director; Head, Forest Planning & Information Systems, Kenya Forest Service
Samuel Muriithi	Forest Economist Head, Economics, Planning, and Investment Promotion, Kenya Forest Service
Keith Dolman	Chief Technical Advisor, Miti Mingi Maisha Bora, Kenya Forest Service
Thomas Makau Lonzi	Component 2 Manager, Miti Mingi Maisha Bora, Kenya Forest Service
Esa Haapasalo	Advisor, Forest Management & Information Systems, Miti Mingi Maisha Bora, Kenya Forest Service
Florence Landsberg	Research Associate, People & Ecosystems Program, World Resources Institute. Working out of International Livestock Research Institute, Nairobi.
Polly Ericksen	Senior Scientist, People, Livestock and the Environment, International Livestock Research Institute
Helen Gichohi	President, African Wildlife Foundation
Moses N. Kanene	Director, Enterprise Development, African Wildlife Foundation
Philip Muruthi	Senior Director, Conservation Science, African Wildlife Foundation
Per Karlsson	Program Design Officer, Eastern Africa, African Wildlife Foundation
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Kiunga Kareko	Ecoregion Technical Manager – The Eastern Africa Coastal Forests Ecoregion Programme, WWF Eastern Africa Regional Programme Office
John Salehe	Regional Forestry Advisor, WWF Eastern Africa Regional Programme Office

NAME	INSTITUTION
Christian Peter	Senior Natural Resources Management Specialist, East Africa, World Bank
Christian Lambrechts	Chief Technical Adviser, Interim Coordinating Secretariat for the Mau
Julius Ithagu	National Environment Management Authority (NEMA)
Wilkister Magangi	Chief Compliance Officer-NEMA
Lewa Conservancy and Northern Resources Trust Conservancies, Isiolo area	
Ian Craig	Strategic Advisor, Lewa Wildlife Conservancy and Board Member, Northern Rangelands Trust
John Kinoti	Community Development Manager, Lewa Wildlife Conservancy
Michael Watson	Chief Executive Officer, Lewa Wildlife Conservancy
Gabriel Nyausi	Assistant Community Development Manager
Peter Lekashwet	Regional Coordinator for Greater Sera, Northern Rangelands Trust
Andrew Lentoijoni	Administrator, Northern Rangelands Trust
Ndiritu Kimondo	Senior Accountant, Northern Rangelands Trust
David Silakan	Grants Management Officer, Northern Rangelands Trust
Reuben Lendra	Manager, Sera Conservancy
Mohamed Lesanjir	Manager, Melako Conservancy
Josephat Lengerpei	Vice Chair of the Board, Melako Conservancy
Wilson Lesamburi	Board Member, Sera Conservancy
Sheikh Dabaso Ali	Grazing Chairman, Biliqo Bulesa Conservancy
Hussein LeParnarai	Board Member, Finance Chairman, Sera Conservancy
Andrew Lesiapadei	Manager, Kalama Conservancy
Lbakino Lenkishili	Vice Chair, Kalama Conservancy
Lepina Lenaguro	Board Member, Kalama Conservancy
Sammy M. Letoona	Conservancy Warden, Kalama Conservancy
Kathy Esterhuysen	Student, Said Business School, Oxford University; on study trip to Lewa Conservancy and Northern Resources Trust
Emily Boezeman	Student, Said Business School, Oxford University; on study trip to Lewa Conservancy and Northern Resources Trust
Joanna Dove	Student, Said Business School, Oxford University; on study trip to Lewa Conservancy and Northern Resources Trust
Adam Rivers	Student, Said Business School, Oxford University; on study trip to Lewa Conservancy and Northern Resources Trust

NAME	INSTITUTION
Dominic Lesimirdana	GIS (Geographic Information System) and Mapping Officer, Northern Rangelands Trust, Isiolo
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Nanyuki	
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Josephat Musyima	Community Conservation Programme Manager, Laikipia Wildlife Forum, Nanyuki
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Norman Karani	Enumerator, TIST
M'inoti Kithagacha	Demonstration Farmer, TIST, Timau
Nakuru Area	
Ian Deshmukh	Chief of Party, ProMara Program, Nakuru
Lazarus Kubasi	Conflict Management Specialist, ProMara Program, Nakuru
Fabian Musila	Natural Resource Enterprise Specialist, ProMara Program, Nakuru
Dennis Mbogo	Forester, Kenya Forest Service, Kiptunga Forest block
Joseph Lesingo	Chairman, Kiptunga Community Forest Association
Edah Ngetich	Co-coordinator, Kiptunga Community Forest Association
James Kiprotich	Chairman, Kiptunga Community Based Organization
David Barange-tuny	Community Representative, Mau East Forest Conservancy
Lamu area	
Kevin Doyle	Chief of Party, Kenya SECURE Project
Nickson Orwa	Program Assistant, Kenya SECURE Project
Samia Omar	Co-management coordinator, Kenya SECURE Project
Richard Paley	Fauna & Flora International
Ali Mbwari	Project Manager, Kibodo Trust
Camilla Pelizzoli	Owner, Kiwayu Safari Village
Simone Pelizzoli Moorhead	Owner, Kiwayu Safari Village

NAME	INSTITUTION
Malindi area	
Francis Kagema	Nature Kenya, Gede
MTE Mbuvi	Principal Research Scientist, Kenya Forestry Research Institute (KEFRI), Coast Region
Athman Seif	Managing Director, Malindi Marine Association
Alex Mwalimu	Field Guide, KEFRI, Coast Region
Presentation Participants, USAID Nairobi, 1 September 2011	
Daudi Sumba	African Wildlife Foundation
Evans Mwangi	Assessment Team Member
Joy Hecht	Assessment Team Member
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Ian Deshmukh	ARD-ProMara
Enock Kanyanya	USAID/Kenya
Harrigan Mukhongo	USAID/Kenya
Isaac N. Thendiu	USAID/Kenya
Jethrol Mwanzi	Ministry of Lands
Bruce Byers	Assessment Team Leader

ANNEX D: LIST OF CITES SPECIES FOR KENYA

	I	Appendices II	III ¹
	PHYLUM C HORDATA		
	CLASS MAMMALIA		
ORDER	ARTIODACTYLA		
Family	Hippopotamidae Hippopotamuses		
		<i>Hippopotamus amphibious</i>	
ORDER	CARNIVORA		
Family	Felidae Cats		
	<i>Acinonyx jubatus</i>		
	<i>Panthera leo persica</i>		
	<i>Panthera pardus</i>		
ORDER	CETACEA Dolphins, porpoises, whales		
		<i>Cetacea spp.</i>	
ORDER	PERISSODACTYLA		
Family	Equidae Horses, wild asses, zebras		
	<i>Equus grevyi</i>		
	Rhinocerotidae Rhinoceroses		
Family	<i>Diceros bicornis</i>		
	<i>Ceratotherium simum</i> ²		
ORDER	PRIMATES Apes, monkeys		
		PRIMATES spp ³	
ORDER	PROBOSCIDEA		
Family	Elephantidae Elephants		
	<i>Loxodonta africana</i> ⁴		
ORDER	SIRENIA		
Family	Dugongidae Dugong		
	<i>Dugong dugon</i>		
ORDER	CUCULIFORMES		
Family	Musophagidae Turacos		

¹ No Kenyan species is listed in Appendix III (which includes those identified as being subject to regulation within a Party's jurisdiction for the purpose of preventing or restricting exploitation, and needing the cooperation of other Parties in the control of trade). Many others are however on the IUCN red-list and other lists of threatened or endangered species

² Populations of the subspecies *Ceratotherium simum simum* in South Africa and Swaziland are included in Appendix II (except the species included in Appendix I)

³ None of Kenya's primate species is included in Appendix I

⁴ Populations of Botswana, Namibia, South Africa and Zimbabwe are included in Appendix II Except the species listed for other countries in Appendices I and III and the species of the Family Cathartidae

		<i>Tauraco</i> spp.	
ORDER	FALCONIFORMES Eagles, falcons, hawks, vultures		
		FALCONIFORMES spp. ⁵	
	<i>Falco peregrinus</i>		
	<i>Falco punctatus</i>		
	<i>Falco rusticolus</i>		
ORDER	GRUIFORMES		
Family	Gruidae Cranes		
		Gruidae spp. ⁶	
Family	Otididae Bustards		
		Otididae spp. ⁷	
Family	Pelecanidae Pelican		
	<i>Pelecanus crispus</i>		
ORDER	PSITTACIFORMES		
		PSITTACIFORMES spp. ⁸	
ORDER	STRIGIFORMES Owls		
Family	Strigidae		
		STRIGIFORMES spp. ⁹	
ORDER	STRUTHIONIFORMES		
Family	Struthionidae Ostrich ¹⁰		
CLASS REPTILIA			
ORDER	CROCODYLIA		
		CROCODYLIA spp. ¹¹	
ORDER	SAURIA		
Family	Chamaeleonidae Chameleons		
		<i>Bradypodion</i> spp.	
Family	Cordylidae Spiny-tailed lizards		
		<i>Cordylus</i> spp.	
Family	Gekkonidae Geckos		
		<i>Phelsuma</i> spp.	

⁵ Except species that may have a Kenyan range and that are listed for other countries in Appendices I and III

⁶ Some crane species found outside Kenya are included in Appendix I

⁷ Some bustard species are included in Appendix I but all are found in Asia and the middle east

⁸ Some species included in Appendix I but others are not included in the Appendices such as *Agapornis roseicollis*

⁹ Some owl species are included in Appendix I but none found in Kenya

¹⁰ The populations of *Struthio camelus* in Algeria, Burkina Faso, Cameroon, the Central African Republic, Chad, Mali, Mauritania, Morocco, the Niger, Nigeria, Senegal and the Sudan. all other populations are not included in the Appendices

¹¹ This applies to the populations of *Crocodylus niloticus* in Botswana, Egypt, Ethiopia, Kenya, Madagascar, Malawi, Mozambique, Namibia, South Africa, Uganda, the United Republic of Tanzania, Zambia and Zimbabwe, all others are included in Appendix I

Family	Varanidae Monitor lizards		
		Varanus spp. ¹²	
Family	Pythonidae Pythons		
		Pythonidae spp. ¹³	
ORDER	TESTUDINES		
Family	Cheloniidae Marine turtles		
	Cheloniidae spp.		
Family	Emydidae Box turtles, freshwater turtles		
		Terrapene spp. ¹⁴	
	Testudinidae Tortoises		
		Testudinidae spp.	
CLASS AMPHIBIA			
ORDER	ANURA		
Family	<i>Bufo periglenes</i>		
	<i>Neurergus kaiseri</i>		
CLASS ELASMOBRANCHII			
ORDER	RAJIFORMES		
Family	Pristidae Sawfishes		
	Pristidae spp. ¹⁵		
CLASS ACTINOPTERYGII			
ORDER	SYNGNATHIFORMES		
Family	Syngnathidae Pipefishes, seahorses		
		Hippocampus spp. ¹⁶	
CLASS INSECTA			
Family	Papilionidae Birdwing butterflies, swallowtail butterflies		
		Ornithoptera spp.	
	PHYLUM ANNELIDA		
CLASS HIRUDINOIDEA (LEECHES)			
ORDER	ARHYNCHOBDSELLIDA		
Family	Hirudinidae Medicinal leeches		
		Hirudo medicinalis	
	PHYLUM MOLLUSCA		
	CLASS BIVALVIA (CLAMS AND MUSSELS)		
ORDER	MYTILOIDA		

¹² Some species of monitor lizards are included in Appendix I but none found in Kenya

¹³ Except the subspecies *Python molurus molurus* which is found in Asia and included in Appendix I

¹⁴ Except the species *Terrapene coahuila* which is included in Appendix I and is not a Kenyan species

¹⁵ Except the species *Pristis microdon* which is included in Appendix II

¹⁶ Except the species *Ornithoptera alexandrae* which is included in Appendix I

Family	Mytilidae Marine mussels		
		<i>Lithophaga lithophaga</i>	
ORDER	VENEROIDA		
Family	Tridacnidae Giant clams		
		Tridacnidae spp.	
	PHYLUM CNIDARIA		
	CLASS ANTHOZOA (CORALS AND SEA ANEMONES)		
ORDER	ANTIPATHARIA Black corals		
		Antipatharia spp.	
ORDER	SCLERACTINIA Stony corals		
		SCLERACTINIA spp.	
	FLORA (PLANTS)		
	CACTACEAE Cacti		
		CACTACEAE spp. ¹⁷	
	CYCADACEAE Cycads		
		CYCADACEAE spp. ¹⁸	
	EUPHORBIACEAE Spurges		
		<i>Euphorbia</i> spp. ¹⁹	
	LILIACEAE Aloes		
		<i>Aloe</i> spp. ²⁰	
	ORCHIDACEAE Orchids		
		ORCHIDACEAE spp. ²¹	
	ROSACEAE African cherry, stinkwood		
		<i>Prunus africana</i>	
	SARRACENIACEAE Pitcher-plants (New World)		
		<i>Sarracenia</i> spp. ²²)	
	ZAMIACEAE Cycads		
		ZAMIACEAE spp. ²³	
	<i>Encephalartos</i> spp.		

Source: Dr. Charles Musyoki, Senior Scientist, KWS and Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Website <http://www.cites.org/eng/app/appendices.shtml>

¹⁷ Some catus species are included in Appendix I

¹⁸ Some cycad species are included in Appendix I

¹⁹ Succulent species only except *Euphorbia misera* and some species athst are included in Appendix I

²⁰ Some aloe species are included in Appendix I. *Aloe vera*, also referenced as *Aloe barbadensis*, is not included in the Appendices

²¹ Some orchid species are included in Appendix I

²² Some species are included in Appendix I

²³ Some species are included in Appendix I

ANNEX E: ACTIONS NECESSARY LIST COMPILED BY ASSESSMENT TEAM FROM ALL SOURCES

Social Action

Political/Institutional/Governance Action

Economic Action

- 1) Coordinated strategy for forest restoration/reforestation to aim at highest-value (e.g. for ecosystem services, or biodiversity conservation – such as migration corridors) catchments and areas (right now lots of tree projects are working in a scattered, uncoordinated way).
- 2) Despite emphasis on five major “water towers,” do not lose sight of more local value of smaller hill/mountain range watersheds, e.g. the Matthews Range, Karasuk Hills, Marsabit, and many other small mountains and ranges that intercept precipitation and provide local surface watersheds all the way to the border of Ethiopia and South Sudan.
- 3) Integration of conservation and Natural Resources Management (NRM) in Kenya into a transboundary, regional picture; e.g., Mara River, tourism Tanzania/Kenya; Western Indian Ocean; mangrove trade with Middle East and to Mozambique and Tanzania; dam on the Omo River, Ethiopia; spillover effects of regional drought and conflict
- 4) Support for Beach Management Units, and other mechanisms of devolved governance of coastal and nearshore marine resources.
- 5) Scientific research to understand climate change effects on marine and terrestrial biodiversity, and to try to design resilience into Marine Protected Areas and the terrestrial Protected Area (PA) system.
- 6) Make the large amount of relevant data, maps, etc. that already exist available to decision makers and the public.
- 7) Transparent information on plans for Lamu Port and Lamu Port-Southern Sudan-Ethiopia Transport Corridor (LAPSSET) Corridor and environmental impact assessments; also, a Strategic Environmental Assessment (SEA) is needed.
- 8) Constitutional implications for wildlife, forests, land, and other policies and laws need to be clarified and elaborated – and time is needed for this, as it is an ongoing political process in Kenya.
- 9) Identification of “critical natural habitats,” “key biodiversity areas,” “high conservation value forests,” and “Important Bird Areas,” and use of such information in land use and development policies and planning.
- 10) Improved enforcement and implementation of the new Forest Policy (2005).
- 11) Restoration of bamboo cover in the Mau Forest and provision of sustainable use incentives for doing so (commercial and communities).
- 12) An understanding of the “ecosystem service” benefits of the microclimate created by proximity to forest for tea production.
- 13) On-farm forestry on private farms.
- 14) Demonstration projects to illustrate viable Payment for Ecosystem Services (PES) models (e.g., hydrological services, carbon sequestration).
- 15) Sustainable, alternative energy sources for cooking/heating/tea production that do not rely on firewood/charcoal.
- 16) Mapping of the national forest estate.

- 17) Maintain options for the movement of livestock and wildlife across savanna rangelands.
- 18) Reinforcement of land conservation programs with innovative mechanisms, such as the easements being initiated under the Kenya Land conservation Trust.
- 19) Applied research on climate change adaptation and arid and semi-arid lands grazing systems.
- 20) Support for institutional reforms and improved governance; for example, for better stakeholder participation.
- 21) More/better studies on the valuation of forest products and services.
- 22) A strategy and action plan for attaining the 10% forest cover stipulated in the constitution.
- 23) Secure migration corridors for wildlife.
- 24) Support of curriculum development on environment and natural resources in colleges and universities.
- 25) Development of wild fire control strategies and capacity in some areas/ecosystems.
- 26) Development of systems and capacity to control invasive species.
- 27) Rationalization of related functions of Government of Kenya (GOK) related to wildlife, forests, biodiversity, and combination of them into functional management units
- 28) Development of incentives to conserve wildlife outside of PAs, on community and private lands.
- 29) Private sector investment to conserve wildlife, and thus, need to convince – with real incentives – private landowners that wildlife is a beneficial land use.
- 30) Reformation of wildlife policy to allow sustainable uses (e.g., hunting, bushmeat).
- 31) A national assessment of performance in the wildlife sector in terms of management, and from that development of a national wildlife conservation strategy.
- 32) Identification and map of dispersal corridors.
- 33) Strengthening of the legal review process of statutes by the Environmental Management and Coordination Act to avoid situations that are now common where other GOK institutions blatantly disregard National Environment Management Authority (NEMA) regulations.
- 34) Applied research to better understand the impact of bushmeat use on wildlife populations and habitats.
- 35) Development of standards for measuring management effectiveness of the various categories of protected areas – especially community conservancies.
- 36) Development of ecotourism in forest reserves.
- 37) Development of mechanisms for entering voluntary and regulated carbon markets.
- 38) Support to devolved/decentralized forest sector institutions, especially Community Forestry Associations (CFAs).
- 39) Support the Kenya Forest Service (KFS) strategy for attaining the 10% forest cover stipulated in the Constitution.
- 40) Policy responses to trigger conservation of montane forests.
- 41) Carry out “resource assessments” in all Forest Reserves, and develop proper management plans based on those baselines.
- 42) Proper policies, properly enforced.
- 43) Build the capacity of civil society organizations to better educate, advocate, and lobby for biodiversity and forest conservation.

- 44) Monitor environmental agreements (including/esp. NEMA).
- 45) Link conservation with livelihoods, so there needs to be applied research to better understand the value of ecosystem services.
- 46) Increase the coverage of protected areas.
- 47) Create community and private PAs, as well as state PAs.
- 48) Keep land open outside of PAs to allow wildlife movement.
- 49) Map and protect “kaya” forests that were traditionally protected for their historical and spiritual values by local communities.
- 50) Development of a tuna management strategy by GOK.
- 51) Development, in general, of regional fisheries strategies and policies in the Western Indian Ocean.
- 52) Applied research on the probable effects of climate change on coastal and marine ecosystems.
- 53) A forum for NGOs to better communicate and coordinate experiences and “lessons learned.”
- 54) Support for Community Forest Associations by GOK.
- 55) Establishment by GOK of functional linkages between KFS and other relevant ministries (land, water, wildlife).
- 56) Forest policy should have a monitoring and evaluation (M&E) mechanism built in.
- 57) Provision by GOK of more of an enabling environment for bio-prospecting and bio-trade (bio-enterprises based on non-timber forest products).
- 58) Finalization of the new Forest Policy and new Wildlife Policy, and enactment of the Forest and Wildlife Acts to give these legal status.
- 59) A SEA of the LAPSET Corridor, considering water, rangelands, open lands, and all other relevant aspects; this should form the basis for any further planning for and development of, this corridor.
- 60) Applied research to help build the evidence base for what works, what doesn’t work, equity, who gets the benefits, and sustainability.
- 61) Bring pastoral communities (i.e., different tribes) together for the conservation of wildlife and for community security (wildlife and human security).
- 62) Wildlife monitoring (e.g., radio collars) for elephant, Grevy’s zebra, etc. to understand their movements, use of resources and conflicts with communities and livestock.
- 63) More grazing control, under the regime of “holistic management,” including paddocking, grazing blocks, etc.
- 64) Better (“holistic”) grazing management.
- 65) Stop/control commercial poaching of elephant and especially rhino.
- 66) Better applied research on the economics of pastoralism in order to influence it.
- 67) Maintain conditions that allow mobility for wildlife and livestock in savanna rangelands.
- 68) Establishment of community conservancies that are rooted in a traditional model of pastoral communication.
- 69) Ways of “bridging the gap” in rangeland management between community lands and private ranches.
- 70) Restoration of altitudinal and wet season-dry season movement corridors for elephants and other species; tracking of collared animals can reveal historical movement corridors that have been all but cut off or lost, such as from Lewa Downs to Mt. Kenya.

- 71) Replication and scaling up the communal lands conservancy model.
- 72) Expansion of the connectivity of Lewa for wildlife through CFAs and conservancies.
- 73) GOK policy reform that will provide the enabling environment for strong private and community conservancies.
- 74) Scale up community-based natural resources management.
- 75) Diversification of the geographic base of wildlife tourism in Kenya to bring economic incentives to more (and more dispersed) local communities (i.e., expand beyond Mara, Amboseli, Lake Nakuru).
- 76) Provision of local ecological input into the national curriculum (which is now lacking in good local case studies and information).
- 77) Bring the “holistic” model of rangeland rehabilitation and management to Kenya.
- 78) National water management starting with sub-catchment Water Resource Users Associations and scaling up to a national management plan.
- 79) GOK’s Water Resource Management Authority needs to implement the law, and adequately manage Kenya’s water resources.
- 80) A legal provision to cultivate wild medicinal plants or other bio-products to take pressure off wild harvesting.
- 81) Mechanisms to support the opportunity costs for small enterprises in the risky environment of bio-products.
- 82) Improvement of donor coordination in the forestry, biodiversity, NRM sector.
- 83) Clarification by GOK of the role of local government in NRM under the new constitution and policies.
- 84) KFS needs to transform itself to create a participatory and transparent culture for forest management.
- 85) A systematic classification and assessment of “high biodiversity conservation value” areas in all national Forest Reserves.
- 86) Hydrological studies of the Mau Forest, and of all mountain forest “water towers” and sub-“water towers” (e.g., Matthews Range) in general.
- 87) Revitalized Mau Interim Coordinating Secretariat (ICS) process, with political will behind it.
- 88) GOK strategy for scaling up from a county-level forest management to a national strategy for protecting all of Kenya’s important watershed forests.
- 89) Creation of an attitude and “culture” within GOK agencies in which co-management of forests and water can be piloted.
- 90) GOK establishment of a forest carbon policy that would provide a national REDD+ (Reducing Emissions from Degradation and Deforestation plus conservation, sustainable management of forests and enhancement of forest carbon stocks in reducing emissions) platform and standards (same for watershed PES also).
- 91) Adequate systems and capacity for management and enforcement for GOK agencies responsible for Kiunga Marine Reserve and Boni and Doodori National Reserves.
- 92) Stop irregular and extra-legal allocation of coastal lands.
- 93) KFS needs to use some of the money from selling mangrove cutting licenses for mangrove management rather than sending it to the national treasury; they currently are not supervising or monitoring the cutting they license.
- 94) GOK Forest Conservancy Committee, which covers the whole coast, needs to become active.

- 95) Applied research and ongoing monitoring to show trends in endemic birds and other species in Arabuko-Sokoke and other coastal forests.
- 96) Regeneration of natural coastal forest in areas where it has been cleared or degraded by the cutting of selected high-value species (e.g., *Azazia* sp., *Brachystegia* sp.).
- 97) Management/control of bushmeat snaring in Arabuko-Sokoke and other coastal forests.
- 98) Policies to prevent further clearing of coastal forest for biofuels, other agriculture.
- 99) Alternative energy sources for cooking to reduce pressure on forests for charcoal and firewood.
- 100) More support for high-quality environmental journalism that links science and journalism and raises the national level of information and awareness about coastal forests.
- 101) Reduction of elephant numbers in Arabuko-Sokoke and/or development of a movement corridor linking the forest with Tsavo so elephants can move out.
- 102) Small-scale, on-farm tree planting to provide construction materials, fuel and reduce pressure on natural forests.
- 103) Forest policy should allow and support broader local participation; CFAs are a good idea, but so far, local users cannot really participate because they lack the economic resources to do so.
- 104) A cost-benefit sharing mechanism between communities and GOK agencies (e.g., KFS) to “level the playing field” and allow communities to participate.
- 105) A mangrove master plan for the Kenya coast (and may be done under the World Bank coastal project), which then it needs to be scaled-down to the local level.
- 106) A “national platform” to be able to work with upstream agricultural communities on the Athi-Galana-Sabaki River to control siltation that is threatening coral reefs in Malindi Marine Park and Reserve.
- 107) Control of unsustainable fishing and use of illegal fishing gear in and around the marine parks and reserves.
- 108) Regulation and/or stoppage of shallow-water prawn trawling, and fishing using other gear that leads to unsustainable harvests through by-catch, harvesting juveniles, or destroying spawning habitat and spawning aggregations.
- 109) Regulation and control of offshore fishery conducted by foreign fleets without surveillance, monitoring, or enforcement, and which brings no economic benefits to Kenya.
- 110) Programs to restore forest cover in montane forest “water towers.”
- 111) Public awareness and education campaigns about the value of forests.
- 112) GOK funds available to compensate and resettle people now living in sensitive forest areas.
- 113) Expansion of forest cover outside of nationally-gazetted Forest Reserves.
- 114) Increased public sector investment in managing and conserving biodiversity and forests.
- 115) More community involvement in biodiversity and forest conservation and management.
- 116) Planning and management at an ecosystem scale.

ANNEX F: REFERENCES AND WEBSITES CONSULTED

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