



Biodiversity Strategy and Action Plan for Sustainable Management of the Mara River Basin



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for Sustainable Management of the
Mara River Basin**

February 2010

This report was published jointly by the Lake Victoria Basin Commission of the East African Community (EAC) and WWF Eastern & Southern Africa Regional Programme Office (WWF-ESARPO).

The Lake Victoria Basin Commission is a specialized institution of the East African Community that is responsible for coordinating the sustainable development agenda of the Lake Victoria Basin. Its vision is to promote, facilitate and coordinate activities of different actors towards sustainable development and poverty eradication of the Lake Victoria Basin. The Lake Victoria Basin Commission is striving to:

- establish a trans-boundary agreement to ensure water flows to sustain the biodiversity of the Mara-Serengeti ecosystem
- encourage implementation of harmonized river basin management practices and policies.
- facilitate cross boundary management of natural resources in the Mara River basin.

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- conserving the world's biological diversity
- ensuring that the use of renewable natural resources is sustainable
- promoting the reduction of pollution and wasteful consumption

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Any inquiries can be addressed to the same at the following address:

The Executive Secretary
Lake Victoria Basin Commission
P.O. Box 1510-40100
Kisumu, Kenya
Tel: +254 (0)57 20238 / 897
Fax: +254 (0)57 2026324
lvbc@lvbcsec.org
www.lvbc.com.org

The Regional Representative
WWF Eastern & Southern Africa Regional Programme Office
P.O. Box 62440 - 00200
Nairobi, Kenya
Tel: +254 (0)20 3877355 / 2124744
Fax: +254 (0)20 3877389
info@wwfesarpo.org
www.panda.org/esarpo

Editing and Design: Kimunya Mugo

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Acronyms

ADB	African Development Bank
AWF	African Wildlife Foundation
ASAL	Arid and Semi-Arid Lands
BSAP	Biodiversity Strategic and Action Plan
CBD	Convention on Biological Diversity
CBO	Community-Based Organization
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COMIFORM	Community Based Integrated Forest Resources Conservation and Management Project
COP	Conference of Parties
DRSRS	Department of Resource Surveys and Remote Sensing
EAC	East African Community
EARPO	Eastern Africa Regional Programme Office
EAWS	East African Wildlife Society
EFA	Environmental Flow Assessment
EIA	Environmental Impact Assessment
ENRM	Environment and Natural Resources Management
ENSDA	Ewaso Ngiro South Development Authority
ESARPO	Eastern and Southern Africa Regional Programme Office
EU	European Union
FAO	Food and Agricultural Organisation
FZS	Frankfurt Zoological Society
GBM	Green Belt Movement
GEF	Global Environmental Facility
GIS	Geographical Information Systems
GLOWS	Global Water for Sustainability
GMO	Genetically Modified Organisms
GoK	Government of Kenya
ICDP	Integrated Conservation and Development Project
ILRI	International Livestock Research Institute
IUCN	International Union for Conservation of Nature - World Conservation Union
IUU	Illegal Unreported and Unregulated Fishing
IWRM	Integrated Water Resource Management
KFS	Kenya Forest Service
KFS	Kenya Forest Service
KFWG	Kenya Forests Working Group
KWWG	Kenya Wetlands Working Group
KWS	Kenya Wildlife Service
LVB	Lake Victoria Basin
LVBC	Lake Victoria Basin Commission
LVEMP	Lake Victoria Environmental Management Project

LVFO	Lake Victoria Fisheries Organization
MFCP	Mau Forest Conservation Project
MFR	Mau Forest Reserve
MMNR	Masai Mara National Reserve
MRB	Mara River Basin
MRBMI	Mara River Basin Management Initiative
MRBP	Mara River Basin Project
MRF	Mara Regional Forum
NBI	Nile Basin Initiative
NBS	National Bureau of Statistics
NBSAP	National Biodiversity Strategy and Action Plan
NEAP	National Environmental Action Plan
NEMA	National Environmental Management Authority
NEMC	National Environment Management Council
NELSAP	Nile Equatorial Lakes Subsidiary Action Plan
NGO	Non-Governmental Organization
NORAD	Norwegian Agency for Development
NRM	Natural Resource Management
NSF	National Stakeholder Forum
PA	Protected Area
SENAPA	Serengeti National Park
SIDA	Swedish International Development Agency
SMME	Serengeti-Maasai Mara Ecosystem
SNP	Serengeti National Park
TAC	Technical Advisory Committee
TANAPA	Tanzania National Parks
TWUF	Trans-boundary Water Users Forum
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Program
UNESCO	United Nations Education, Scientific and Cultural Organization
URT	United Republic of Tanzania
USAID	United States Agency for International Development
WRUA	Water Resource Users Association
WWF	Worldwide Fund for Nature

Foreword

The Mara River Basin (MRB) is one of the river basins within the Lake Victoria Basin (LVB) and is shared between Kenya (65%) and Tanzania (35%). The Mara River originates from the Mau Forest in Kenya and flows through Masai Mara National Reserve (MMNR) in Kenya and Serengeti National Park (SNP) in Tanzania before draining into Lake Victoria in Tanzania. The MRB is rich in biodiversity with one of the highest species diversity of large herbivores in the world. The basin has a diversity of vegetation from forest to savanna through which a large number of animals migrate within the Serengeti-Maasai Mara Ecosystems (SMME). The spectacular annual wildebeest migration is considered one of the wonders of the world. The biodiversity of the MRB is however threatened by habitat modification and fragmentation, a reduction in vegetation cover and species diversity, and over-exploitation and competition from invasive species, mainly as a consequence of human population growth. It was therefore found necessary to develop a Biodiversity Strategy and Action Plan (BSAP) for MRB to enable Kenya and Tanzania to manage the trans-boundary biodiversity resources of the MRB.

The BSAP was developed on the basis of international, regional and national frameworks on biodiversity conservation. Both Kenya and Tanzania ratified the Convention on Biological Diversity (CBD) and have developed National Biodiversity Strategies and Action Plans (NBSAP) to address the requirements of the CBD. Both countries are also Partner States of the EAC and are parties to the EAC Protocol on Sustainable Development for Lake Victoria Basin. Article 3 of the protocol outlines areas of cooperation which relate to conservation and sustainable utilization of the resources of the basin and Article 33 establishes the Lake Victoria Basin Commission (LVBC) as a body for the sustainable development and management of the Lake Victoria Basin, with a broad range of functions, including guiding implementation of sector projects and programmes, promotion of capacity building and institutional development and initiation and promotion of programmes that target poverty eradication. The EAC has also prepared a protocol on Environment and Natural Resources Management to facilitate cooperation in environment and natural resources management. In 2005, the EAC published its “Vision and Strategy Framework for Management and Development of Lake Victoria Basin” which establishes a shared vision and a long term strategic plan for the sustainable management and development of the LVB. Individual Partner States of the EAC also have policy and legal frameworks for managing components of biodiversity.

This BSAP for MRB was developed through a consultative process involving key stakeholders at international, regional, national and grassroots levels. The BSAP examines historical and current uses, changes, current status, threats, current actions and required actions for sustainable management of biodiversity in the MRB. It focuses on three critical ecosystems namely: the Mau Forest and Mara riverine forest; the Serengeti-Maasai Mara Ecosystems; and the Aquatic Habitats of the Mara River. The overall goal is to maintain a rich biodiversity that benefits the present and future generation and ecosystem functions. The main objective is to improve rural livelihood by promoting trans-boundary ecosystem management of the selected ecosystems by collecting and disseminating knowledge and using it to manage the resources. The measures to be undertaken target improving policy, legislation and institutions, economics, investments, applied research, communication, education and awareness raising. Implementation of the BSAP will require commitment of international, regional, national and grassroots institutions, including government agencies, NGOs, CBOs and private individuals. These institutions are called upon to embrace these measures so as to improve collaborative management of the trans-boundary resources of MRB.

Dr Tom O. Okurut

EXECUTIVE SECRETARY,
LAKE VICTORIA BASIN COMMISSION

Executive summary

Following international agreements on environmental management and sustainable development, including the Rio Summit held in Rio de Janeiro in 1992, both Kenya and Tanzania ratified the Convention on Biological Diversity (CBD) and developed National Biodiversity Strategies and Action Plans (NBSAPs). In addition, the EAC developed a Protocol on Environment and Natural Resources Management (ENRM). This BSAP is one of the efforts of the EAC, in cooperation with WWF-ESARPO and USAID-EA, to achieve the objectives of the CBD and of the provisions of the protocol for ENRM with respect to biodiversity conservation and management in the MRB, the trans-boundary natural resources which are shared by Kenya and Tanzania.

The BSAP has been developed for the following reasons:

- a) Regional watershed protection: The Mau Forest in Kenya and the Mara riverine forest in both Kenya and Tanzania comprise one large drainage basin of Lake Victoria. The protection of this watershed and associated biodiversity is important nationally, regionally and internationally;
- b) Reduction of environmental degradation: The MRB is vulnerable to many anthropogenic activities including fire, over-utilization of resources and increasing aridity in an area of unpredictable rainfall. Therefore, a strategy to protect biodiversity in the MRB provides an opportunity to develop mitigation measures for a much larger problem affecting environmental management in East Africa;
- c) Protection and management of biodiversity: The MRB is very rich in biodiversity, but this is being depleted. It is necessary to develop strategies to curtail biodiversity loss;
- d) Tourism potential: The basin is unique in terms of forest and savanna biodiversity which is unequalled by any other area in the world. It is the centre of wildlife and nature based tourism, and the biodiversity of the basin is valuable as an international tourism asset; and
- e) socioeconomic development: The diverse topography and climate of the area is amenable to various land uses including agriculture, agroforestry, fisheries, pastoralism, hunting and gold mining. These activities have socioeconomic and ecological impacts on biodiversity, and it is imperative that a coordinated approach is used to achieve biodiversity conservation in this region.

The biodiversity of MRB is facing a number of threats which include habitat loss and/or modification due to human population growth, deforestation, farming, over-grazing, settlements, illegal hunting, and infrastructure development. Over-abstraction of water and alteration of river flow regimes pose a fundamental threat to biodiversity and livelihoods in this semi-arid region. In recognition of this problem, WWF-ESARPO in liaison with the LVBC is pursuing a strategy of using Environmental Flows to determine appropriate water resource allocation in the MRB. Similarly, global warming and climate change have been identified as emerging threats for most habitats and species. Bilateral cooperation, policy, enforcement laws and institutional difficulties are also a barrier to biodiversity conservation and management. Other barriers to sustainable natural resource management in the basin include: inadequate use of the scientific information available on the MRB in decision-making processes; weak trans-boundary legal and policy framework between Kenya and Tanzania on biodiversity management; and minimal scaling-up and application of best practices for integrated management of natural resources that balance conservation with sustainable land and water management.

Studies in the MRB suggest that the best approach to conservation of biodiversity is not only through conservation of plant and animal species, but also through conservation of habitats. Moreover, experience shows that the best way to conserve species is through protection of their critical habitats. This BSAP aims at conserving biodiversity in the MRB through conservation of three critical habitats namely: (i) Forest Habitats of the Mau Forest and Mara Riverine Forests; (ii) the Serengeti-Maasai Mara Ecosystem; and (iii) Aquatic Ecosystem of the Mara River.

At least one objective has been identified for each habitat to satisfy the biodiversity conservation requirement in that habitat. Each objective has at least one activity that has to be undertaken to meet the biodiversity conservation requirement for that objective.

The biodiversity of the MRB is most vulnerable to actions of the people living in the basin as well as traders in biodiversity resources. This BSAP provides options aimed at increasing people's perception of the direct benefits they receive from utilization of biodiversity as one way to create ownership and to make people custodians of biodiversity conservation. The concept of a participatory community approach to biodiversity conservation and co-management is emphasized. The BSAP provides comprehensive interventions to minimize biodiversity loss in the basin. A combination of legal, technical (investment), socioeconomic, applied research, communication, education and awareness raising in relation to biodiversity conservation are emphasised.

Government and donor resources have been the primary support for biodiversity conservation in the MRB. Due to these limitations, interventions have mainly been donor driven and mostly addressing short-term needs with inadequate ownership of the interventions. This BSAP hopes to establish mechanisms that ensure sustainability of funding, as well as drawing on private capital. Community ownership and participation will be sought and obtained at all stages of implementation of the BSAP. However, involvement of major donors will still be required due to the large scope of the plan.

This BSAP has been written to elucidate the overall strategy and action plans to conserve critical biodiversity habitats throughout the MRB. Detailed activities will need to be developed by the responsible actors and these will be included in a detailed work plan, as well as a list of measurable performance indicators in terms of quantity, quality and time frame. The responsible actors are comprised of government departments, international conservation organizations, protected area authorities, environmental conservation agencies, private individuals, and research and financial institutions. Overall coordination, monitoring and evaluation will be the responsibility of the LVBC.

Implementation of the BSAP will contribute to sustainable development and economic benefits for the people of the MRB and beyond. However, commitment will be required from stakeholders including landowners, land-managers and policy makers to achieve these ends through protection of biodiversity of the MRB. It is expected that the governments of Kenya and Tanzania and the EAC partner states and other stakeholders will build on the recommendations made in the BSAP to create a vibrant and effective intellectual and moral framework to support the conservation and management of biodiversity resources of the MRB. This BSAP is an adaptive and dynamic document, and there will be need for continuous and improved understanding, development and evaluation of the knowledge of biodiversity conservation and socioeconomic policy interface, as well as establishment of feedback loops in its implementation

Chapter 1: The Mara River Basin

This chapter provides the background to the BSAP and describes the geographical and economic setting of MRB and its critical habitats namely:

- a) Forest Habitats of Mau Forest and Mara riverine forests;
- b) The Serengeti-Maasai Mara Ecosystems; and
- c) Aquatic Habitats.

It provides an overview of each of the critical habitats including:

- i. The values;
- ii. The current status;
- iii. The threats; and
- iv. The current actions.

1.1 Geographic and economic setting of Mara River Basin

The MRB is one of drainage basins that feed into Lake Victoria and is functionally and ecologically related to the socioeconomic activities of the lake. The Mara River originates from the Napuiyapui swamp in the Mau Escarpment (2,932 m asl) and flows through the plains of Maasai Mara National Game Reserve in Kenya and Serengeti National Park in Tanzania before entering Lake Victoria (1,134 m asl) (Fig. 1.1). The Mara River Basin covers approximately 13,750 km² and is shared between Kenya (65%) and Tanzania (35%). Kenya holds a key responsibility in determining the future of this basin, as the basin's headwaters stem from Kenya's Mau Escarpment and Loita Hills. The basin is located between longitudes 33° 47' E and 35° 47' E and latitudes 0° 28' S and 1° 52' S

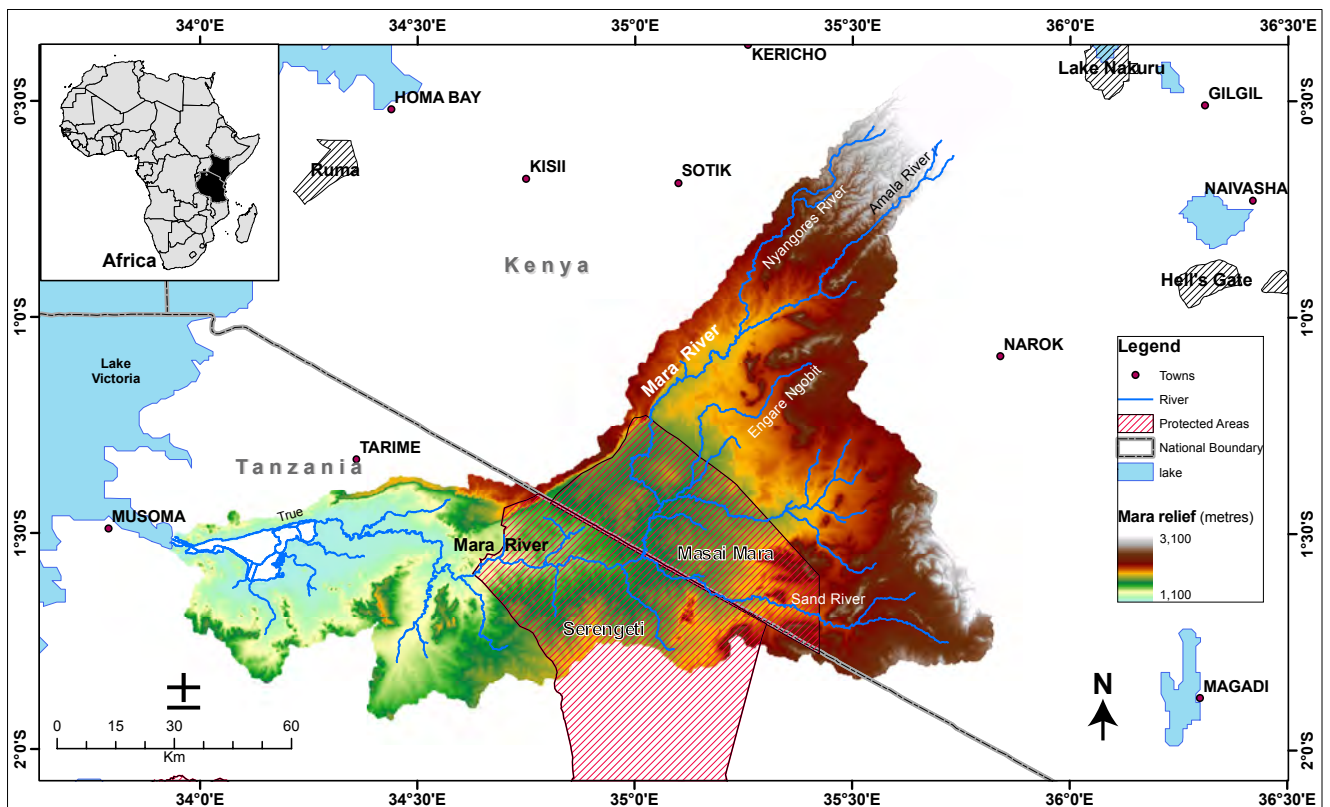


Figure 1.1: The location and relief of the Mara River Basin in Kenya and Tanzania. (Mati et al 2005)

The population in the MRB (Tables 1 & 2) is approximately 800,000 people, the majority of whom live in Kenya. In Kenya, the combined annual population growth rate for Nakuru, Bomet, Narok and Trans Mara Districts is 2.4% for the period from 1999-2010 (Kenya NBS, 2006). The population growth within the Mara Region of Tanzania, which includes Tarime, Serengeti and Musoma Districts, is 2.5% (Tanzania NBS, 2003).

Table 1. Population characteristics of the Mara River Basin

Human Population (est.2009)	Total: 803,741; KE: 531,5951; TZ: 272,1462
Tourism Numbers	Increase from 133,000 visitors in 1995 to 240,000 in 2004 in MMNR ¹ , and from 59,564 visitors in 1990 to 378,218 in 2002 in the Serengeti National Park ²
Livestock Numbers	1,079,270; KE: 559,204; TZ:520,066 ³
Wildlife Numbers (est. 2000)	Resident: 233,573; Migratory: 1,600,000 (wildebeest, Thompson gazelle and zebra)

¹ Kenya NBS, 2005; ² Tanzania NBS, 2002; ³ Hoffman, 2007

Table 2. Historic and projected human populations within the Mara River Basin from 2000 to 2030

	Human Population in the MRB			
	2000	2010	2020	2030
Kenya	428,706	556,497	705,448	894,268
Tanzania	231,614	282,204	361,251	462,437
Total	660,320	838,701	1,066,699	1,356,705

(Hoffman 2007)

The main perennial tributaries of the Mara River are the Amala and the Nyangores, which drain the western Mau Escarpment. Other tributaries include the Talek, which starts from Loita plains and joins the Mara in the Masai Mara National Reserve (MMNR), the Engare Ngito, originating from the Ilmotyookoit ridges, and the Sand River, which is the last main tributary, joining the Mara at the Kenya-Tanzanian Border in the Serengeti plains. The Mara River then flows through Tanzania and into the Mara Swamp, finally draining through the Mara Bay into Lake Victoria at Musoma. Mean annual rainfall ranges between 1,000-1,750 mm in the Mau Escarpment, 900-1,000 mm in the middle rangelands, and 700-850 mm in the lower Loita hills and around Musoma. There are two rainy seasons between March and June, and November and December.

The values of the Basin

The MRB supports some of the highest levels of both species diversity and biomass of large herbivores in the world (Fig. 1.2 & 1.3) and is important internationally, regionally and nationally. Other attributes of the basin include a varied equatorial climate; existence of both highlands and lowlands; influence of the Mara River, wetlands and Lake Victoria waters; diversity of vegetation and soils; local migration of a large number of species within the Serengeti-Maasai Mara Ecosystem (SMME); a large proportion of resilient savannas; and extensive retention of traditional methods of land use, including nomadic pastoralists and non-sedentary agriculturalists. The spectacular annual wildebeest migration is considered one of the wonders of the world (Fig. 1.2). These attributes attract visitors and make the MRB an important international tourist destination.

The main ecosystems of the MRB consist of the Forested Habitats of the Mau Forest and the Mara riverine forest; the Serengeti-Maasai Mara Ecosystem; and the Aquatic Habitats of the Mara River and the Mara Swamp.

Threats to biodiversity of the Basin

There are major threats to the biodiversity of the MRB, including habitat loss and/or modification due to increasing human population, deforestation, farming, over-grazing, human settlements, illegal hunting, infrastructure development and tourism. Over-abstraction of water and alteration in river flow regimes particularly pose a threat to biodiversity and livelihoods in this semi-arid region. Global warming and climate change have also been identified as emerging threats for most habitats and species. Limited bilateral cooperation in policy implementation and law enforcement, among other institutional

difficulties, has hampered biodiversity conservation and management in the area. Other threats include weak trans-boundary legal and policy framework in biodiversity management; institutional barriers leading to inadequate use of the available scientific information on the MRB in decision-making processes; and minimal scaling-up and application of best practices for integrated management of natural resources that balance conservation with sustainable land and water management.

Actions in Biodiversity Conservation in the Basin

The governments of Kenya and Tanzania have for a long time had programmes on biodiversity conservation in the MRB. In addition, there are a number of international, regional and national institutions that have been involved in conservation of biodiversity in the MRB. Despite these numerous efforts, biodiversity of the MRB continues to decline and there is need for an integrated trans-boundary approach to biodiversity conservation in the basin. It has therefore been found necessary to build a wide range of strategic planning into conservation, and to find ways for different groups, including local, national and international agencies, academic institutions, private landowners and organizations, and public groups to network and collaborate to bring the separate approaches together in a complementary way.



Figure 1.2: Wildebeest crossing the Mara River during the annual migration.
(Fred Hoogervorst/WWF-ESARPO)



Figure 1.3: Elephants in the Serengeti Plains. (Fred Hoogervorst/WWF-ESARPO)

1.2 The forest habitats

The values of forested habitats

The forested habitats consist of the Mau Forest and the Mara Riverine Forest. The Mau Forest forms one of the five crucial water catchments or “water towers” in Kenya. It is the source of some of the large rivers in Kenya that feed Lakes Nakuru, Baringo, Victoria and Natron. The Mara River originates from the Mau Forest. Forested lands also include the corridor of riparian forest along the Mara River which stabilize its banks and reduce soil erosion.

Forested ecosystems are important in biodiversity conservation in terms of their regulative, protective and productive functions, and the manner in which they influence the flow of matter and energy across landscapes. Riparian forests serve critical roles in stabilizing river banks, slowing down runoff during large rainfall events, and reducing soil erosion. They are also hotspots of biodiversity. Attempts to replace native forests with exotic species are generally ineffective and sometimes harmful, because the resultant monocultures have a lower capacity to buffer anthropogenic factors.

Forests have recreational value as areas that harbor a diversity of life forms. Recreational tourist activities may have negative impacts on forest biodiversity, but the understanding and appreciation generated by such activities can prove worthwhile in the long run and could thereby alleviate the negative impacts on biological diversity. With the expected trend in increased tourism in forested land, it is important to plan so as to minimize negative impacts, especially in areas close to water bodies.

The status of forested habitats

The Mau Forest Complex has been degraded over the past few decades. The natural vegetation has been declining as closed forests have been reduced in area by 23% due to forest clearing for tea and/or timber harvest (Fig. 1.4), which has increased open land by 82% (Mati et al. 2005). The corridor of riverine forest along the Mara River has also been severely degraded for small-scale cultivation despite existence of laws protecting riparian buffer zones.

The Mau Forest complex falls under three ownership regimes (Fig. 1.5):

- Government Gazetted Forest;
- Trust Land Forest, managed by the County Council; and
- Private farms and group ranches.

Government gazetted forests

The government gazetted forests consist of Transmara, the Southern Mau block and the Olposimoru block. The Transmara block includes Olenguruone, Nairotia, and Nyangores forests, covering a total of 35,270 ha and consisting of mainly indigenous and fairly protected forests. The Southern Mau block covers 314 ha of indigenous forest. The Olposimoru block originally covered 36,832 ha of indigenous forest, but 20,000 ha of this have been converted to settlement, leaving 16,832 hectares under forest cover.

The Trust Land Forests

The Trust Land Forests, which are under the management of County Councils, consist of Maasai Mau, Loita and Enosupukia forests in Kenya. The Maasai Mau Forest originally covered 45,000 hectares. About 50% has been lost due to unclear boundaries between the private farms and the forest. Also, some individuals were issued with title deeds for land belonging to gazetted forest and squatters who were chased away in 1986 have begun returning, leading to encroachment on the forest. Loita forest covers 20,000 ha and is fairly well conserved by the local community. The Enosupukia forest covers 10,772 ha. It had been encroached upon by settlers and a large portion had been degraded, but after the eviction of settlers in the mid-1990's, the forest has been showing signs of recovery.



Figure 1.4: Mau Forest showing some loss of forest cover due to agricultural encroachment. (Fred Hoogervorst/WWF-ESARPO)

Private farms and group ranches

The Private Farms and Group Ranch forest areas are primarily found in Ololulunga, Nkoben and Nkareta, and originally covered a total of 58,517 ha. These are small pockets of forests, which are disappearing at an alarming rate, and most of them may have already been lost to loggers and charcoal producers. Some farmers own up to 200 ha of indigenous forest stocked with cedar, podo and many other valuable species.

The threats to forested habitats

The major threats to the forested habitats in the MRB include encroachment by settlers, unclear forest boundaries, and ownership conflicts, including issuing of fake titles, illegal logging and inadequate law enforcement. The situation has been complicated by political interference.

There has also been extensive loss of riverine forests to small and large-scale cultivation, and the laws protecting riparian buffer zones along rivers have not been adequately enforced. Previously the Forest Act was limited in its jurisdiction to gazetted forests only, leaving the remaining categories vulnerable to deforestation. Moreover, the penalties to illegal trade in forest products were very low.

In order to properly manage the Mau forest resources, clear boundaries need to be established and marked, illegal settlement and fake title deeds need to be addressed, and innovative strategies must be developed to reduce land use conflicts.

Actions in forested habitats

The departments or institutions responsible for environment and natural resources management such as forestry, water, wildlife, tourism, fisheries and agriculture in Kenya and Tanzania, as well as international, regional and national non-governmental conservation and development organizations, have attempted to address some of the problems facing the forested habitats using applicable laws and regulations but with limited success. Other initiatives at the time of preparing the BSAP are briefly outlined below.

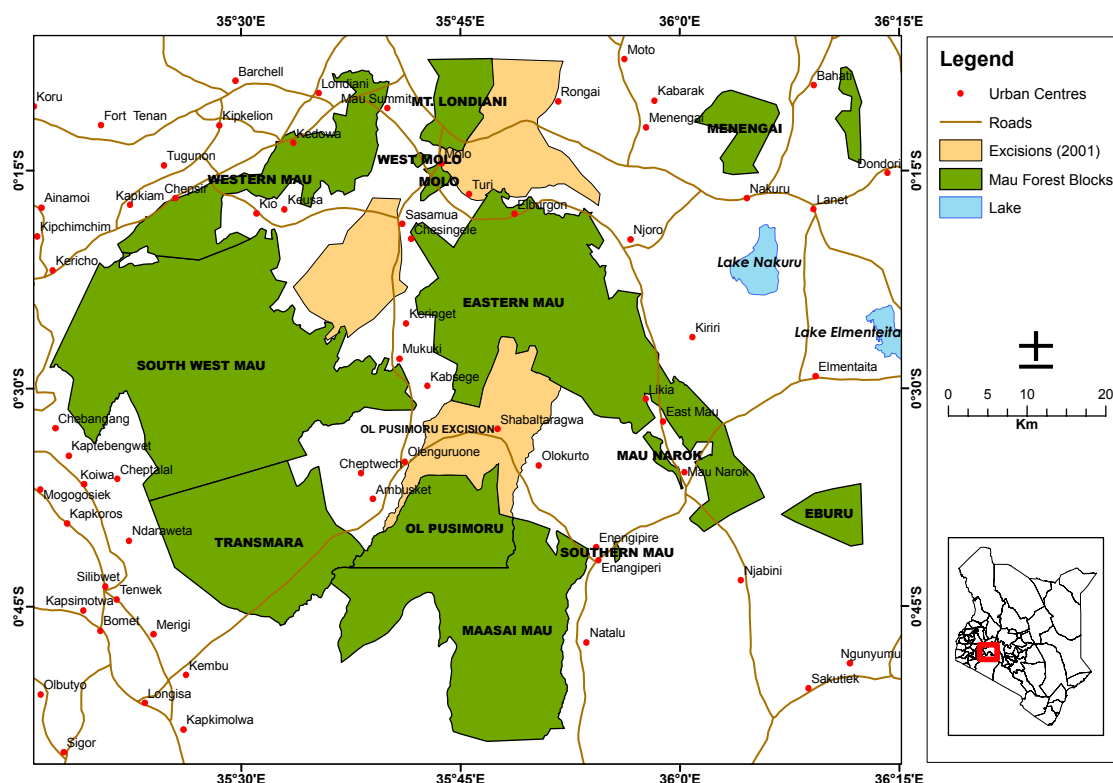


Figure 1.5: Map of the Mau Forest Complex.

The Kenya Forest Act, 2005

In 2005, the Kenya Forest Act was passed to replace the Forest Act (cap 385). The new Act aimed to fulfil Kenya's commitment both to the inter-sectoral development and sustainable use of forestry resources and to international agreements promoting sustainable management, conservation and utilization of forests and biological diversity. The Forest Act of 2005 established the Kenya Forest Service (KFS) to protect and manage the country's forests; a Forest Management and Conservation Fund to provide for conservation, education and management activities; and rules and regulations for the creation and management of forests that help to address the problem of politically motivated excisions from Kenya's gazetted forests with minimal review. It also provided for community involvement in forest management through creation of Community Forest Associations.

The Community Based Integrated Forest Resources Conservation and Management (COMIFORM) Project

The Community Based Integrated Forest Resources Conservation and Management Project (COMIFORM), is funded by the Government of Spain through UNEP. It works with communities surrounding the Maasai Mau Forest and the Narok County Council (the custodian of the Maasai Mau Forest) to introduce a shift from unsustainable land use practices to sustainable management. Other partners in the project are Ewaso Ngiro South Development Authority (ENSDA), Kenya Forest Working Group (KFWG), Green Belt Movement (GBM), and Kenya Forest Service (KFS). The objective of the project is to halt further destruction of the forest and to promote reforestation within and around the Maasai Mau Forest and the water catchment areas of Lake Natron, and rivers Mara and Ewaso Ngiro. This is to be achieved through decreasing the pressure on the remaining indigenous forests by providing alternative livelihoods and resources to the communities adjacent to the forest and through restoration of the forest cover within the project area.

WWF Mau Forest Conservation Project

This is a collaborative pilot project implemented by WWF Eastern Africa Corporate Club in the upper regions of the Mau Forest Complex towards forest restoration and watershed protection in support of community livelihood. The project works towards achieving the following objectives:

- Protecting and conserving Mau Forest;
- Empowering communities in environmental governance through partnerships; and
- Promoting environmental awareness through information dissemination.

WWF Mara River Basin Management Initiative

This project has been implemented since 2008 by WWF-EARPO with financial support from BMZ-Germany to promote Sustainable Forest and Water Resources Management in the Mau Forest and its surroundings. The goal of the project is to reduce highland forest degradation in the Mau complex in order to restore ecosystem services. These services include maintenance of river flows for socioeconomic activities downstream as well as the survival of wildlife in the SMME. The project endeavours to restore the ecological functioning of approximately 15,000 ha of the upper catchment of the Mara River, thus increasing dry season water flows. It is also expected to contribute to the socioeconomic welfare of approximately 30,000 people in the upper catchment and others downstream in both agricultural and wildlife sectors.

1.3 The Serengeti-Masai Mara Ecosystem

The values of protected areas

The protected areas consists of savannah, grasslands and shrublands of the Serengeti-Masai Mara Ecosystem (SMME). They are famous for wildlife worldwide and cover approximately 25,000 km². The Masai Mara National Reserve (MMNR) and the Serengeti National Park (SNP) have some of the greatest concentrations of large herbivores and predators in the world. They host one the great wonders of the world with an annual migration of over one million wildebeest. Several distinct habitats exist within the protected areas, including wetlands, open grasslands, shrubs, thickets, woodlands and riverine forests. The vegetation in the dry lowlands is replete with xerophyllic plants, the most common being *Acacia* and *Commiphora* woody plants.

The SMME harbours one of the most diverse large herbivore assemblages found anywhere on earth with up to 92 species of mammals. Some rare species, such as the aardwolf, golden cat and striped hyena are found in this ecosystem. More than 452 species of birds have been recorded in the SMME including fifty-three species of birds of prey (Williams, 1967). The MMNR has the highest concentration of wildlife in Kenya and is a priority habitat for conservation of antelopes. The Serengeti also harbours the largest giraffe population in Africa, estimated at between 8,000 and 17,000, and a moderate population of wild dog, an endangered species of international importance. The European white stork has a major wintering ground on the Serengeti plains.

Status of Serengeti–Masai Mara Ecosystem

The Serengeti-Masai Mara Ecosystem includes national parks such as SNP and national reserves such as MMNR. Human activities are restricted in all the protected areas and are controlled as per the applicable Act. They are managed to ensure that the resources therein meet the needs of the present generation without compromising their capacity to meet the needs of future generations. These protected areas are, however, under severe socioeconomic and political pressure, which makes them fail to meet their objectives satisfactorily. Cases of biodiversity loss in terms of population decline or local extinction are increasing. Protection of species needs to be intertwined with habitat protection, and this requires involvement of multiple agencies responsible for natural resource conservation and management. Sustainable natural resource management must also extend outside of the protected areas.

The Masai Mara dispersal area is an integral component of the SMME, which encompasses approximately 4,200 km² (Sitati, 2004). The natural value of the area has led to the proposition to designate the MMNR as a World Heritage Site. The Masai Mara Group Ranches also support a high and diverse population of wildlife species. It is an important wildlife dispersal area and supports both resident and migratory wildlife species from the reserve. Some group ranches adjacent to the MMNR have formed “conservation areas” in which sustainable human development in partnership with natural resource conservation is being promoted. Negotiations are ongoing for other group ranches to follow suit.

Although pastoralism has co-existed with wildlife and water resources of the area for many years, the Masai are undergoing rapid changes in lifestyle. Growing human population (5.3%) and a shift to a more sedentary way of life have gradually increased pressure on natural resources. Human immigration and the uptake of cultivation amongst the Masai have further accelerated the pace of change. There is need for a detailed management plan to guide management of the Masai Mara and its environs, as well as a long term conservation and development strategy for the area. These growing pressures require increasingly sophisticated mechanisms to ensure that a delicate balance is maintained between conservation and human development in the Masai Mara region.

Threats to Serengeti-Masai Mara Ecosystem

Conservation and management problems in the protected areas include mismanagement of the resources, increasing pressures exerted by a growing human population, increasing socioeconomic demands such as tourism activities, encroachment of human settlements, hostile neighbours with conflicting interests, and poaching. As a result, the conservation status of the protected areas can be considered precarious unless immediate actions are taken to remedy the situation.

The annual average decline of large herbivores in the SMME ranges from 1.7% to 8.1% for Thomson’s gazelle and buffalo, respectively (Kaelo *et al.* 2007). Poaching is partly responsible for the decline in biodiversity of the protected areas, as even subsistence hunting for bush meat can push certain species to extinction (Alroy, 2001). Hunting is allowed in game reserves in Tanzania but prohibited in Kenya. Hunting can have severe consequences on biodiversity if not well managed and controlled. Alternative options to hunting do exist, such as capturing animals to sell or provide to conservation institutions, and these options can be utilized in the case of local overpopulation of certain species of wildlife or instances of negative human-wildlife interactions.

The community lands around protected areas are also being increasingly converted to provide land for settlements, cultivation and grazing. The exploitation of biodiversity resources in the community lands has traditionally been minimal due to the low human population and partly due to the seasonal

pattern of use by semi-nomadic pastoral tribes. However, with the adoption of new modes of life by the surrounding communities, these areas are now facing undue pressure. The biodiversity in these areas lacks adequate legal protection, and its utilization is often unplanned and uncontrolled.

Many of the above threats are caused by trade-offs between biodiversity conservation and other income generating activities. There appears to be strong economic incentives for individual landowners to develop their land at the expense of biodiversity. It is important to identify and develop biodiversity-friendly alternative land uses, which would yield acceptable levels of income to landowners. It has been argued that the current revenues to landowners from wildlife-based tourism are simply not adequate to stop land development. It also appears that the community based Integrated Conservation and Development Projects (ICDPs) in the SMME do not generate the scale of revenues needed to prevent the development of land (Norton-Griffiths, 1995). These institutional, market and policy failures have been identified by economists as the link between economic growth and “excessive loss” of environmental resources, and they pose a significant threat to biodiversity conservation and management.

Loss of habitat due to farming, grazing and settlement are increasing in the MRB. As wildlife habitat is lost, biodiversity is also lost. Although areas with moderate agricultural development provide good habitat for some species of birds and small mammals, large mammals are generally lost as agriculture expands. Studies have shown that agroforestry is one way to conserve biodiversity, because it allows coexistence of natural and agricultural habitats. In addition, agroforestry attracts species beneficial to farming, such as pollinators, and improve farm conditions by reducing soil erosion; thus, it is economically beneficial to farmers (Bichier, 2006).

Actions in Serengeti-Masai Mara Ecosystem

Serengeti National Park has a general Management Plan developed for 2006-2016. Masai Mara National Reserve is in the process of developing a Management Plan. However, coordination of these plans is required to promote harmony in sustainable management of SMME.

In 2001, management of the Trans Mara portion of the MMNR was contracted to a non-profit organization, the Mara Conservancy. Since that time, the Mara Conservancy has implemented cross-border controls with TANAPA that have resulted in the arrest and prosecution of more than 1,300 poachers, recovered 10,500 snares, recovered 150 stolen heads of cattle, recovered and treated several animals damaged by snares, and made the Mara Triangle and adjoining areas relatively secure for the local communities, wildlife and tourists.

Another example of a promising approach to sustainable management of the protected areas is the Serengeti-Luangwa Ecosystem Management Project. This is a 5 year initiative, co-financed by the EU and Frankfurt Zoological Society (FZS), to implement and apply the CBD’s Ecosystem Approach in the SMME. The project emphasises building sustainable institutional mechanisms for stakeholder collaboration in ecosystem management, and developing community participation and empowerment in the management of natural resources. In addition, FZS, through UNEP, is developing a GEF project to study the development of conservation finance mechanisms for the Serengeti and North Luangwa. This project will build upon the Ecosystem Management Project, with the new GEF project focusing on the establishment of sustainable financing systems for ecosystem management, complementing the institutional mechanisms being developed by the EU-financed project.

1.4 Aquatic Habitats

The values of aquatic habitats

There are two primary Aquatic habitats in MRB, the Mara River itself, and the Mara Swamp. These habitats are linked in a continuous network extending from the headwaters of the basin in the Mau Forest through the Mara Swamp to Lake Victoria. They include channels and adjacent riparian habitats which are heavily dependent on the water and the flow regimes provided by the river. River corridors are a hotspot for biodiversity in the basin, as both aquatic and terrestrial species congregate there.

The Mara River flows for 395 km from the Mau Forest in Kenya to Lake Victoria in Tanzania. Along this route, it provides water for wildlife, livestock and human use, as well as contributing to the

ecological processes in the SMME. In April and May, more than 1 million wildebeest (Fig. 1.2), over 200,000 zebras and 400,000 Thomson gazelles migrate westward from the Ndotu Plain in Tanzania in search of food and water. This migration, which is the largest on Earth, reaches the Mara River in July or August and continues northward, eventually crossing the border into Kenya's Maasai-Mara National Reserve. This migration has been linked to water availability and water quality (Gereta *et al.*, 2009). In the south, animals rely on the Grumeti and Mbalageti Rivers in Tanzania for water, but the flow of these rivers ceases during the dry season leaving only a series of stagnant pools to provide the only source of water.

During severe droughts, which occur every six or seven years, even these stagnant pools dry up, leaving the Mara River as the only perennial river in the region. It is the only steady dry-season source of water to grazing animals, and the water needs of these animals are substantial. Wildebeest and zebra consume more than 20 litres of water per day during the dry season (Hoffman, 2007). The Mara also provides critical in-channel and riparian habitats to a host of other animals. Hippopotamus, crocodiles and fish rely on in-stream habitats, while elephants and many other species rely on the food and cover of the riparian wetland vegetation. In addition to its critical ecological role, the Mara River plays an important role in the economics of the basin, as the Mara-Serengeti migration of wildebeest (Fig. 1.2) is a major attraction for tourists visiting both Kenya and Tanzania.

The Mara Swamp is the most downstream portion of the Mara River, extending to the river mouth on Lake Victoria and covering an area of approximately 70 km². The river empties into Lake Victoria in Musoma Bay, which stretches in an easterly direction for approximately 20 km with an average width of 5 km. The Mara Swamp is a repository of floral and faunal biodiversity (Munishi, 2007). The wetland has at least 13 important fish species, some of which are rare or endangered in Lake Victoria (Chitamwebwa, 2007). They include *Brycinus jacksonii*, *Clarias alluaudi*, *Oreochromis niloticus*, *Schilbe intermedius*, *Clarias gariepinus*, *Synodontis afrofishcheri*, *Ctenopoma muriei*, *Synodontis victoriae*, *Tilapia zillii*, *Oreochromis leucostictus*, *Protocephalus catastoma*, *Ctenopoma muriei* and *Haplochromine* spp.

A total of 32 mammals have been observed in Mara Swamp at different periods. They include: hippopotamus, sitatunga, wild pig (*mbeche*), warthog, reed buck (*tohe*), waterbuck (*kuro*) and topi (*nyemela*) (Munishi, 2007).

The majority of reptiles and amphibians observed or reported to inhabit the swamp are various types of snakes and frogs (Munishi, 2007). Some were observed during field visits, and others were reported by the local people to exist in the area. Not all species are wetland residents, although the presence of the wetland has a connection with their occurrence. Some only visit the wetland during the dry season, to search for food, water or shelter. Little is known about the status of these taxa within the swamp and further studies are needed.

There are different types of insects resident in or around the wetlands (Munishi, 2007). Common insects include senene (*chinsaramaila*), luba (*chenyinta*, *liibi*), scorpions (*egetomari*, *nge*), grasshoppers (*ebisasi*, *panzi*), mosquitoes (*ensona*, *mbu*), tsetse flies (*lisagi*, *mbung'o*), and butterflies (*kipepeo*). These species are commonly found in different seasons.

A total of 81 terrestrial bird species belonging to 28 families were identified around the Mara River Swamp (Munishi, 2007). Of these species, 7 were breeding, 5 were crop pests and several are endemic and/or endangered. A total of 15 species of the terrestrial birds were more frequent visitors of the swamp, of which the Dark-capped Bulbul (*Pychnonotus tricolour*) was the most frequent followed by the Village (Black-faced) Weaver (*Ploceus cucullatus*).

Threats to aquatic habitats

Agricultural land use in the MRB has increased by 200% over the past three decades (Mati *et al.*, 2005), and this has been associated with deforestation, degradation of natural rangelands and poor soil conservation efforts. As a result of loss in vegetation cover in the upper catchment, the water cycle has been reduced, resulting in rapid runoff, high peak flows and soil erosion during rainfall events. These changes have not only affected the quantity and quality of water in the Mara River itself, but



Fig. 1.6. An egret fishes in the Mara Swamp (Photo: F. Hoogervorst).

also the Mara Swamp downstream. The Mara Swamp has increased in area by a factor of 131% in the last 15 years (Mati *et al.*, 2005), an increase that has been associated with the build up of sediments downstream from upstream erosion processes.

In addition to land use changes, water abstraction from the river is increasing to sustain growing urban areas, irrigated agriculture, tourism facilities and the mining industry. These water uses are also increasing pollution of the river. Most of the urban centres and tourism sites lack facilities for solid waste disposal or waste water treatment. Fertilizer input and topsoil from agricultural lands often end up as runoff from the steep slopes during rainfall events, a situation which has been exacerbated by the loss of riparian vegetation. Small and large scale mining activities rely on toxic chemicals, such as cyanide, arsenic and mercury, which can also result in pollution in the river.

There are also some threats which are specific to the Mara Swamp. Unsustainable agricultural and fishing practices, livestock grazing, mining and harvesting of wetland products have had negative impacts on biodiversity of the swamp. The main fishing gear used in Musoma Bay and Mara Swamp are gillnets, longlines and handlines. Monofilament gillnets, undersized gillnets, beach seines, fixed stake-traps and poison (mainly insecticides and herbicides) are illegal; however, they are sometimes used and their control is a major problem in management of the fisheries in the lake. Another major threat is burning of the wetland when hunting or opening up land for agriculture especially in the dry season. Control of this practice is of great relevance for biodiversity conservation.

Status of aquatic habitats

The Mara River is under increasing pressure due to land use change and water abstraction for consumptive use. The change in land use in the upper catchment has resulted in higher peak flows during the rains and lower flows during drought (Mati *et al.*, 2005). Abstraction levels for consumptive uses are often highest during the dry season, putting additional strain on the river ecosystem during these critical low flows. Both the Kenya Water Act (2002) and the Tanzania National Water Policy

(2002) require protection of Reserve flows to provide for basic human need and to sustain ecosystems into the future (GoK, 2002; URT, 2002). An Environmental Flow Assessment (EFA) was conducted in 2007 by WWF, with financial support from USAID-EA, to determine how much water is available in the river during different times of the year and how much is needed to maintain reserve flows. This information allows an estimate of the amount of water available for abstraction (LVBC & WWF-ESARPO, 2010. Assessing Reserve Flows for the Mara River).

During years of normal rainfall, the reserve flow is met and ample water is available for extractive uses. During drought, the situation is quite different, as the assessment found that, in the upper catchment, the reserve was not being met during several months of the year. This provides evidence of a trend toward unacceptable alterations of the Mara River's flow regime. Upstream impacts are linked to downstream resources, and poorly managed water abstraction above the wildlife reserves will ultimately affect the downstream reaches as well.

Actions in aquatic habitats

In 2006, WWF-EARPO established the Mara River Basin Management Initiative, aimed at institutionalizing Integrated Water Resources Management in the Mara River Basin. This includes establishment of a Mara River Water User's Association to participate in water resources management at the grassroots level; establishment of Community Forest Associations to protect forested lands and to re-plant degraded forests in the upper catchment; and work with tourism facilities in the Basin to develop wastewater treatment facilities and to participate in a payment for environmental services scheme.

The Nile Basin Initiative, under the Nile Equatorial Lakes Subsidiary Action Plan (NELSAP), began the Mara River Basin Project (MRBP) in 2002. This program is also aimed at implementing IWRM in the MRB. The MRBP has been developing wastewater treatment facilities in growing urban centres as well as developing an investment strategy and decision support system for the MRB.

Scientists from Florida International University and UNESCO-IHE Institute for Water Education have also been conducting research in partnership with scientists from Egerton University, Jomo Kenyatta University and the National Museums of Kenya. These scientists work closely with WWF-MRBMI, NELSAP-MRBP and other implementing bodies in the region, which in turn work closely with local, national and regional water resource management authorities from both Kenya and Tanzania. Other developments include the formation of National Technical Advisory Committees, a Trans-boundary Water Users Forum, National and Trans-boundary Stakeholder Forums, and a Secretariat for the MRB. These developments hold great promise for the improvement of biodiversity conservation in the MRB.

The above threats to the different habitats of the MRB have made it necessary to apply existing international, regional and national tools to conserve biodiversity of the MRB. The next Chapter will examine the available tools for management of the biodiversity of MRB.

Chapter 2: International, regional and national frameworks on biodiversity conservation

This chapter describes international, regional and, national frameworks for managing biodiversity which forms the platform for preparation of the BSAP including:

- a) The CBD and associated decisions of COP;
- b) The Regional Policies and legal instruments;
- c) The National Policies and legislation;
- d) National Biodiversity Strategies and Action Plans;
- e) Institutional frameworks; and
- f) Funding mechanisms

2.1 Definition and components of biodiversity

biological diversity is, according to Article 2 of the Convention for Biological Diversity (CBD), the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and freshwaters and the ecological complexes of which they are part. This includes the diversity within species, between species and of ecosystems. Biodiversity is the variety of the world's organisms, including their genetic make up and the communities they form. Biological resources include genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value. There are three components of biodiversity: ecosystem, species and genetic diversity. Genetic biodiversity is the inheritable variation within the gene pool of a species. At the species level, biodiversity refers to the number of species inhabiting a certain area. Ecosystem diversity is the variety of ecosystems or biological communities found in a given area and their physical environment. These three components of biodiversity are interrelated although they are sometimes treated separately.

2.2 Global values to biodiversity

The global value of biodiversity as a key component of the environment was recognized during the build up to the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992. It was recognized that biodiversity is the natural biological capital of the earth and represents important opportunities for all nations. It provides goods and services which support human livelihood. The protection of these assets and their sustainable exploitation offers the means by which humanity sustains his own well being. Losing genes within species, species within ecosystems, and ecosystems within regions reduces the benefits that the systems can supply to human well being.

Biodiversity values fall in four main categories: direct use values, indirect use values, option values and existence values. Direct use values are the benefits from which people derive their livelihoods through exploitation of biodiversity to produce goods and services, and to supply consumers, industrial processors and export markets. Indirect use values are the ecosystem services provided by biodiversity. Option values reflect the desire among people that biodiversity should not be destroyed by its present use but should continue to provide benefits of the same quality in the future at undiminished rates. Existence values refer to the satisfaction people get from simply knowing that a biodiversity element exists although they do not obtain any direct or indirect goods or services from it. Biodiversity is the basis of support systems on which all life depend for food, fibres, shelter, medicine, pesticides, energy, industrial chemicals, water, and air. It is therefore necessary to protect it.

2.3 Global threats to biodiversity

Biodiversity is currently under extensive pressure from human activities such as industrial and domestic activities, land use change, and over-abstraction of resources. One of the major threats to biodiversity is the reduction in geographic range of species, primarily as a consequence of human population growth, habitat modification and fragmentation, species over-exploitation and competition from invasive species, and climate change. Well-known examples of successful invaders in Eastern Africa are the water hyacinth, *Eichornia crassipes*, and Nile perch, *Lates niloticus*, in freshwater ecosystems of the Lake Victoria Basin and terrestrial species such as *Prosopis juliflora*, *Tarchonanthus camphoratus*, *Solanum incanum*, *Lippia javanica*, *Urtica massaica*, *Datura stramonium*, and *Occimum suave*. Economic costs of alien invasions are enormous, reaching billions of dollars annually.

2.4 Objectives and key provisions of the convention on biological diversity

The threats to biodiversity spurred the nations of the world to enter into a legally binding Convention on Biological Diversity (CBD) which came into effect during the Earth's Summit in Rio de Janeiro in June 1992 to guide conservation and sustainable use of biodiversity. The CBD is the key international legal instrument on biodiversity. It defines the objectives and provides a framework for management of biodiversity. The objectives of the Convention are (Article 1):

- The conservation of biological diversity;
- The sustainable use of its components; and
- The fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including appropriate access to genetic resources and transfer of technologies.

The CBD empowers nations to exploit the biodiversity within their jurisdiction (Article 3) but requires them to cooperate in respect to areas beyond their national jurisdiction, as in the case of the MRB. The Convention also provides a framework for conservation and sustainable use of biodiversity.

- Article 6 provides for general measures for conservation and sustainable use of biodiversity and obliges the parties to the convention to develop National Biodiversity Strategies and Action Plans (NBSAPs), or to adapt existing plans to address the provisions of the CBD and to integrate biodiversity conservation into sectoral and cross-sectoral plans, programs, and policies;
- Article 7 provides for identification and monitoring of components of biodiversity that need protection; the processes that threaten biodiversity; biodiversity which is important for conservation; and processes and activities that have actual, potential or significant impacts on biodiversity;
- Articles 8 and 9 provide for methods of conserving biodiversity either In-Situ or Ex-Situ;
- Article 10 proposes measures for sustainable use of the components of biodiversity;
- Article 11 provides for measures that can act as incentives for conservation of biodiversity;
- Article 12 provides for research and training to provide information and build capacity for conservation and sustainable use of biodiversity;
- Article 13 provides for communication, education and public awareness to provide an understanding of the importance of, and the measures required for, the conservation of biological diversity, as well as its propagation through media, and inclusion in educational programs;
- Article 14 provides for environmental impact assessment to minimize impacts of activities on biodiversity;
- Article 15 provides guidelines for access to genetic resources;
- Article 16 provides guidelines for access to and transfer of technology;
- Article 17 provides for exchange of information;
- Article 18 provides for scientific and technical cooperation in conservation and sustainable use of biodiversity;
- Article 19 provides for handling of biotechnology and distribution of its benefits; and
- Articles 20 and 21 suggest sources of funds for conservation of biodiversity.

2.5 The 2010 Biodiversity targets and indicators

In addition to the provisions of the CBD, the conference of parties (COP) to the CBD meets periodically and makes additional decisions to meet the provisions of the CBD. For instance, the seventh regular session of COP in 2002 realized that biodiversity was continuing to decline despite existing efforts and adopted a Strategic Plan with the mission: to achieve by 2010 a significant reduction in biodiversity loss at global, regional and national levels, as a contribution to poverty alleviation and to benefit life on earth. The parties agreed on seven focal areas and some headline indicators for meeting the 2010 targets.

The first focal area targeted reducing the rate of loss of the components of biodiversity, including biomes, habitats and ecosystems, species and populations, and genetic diversity. This would be determined from: trends in extent of selected biomes, ecosystems and habitats; trends in abundance and distribution of selected species; change in status of threatened species; trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socioeconomic importance; and coverage of protected areas.

The second focal area targeted maintaining ecosystem integrity, and the provision of goods and services provided by biodiversity in ecosystems, in support of human well-being based on indices like: Marine Trophic Index; connectivity/fragmentation of ecosystems; and water quality in aquatic ecosystems.

The third focal area targeted addressing the major threats to biodiversity, including: habitat change; climate change; pollution; over-exploitation and invasive alien species and would be determined from indicators like: trends in invasive alien species; nitrogen and phosphorus deposition; ecological footprints and related concepts.

The fourth focal areas targeted promoting sustainable use of biodiversity and would be determined from indices like: area of forest, agricultural and aquaculture ecosystems under sustainable management; and from ecological footprint and related concepts.

The fifth focal areas targeted protecting traditional knowledge, innovations and practices and would be judged from the status and trends of linguistic diversity and numbers of speakers of indigenous languages.

The sixth focal areas targeted ensuring the fair and equitable sharing of benefits arising out of the use of genetic resources for which indicators were yet to be developed.

The seventh focal area targeted mobilizing financial and technical resources, especially for developing countries, in particular, least developed countries and small island developing states among them, and countries with economies in transition, for implementing the CBD and the Strategic Plan and would be determined from trends in the official development assistance provided in support of the Convention.

2.6 Other international commitments to conservation of biodiversity

In addition to the CBD, there are other international declarations, treaties, conventions, protocols and policies which apply to conservation of biodiversity and sustainable use of its components. The Declaration on Environment and Development made at Stockholm in 1972 followed by that on Environment and Development at Rio de Janeiro in 1992, Agenda 21, The Millennium Declaration, and The Johannesburg Declaration on Sustainable Development, in Johannesburg in 2002, committed all nations to pursue the sustainable development objective. These and other legal instruments and their relevance to the MRB are listed below.

Agenda 21 sets the international development agenda for the 21st century. It specifically calls for development of national strategies for the conservation and sustainable use of biological resources. Biodiversity related activities feature prominently among the 40 Chapters of Agenda 21.

The United Nations Convention to Combat Desertification calls for cooperation in combating drought and desertification and its consequences by taking actions that contribute to sustainable use of arid and semi-arid lands (ASALs) to avoid spread of desertification. Kenya ratified this convention on 24 June, 1997 and Tanzania on 19 June, 1997.

The World Heritage Convention provides for protection of ecosystems and habitats of global scientific value. Serengeti National Park was inscribed as a World Heritage site in 1981, thus this convention applies directly to one of the critical biodiversity habitats in the MRB.

The Ramsar Convention on Wetlands of International Importance protects wetlands to enable them to perform their ecological, economic, cultural, scientific and recreational functions, especially as habitats for birds and other organisms. The convention requires contracting parties to formulate and implement plans that ensure conservation and wise use of wetlands within their boundaries. Kenya ratified this convention on 5 June, 1990 and Tanzania in August, 2000.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) protects endangered species from trade through controlling import and exports. Kenya ratified this convention on 13 December 1978 and Tanzania on 29 November 1979.

The 1979 Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) provides for protection of wild animals that migrate outside national boundaries. The annual migration of over 1 million wildebeest between the Kenyan and Tanzanian sides of the MRB is one of the Seven Wonders of the Natural World, making conservation of this spectacle an issue of critical importance.

The Framework Convention on Climate Change aims at regulating and stabilizing greenhouse gases at levels that do not change the climate. Kenya ratified this convention on 30 August, 1994 and Tanzania on 17 April, 1996.

The Stockholm Convention on Persistent Organic Pollutants is a global treaty to protect human and environmental health from chemicals that persist for a long time in the environment. Growth of the mining industry and agricultural sector in the MRB raises the likelihood of increased accumulation of chemical contamination in the environment, which could lead to harmful impacts on wildlife and human populations. Kenya ratified this on 24 September, 2004 and Tanzania on 30 April, 2004. Kenya and Tanzania have also both developed National Implementation Plans for the recommendations of this Convention.

The Convention for the Establishment of the Lake Victoria Fisheries Organization was ratified by Kenya on 24 May, 1996 and Tanzania accessioned it on 23 May, 1995 and ratified in 1996 and applies to the fisheries of Lake Victoria including the Mara River.

The FAO Code of Conduct for Responsible Fisheries provides international guidelines and standards for conservation, management and development of living aquatic resources and their environment. There are other international legal instruments associated with this code such as the International Plan of Action on Illegal, Unregulated, and Unreported (IUU) fishing which aims at combating IUU fishing.

2.7 International institutional mechanisms for conservation of biodiversity

There are many international intergovernmental organisations, NGOs and development agencies that focus on management of biodiversity and natural resources. These include: African Development Bank (ADB), African Wildlife Foundation (AWF), European Union (EU), Global Environmental Facility (GEF), Norwegian Agency for International Development (NORAD), Swedish International Development Agency (SIDA), United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), United States Agency for International Development (USAID), World Bank, World Conservation Union (IUCN), and WWF. Many of these institutions operate in East Africa and some of them have been involved in conservation and sustainable use of biodiversity in the MRB.

2.8 National biodiversity strategies and action plans

Article 6 of the CBD obliges Parties to the CBD to prepare National Biodiversity Strategies and Action Plans (NBSAPs) to guide implementation of the requirements of the CBD at national level, and both Kenya and Tanzania have developed NBSAPs. The NBSAP of Kenya was developed in 2003 while Tanzania's was prepared in 1998. Co-operation in the management of trans-boundary biodiversity resources of the MRB is guided by the provisions of the CBD and by the NBSAPs of the two countries.

2.9 Key biodiversity resources of Kenya and Tanzania

The major biodiversity resources of Kenya and Tanzania include ecosystems, such as natural forests, woodlands, savannah, arid and semi-arid areas, wetlands, and open water ecosystems, and the plant and animal life in these ecosystems and their genetic make up. There are also modified agro-ecosystems and forest plantations. The different ecosystems and the organisms they contain have both direct and indirect values as a source of food, fuel, shelter, employment, foreign exchange earnings and tourism. Forests serve as a source of wood fuel, timber, poles, fibres, fodder, crafts, medicine, wild food, and tourism. Woodlands provide building materials, fibres, pasture, fodder, medicine and wild foods. Natural vegetation including forests, woodlands and grasslands play an important role in mitigating soil erosion which maintains fertility and reduces sedimentation and siltation of water courses. Natural vegetation also acts as carbon sinks and helps to mitigate global warming. Wildlife is a source of bush meat, trophies, food, and medicine, and supports tourism. Wetlands are important in water storage and recharge, sediment trapping, nutrient cycling, water purification and treatment of wastes. Inland water systems (rivers, lakes and wetlands) are a source of fish, plants (some of which are of medicinal value), water for various uses, and recreation.

Both Kenya and Tanzania have designated National Parks, National Reserves, Wildlife Sanctuaries, National Monuments, Biosphere Reserves, World Heritage Sites, and Ramsar Sites for conservation and sustainable use of biodiversity in many areas including the MRB. However, these areas still face a number of challenges.

2.10 Threats to biodiversity resources in Kenya and Tanzania

Some of the general threats to biodiversity in both Kenya and Tanzania include human encroachment, habitat destruction, poaching, over-abstraction of resources, deforestation, pollution and introduction of invasive species and genetic materials. The main challenges identified in the management of protected areas include weaknesses in policy and regulatory mechanisms, inadequate institutional arrangements to foster effective collaboration and networking, inadequate financial resources, and declining earnings from the tourism sector. In addition, there are gaps in biodiversity research, information and data. There is also inadequate community participation in wildlife management. The NBSAPs of Kenya and Tanzania are founded on the CBD and provide, A Vision, Guiding Principles, Strategic objectives, Methodologies and Actions which can guide conservation of biodiversity in MRB.

2.11 Regional policies and legal instruments for management of biodiversity

The EAC Partner States have policies, legal instruments and action plans which can be applied to conservation and sustainable use of biodiversity in the MRB.

The EAC Treaty provides for sustainable utilisation of natural resources through measures that protect the environment.

The Protocol for Sustainable Development of Lake Victoria Basin provides for protection and conservation of the basin and its ecosystem, sustainable development of natural resources including fisheries, and prevention of pollution.

The Protocol on Environment and Natural Resources Management provides for cooperation in management of the environment and natural resources including water resources, biological diversity, wetland resources, forest resources, wildlife, fisheries, and genetic resources.

The Convention for Establishment of Lake Victoria Fisheries Organization (LVFO) provides for harmonization of measures for the sustainable development and management of the living resources of Lake Victoria and its basin.

The Regional Plan to Combat IUU Fishing outlines measures to prevent, deter and eliminate IUU fishing, conserve fish species diversity, and protect the environment in the LVB.

Both Kenya and Tanzania have committed themselves to the above regional legal instruments.

2.12 National policies and legal instruments for management of biodiversity

both Kenya and Tanzania have national policies and legal instruments, which can be applied to conservation and sustainable use of biodiversity in MRB. These are covered in the national constitutions, development plans, session papers, policies, laws and regulations, especially those on environment, land, forestry, water, agriculture, wildlife, and fisheries (Annex 1).

The National Constitutions

These provide for measures to protect and preserve the environment and natural resources, including biodiversity.

The National Development Plans and Session Papers

Most of these have integrated environmental concerns, sustainable development, and conservation of natural resources.

The National Environmental Management Acts

These acts cover cross-sectoral issues, including conservation and sustainable management of the environment (including lakes, rivers, water, wetlands, forests, biodiversity, genetic resources, natural heritage sites, river banks and lake shores, and soils), proper management of pollution and air quality standards, and protection of ozone layer. They also provide for EIAs for development projects that are likely to impact the environment and natural resources, and give authority to environmental management authorities/councils to coordinate environmental issues.

The Land Acts

Provide for ownership, planning, management and administration of land use with involvement of communities within the context of the principles of sustainable development.

The Forest Acts

Provide for establishment, control, regulation and sustainable management of forests, protection and conservation of biodiversity, establishment of nature reserves, and EIAs in forest areas before development.

The Water Management Policies and Acts

Provide for planning, use, protection and management of water resources and supply; water permits; waste discharge; effluent discharge; control of water abstraction; apportionment and use of water; water quality monitoring, pollution control; water supply and sewerage treatment; and contain water quality standards for different water uses. They also provide for participatory approach to water resources planning, development and management.

The Agriculture and Livestock Policies and Acts

Provide for soil and water conservation, good land husbandry, biotechnology, and food security.

The Plant Protection Acts

Provide for prevention of the introduction and spread of destructive plant diseases.

The Suppression of Noxious Weed Acts

Provide for powers to declare a plant to be a noxious weed.

The Wildlife and Tourism Policies and Acts

Provide for protection, control, and conservation of biodiversity; management and utilization of wildlife, including sustainable management of wildlife covering wild plants and animals; establishment and management of wildlife conservation and protected areas; species protection; wildlife user rights; and international trade in wildlife. They advocate for harmonization of tourism, wildlife and land use policies and provide for community participation in management of wildlife.

The Fisheries Policies, Acts and Regulations

Provide for control of fishing, optimal and sustainable exploitation, management and development of fisheries resources, and development of aquaculture.

The Precautionary Principle

Requires that, where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

Chapter 3: The biodiversity strategy and action plan

This Chapter uses the international, regional and national frameworks for biodiversity conservation to develop the BSAP for MRB including:

- a) The Goal for MRB;
- b) The Objectives of the BSAP;
- c) The Guiding Principles for the actions to be undertaken;
- d) The methodology; and
- e) The activities to be undertaken.

3.1 The need for the Biodiversity Strategy and Action Plan

The EAC initiated a process to manage shared trans-boundary natural resources when it signed the Protocol for Environment and Natural Resources Management to guide management of shared trans-boundary resources such as those of the MRB. The MRB BSAP has been developed in line with this protocol, the provisions of the EAC Treaty (especially Articles 111, 112 and 114), the Protocol for Sustainable Development of Lake Victoria Basin (especially Articles 6 and 7), and the LVBC Operational Strategy 2007 to 2010, under the Environment and Natural Resources Management Programme.

The preparation of the BSAP was in recognition of the need for new approaches to social, political, economic, and environmental challenges. The stakeholders are aware of these challenges and were fully engaged in developing this BSAP. They will also be responsible for its implementation within a trans-boundary resource management context.

The primary thesis of this BSAP is that management strategies that promote survival of species, biological communities and ecological processes are a key element in conservation of trans-boundary resources to meet diverse human needs. Primary management goals will be set by the communities and harmonised at the regional level by the EAC. The setting of further goals may be site-specific by the individual Partner States, taking account of the context of the ecosystem within national context. High quality information is necessary to identify trends and respond to them intelligently and deliberately. The social, political and environmental issues will be viewed in a systems context, and not as individual issues.

3.2 Overall goal for MRB

The goal for the BSAP for MRB is based on the shared vision of the Lake Victoria Basin which aims at having: “A prosperous population living in a healthy and sustainably managed environment providing equitable opportunities and benefits”.

The overall Goal for MRB is to have “a region rich in biodiversity which benefits the present and future generations and ecosystem functions”.

3.3 Objectives of the Biodiversity Strategy and Action Plan

The overall objective of the BSAP for MRB is to conserve biodiversity through maintenance of ecosystem integrity of the MRB which will be achieved through the following specific objectives:

- a) Promote joint management of the MRB trans-boundary ecosystem and conservation of its biodiversity;
- b) Promote the role of protected areas in conservation of biodiversity;
- c) Build sustainable rural livelihoods through promotion of ecosystem integrity as a basis for biodiversity conservation;

- d) Provide the foundation for concerted action on biodiversity management and sustainable development; and
- e) Promote the use of strategic, science-based information for biodiversity conservation.

3.4 Guiding principles for the BSAP in MRB

Addressing of the issues, problems and challenges of biodiversity conservation and management in the MRB will be guided by the principles outlined below.

Linking the BSAP to the wider government, regional and international policies and legal instruments

The conservation strategies in Kenya and Tanzania, complemented by those stipulated by the EAC and in various international conventions, treaties, protocols, and agreements, focus on interventions that minimize loss of biodiversity. Capacity building is critical for better management of biodiversity as is enhanced involvement of the community in planning, implementation, monitoring and evaluation of interventions.

Multi-sector programmatic approach to implementation of the BSAP

Biodiversity conservation and management relies upon and impacts virtually all sectors of the economy. The proposed interventions in this BSAP will involve participation of various sectors such as agriculture, livestock development, forestry, water, fisheries, tourism, wildlife, transport, trade, education, and research.

Coordination of interventions

One of the major obstacles to biodiversity conservation in the MRB has been poor coordination of interventions either within or between the two countries and between the different players. The LVBC has the mandate for coordination of biodiversity conservation and management although this could be delegated to an institution within the MRB to focus interventions at a technical level.

Sustainability through stakeholder involvement and ownership

There has been previous donor and government support for biodiversity conservation initiatives in the MRB. This has sometimes resulted in addressing donor-specific interests, short-term approaches and lack of ownership of the interventions. This BSAP aims to establish mechanisms that would ensure sustainability through pooling and allocation of public resources in a consistent manner, as well as drawing on private capital where possible. Secondly, community ownership and participation will be promoted at all stages of implementation of the BSAP.

Cognizance of scarce resources

The conservation of biodiversity to a level that ensures inter-generational equity requires huge financial resources. However, there has not been any deliberate effort or clearly defined and coordinated approach to funding biodiversity conservation initiatives, nor has there been the development of any clear implementation mechanisms. There will be need for deliberate infusion of resources to implement the objectives of the BSAP and to develop mechanisms to harmonize and coordinate the interventions in order to minimize duplication of efforts and waste of resources.

Maintaining a long-term perspective

The general long-term objectives for conservation of biodiversity have been captured in the CBD which has been adopted and institutionalized by Kenya and Tanzania in their NBSAPs. These objectives also have been adopted and appropriately linked in preparation of this BSAP.

Pursuance and support of diversified livelihoods

Eradicating poverty by supporting diversified livelihoods in the MRB is essential to achieve success in biodiversity conservation. It is critical to give due attention to the poor since their unplanned actions to earn a living from biodiversity resources can lead to its degradation.

3.5 Approaches and methodology to development of the BSAP for MRB

This BSAP focuses on three critical habitats in the MRB (Figure 3.1) namely:

- a) The forest habitats comprising Mau Forest and Mara riverine forest;
- b) The Serengeti-Masai Mara Ecosystems; and
- c) The Aquatic ecosystems comprising Mara River and Mara Swamp.

The focuses of the BSAP are based on the actual and potential activities in the MRB that may impact biodiversity such as uncontrolled and unplanned utilization of natural resources (land, water, animals, plants, and mineral resources), pollution, mining, road construction, and genetic modification of organisms that may lead to biodiversity loss or extinction of species. At least one objective has been identified for each habitat, and at least one activity is planned for each objective to meet the biodiversity conservation requirements. These will be adjusted over time.

3.6 Objectives for the forested habitats

The main objective of the BSAP is to protect Mau Forest resources and Mara Riverine Forests through implementation of the following specific objectives:

- a) Protect, maintain and enhance the health and productivity of forests and their biodiversity;
- b) Provide a balance of natural resource benefits and uses, including opportunities for commercial forest production;
- c) Protect certain forest lands from exploitation to protect unique riparian and water catchment areas;
- d) Understand and explain the effect of various forest utilization methods on biological diversity;
- e) Minimize changes that would lead to loss of biodiversity during utilization of the forest;
- f) Encourage and promote activities and utilization methods that sustain and protect biodiversity;
- g) Develop indicators to measure the quantitative and qualitative levels of forestry influences on biological diversity; and
- h) Build the capacity of responsible institutions.

3.7 Objectives for Serengeti-Masai Mara Ecosystem

The primary objective of the BSAP for Serengeti-Masai Mara Ecosystem is to integrate protection of biodiversity within and around this ecosystem with sustainable development and use of resources through implementation of the following specific objectives:

- a) Integration of biodiversity protection into a system of consumptive resource utilization;
- b) In-situ conservation of genetic resources; and
- c) Mitigation of risks posed by genetically modified organisms.

3.8 Objectives for aquatic habitats

The overall objective of the BSAP in aquatic habitats is to improve water and other aquatic resources management in the basin, and to balance resource conservation with resource use and development through the following specific objectives:

- a) Prevent or mitigate land degradation in order to minimize sediment and organic pollutant loads;
- b) Promote improvement in water management schemes;
- c) Enhance linkages for improved water resource management;
- d) Utilize natural fish stocks while sustaining the biodiversity of the water bodies;
- e) Utilize fish farming for protection of endangered fish species and biotopes; and
- f) Mitigate and avoid negative impacts of fish farming.

3.9 Activities to be undertaken under different objectives

The activities to be undertaken under the different objectives will fall under the categories outlined below. The category of each activity has been indicated by a letter which identifies the category.

- a) Legislative and institutional changes (L);
- b) Economic measures (E);
- c) Technical measures (including investment (T);
- d) Education, information, awareness raising (A); and
- e) Applied research (R).

Some activities are provided for each of the objectives of the three critical habitats. However, during implementation of the BSAP, more detailed and specific activities may be needed for each habitat to capture issues in more detail and to provide clearer outputs.

3.10 Activities for objectives in forested habitats

Objective: To protect Mau Forest resources and Mara riverine forests

- i. Enhance the fight against illegal felling of trees (L);
- ii. Control illegal extraction of forest products (L);
- iii. Adopt management plans for all protected indigenous forests (L);
- iv. Protect presently unprotected indigenous forests (L);
- v. Integrate biodiversity conservation in Forest Acts CBD (L);
- vi. Enforce existing laws (L);
- vii. Reallocate part of product license fees to forest protection (E);

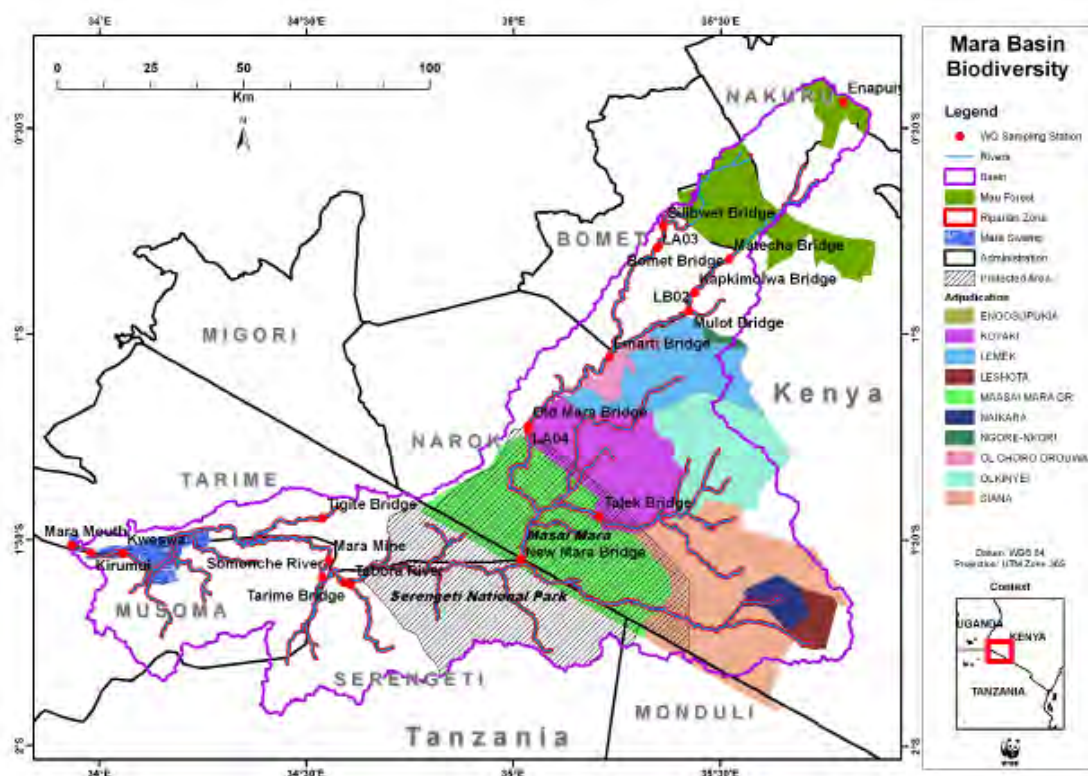


Figure 3.1: Key biodiversity sites classified in Mara River Basin

- viii. Provide compensation for economic loss following protection of forests (E);
- ix. Exchange real private property and implement state purchase privilege (using compulsory acquisition law) in extremely threatened, unprotected forests (T);
- x. Empower the local communities with knowledge, skills and facilities for conservation-friendly agroforestry (T);
- xi. Explain the value of indigenous forests (A);
- xii. Promote community conservation awareness and education (A);
- xiii. Improve exchange of information between government and local communities (A);
- xiv. Identify biodiversity indicators and determine means to monitor them (R);
- xv. Determine the needs and methods of protecting biodiversity in protected forests (R);
- xvi. Improve methods for protecting forest resources (R);
- xvii. Evaluate the role of protected forests in protection of biodiversity (R);
- xviii. Determine community knowledge, attitudes and practices regarding illegal off-take of products from newly protected forests (R);
- xix. Analyze the location and coverage of forest protected areas from the point of view of nature conservation representation (R);
- xx. Analyze forest conservation system planning (R);
- xxi. Determine the number of visitors to protected forests and use the results for formulation of an appropriate development program (R);
- xxii. Analyze tourism potentials and use of forests (R);
- xxiii. Analyze alternatives of administrative management of protected forests and formulate an optimal economic solution (R);
- xxiv. Analyze the effectiveness of protected forest management (R);
- xxv. Analyze possible uses of economic instruments for improving protection of biodiversity in protected forests and protection of the interests of the stakeholders and elaborate appropriate guidelines (R); and
- xxvi. Analyze alternative economic incentives and compensation schemes for improving conservation of forests (R).

3.11 Activities for objectives in Serengeti-Maasai Mara Ecosystem

Objective (a): Integration of biodiversity conservation into a system of consumptive resource utilization

- i. Integrate the requirements and goals of sustainable use and protection of biological diversity into national hunting laws (L);
- ii. Prepare management plans for large carnivores, (L);
- iii. Observe hunting regulations and conditions specific to particular types of animals (L);
- iv. Issue hunting permits on the basis of species and population size of a species (E);
- v. Reallocate part wildlife license fees for biodiversity protection (E);
- vi. Provide economic incentives to stimulate hunting of over-abundant populations of less charismatic species (E);
- vii. Use biotechnological development to produce varieties which are beneficial to man such as improving fodder production in the savannah) (T);
- viii. Conduct field training in biodiversity (A);
- ix. Identify indicators of hunting and poaching on biodiversity (R);
- x. Identify the effect of various land management regimes on biodiversity (R); and
- xi. Study the ecology, management and protection of large predators (R).

Objective (b): In-situ conservation of genetic resources

- i. Propose policies and laws for creation, preservation and maintenance of collections of genetic resources and on provision of access to and exchange of genetic resources with third parties (L);
- ii. Establish a MRB plant and animal genetic resources collection centre (L);
- iii. Support the preservation of private collections which are valuable to biodiversity (E);
- iv. Propose mechanisms for accessing state support for bringing samples of genetic material of MRB origin, which are held abroad back to MRB (E);

- v. Create ex-situ gene-banks for endangered MRB animal breeds and plant varieties (T);
- vi. Strengthen exchange of information on genetic resources between Kenya and Tanzania (A);
- vii. Training personnel in collection and maintenance of genetic collections (A);
- viii. Prepare and publish information on plant and animal genetic resources of MRB (A);
- ix. Develop information and data communication systems on compilation and maintenance of genetic resource collections and make available information about these resources for scientific research and to the general public (A); and
- x. Carry out a survey of the condition of existing genetic resource collections in MRB and the means required to preserve them (R)

Objective (c): Mitigate risks posed by genetically modified organisms

- i. Propose regulations on introduction of GMOs into the environment (L);
- ii. Provide State support for the participation of MRB specialists in international projects on genetic diversity (T);
- iii. Carry out studies on economic impact of introduction of GMOs into the environment (E);
- iv. Conduct training in genetic resources and biotechnology for specialists in biodiversity (A);
- v. Establish and maintain a database on biotechnologies and their environmental risks to create an information system and make it accessible to the general public (A);
- vi. Promote participation of MRB’s biodiversity players in international research on the development of safe biotechnologies (A);
- vii. Assess the impact of biotechnologies on biodiversity (R); and
- viii. Survey options for application of biotechnologies in treatment of pollution.

3.12 Activities for objectives in Aquatic Habitats

Objective (a): Prevent or mitigate land degradation in order to minimize sediment and organic pollutant loads.

- i. Develop and enforce Mara River protection regulations (L);
- ii. Initiate integrated Mara River protection plans including good land use practices (L);
- iii. Apply economic incentives and disincentives to promote good land use practices (E);
- iv. Establish and implement the reserve flow to ensure that water needs of habitats and species are met (T);
- v. Measure flows, establish off-take, quality, assess water needs, draw water budget, set up water payment systems (T);
- vi. Support extension work on good land use practices (T);
- vii. Conduct education programs that minimize land degradation problems (A); and
- viii. Monitor water quality, quantity and impact of sediment and organic pollutants on biodiversity (R).

Objective (b): Encourage improvement in water management schemes

- i. Promote bilateral cooperation in protection and sustainable use of water (L);
- ii. Develop formal and informal conflict management and procedural mechanisms (L);
- iii. Adopt realistic water pricing policies (E);
- iv. Encourage use of better technologies such as micro-irrigation in water use (T);
- v. Improve the information base for sustainable water management (A);
- vi. Conduct awareness campaigns and education program on sustainable use of water (A);
- vii. Conduct a full evaluation of the hydrological balance of the Mara River System (R);
- viii. Monitor and evaluate policies and procedures to integrate management of water with land uses, and management of water demand (R); and
- ix. Evaluate the total economic value of MRB water resources (R).

Objective (c): Enhance linkages for improved water resource management

- i. Integrate water resources management between different sectors (L);
- ii. Establish communal water management institutions (L);
- iii. Provide budgets to facilitate linkages and coordination (E);

- iv. Establish cross-sectoral mechanisms for integrated water management, including public input (T);
- v. Use participatory planning which draws heavily on people's knowledge of land and water in their immediate locality (A); and
- vi. Assess the effectiveness of cooperation in integrated management of water resources in improving water quantity and quality and its effect on biodiversity (R).

Objective (d): Utilization of natural fish stocks while sustaining the biological diversity of water bodies.

- i. Incorporate biodiversity protection in the fisheries policies and plans of Kenya and Tanzania (L);
- ii. Adapt fishing license fees as a measure for regulating fishing intensity(L);
- iii. Enhance compliance to fishing regulations (L);
- iv. Reallocate part of fishing license fees to biodiversity protection (E);
- v. Promote subsidies to encourage use of sustainable fishing methods (E);
- vi. Apply sustainable fishing methods (T);
- vii. Provide printed materials introducing water biotopes and their protection for management of fisheries (A);
- viii. Prepare a simplified handbook on the fishes of MRB (A);
- ix. Publish a fishing magazine, electronic media and public forums (A);
- x. Conduct fish stock assessment; establish maximum sustainable yield and removal rates of fish for different fishing methods in different conditions (R);
- xi. Compile fishing gear used and determine gear selectivity (R);
- xii. Develop monitoring indicators of aquatic biodiversity and include them in the MRB monitoring program (R); and
- xiii. Encourage adoption of sustainable fishing methods (R).

Objective (e): Application of fish farming for protection of endangered fish species and biotopes.

- i. Elaborate regional and national programs for renewal of fish stocks considering biodiversity, including intra-species variations (L);
- ii. Support conservation of endangered local fish species through fish culture (E);
- iii. Conduct public awareness on the importance of a high species diversity, threats to rare species and their role in endangerment (A);
- iv. Undertake an inventory of the fish community and their environmental needs (R);
- v. Conduct genetic research related to fish stocks (R); and
- vi. Create a database and monitoring plan for introduced and invasive fish species (R).

Objective (f): Mitigation and avoidance of negative impacts of/on fish farming.

- i. Define sanctions and penalty for introduction of alien species (L);
- ii. Regulate water diversion for fish farming (L);
- iii. Provide marketing avenues for cultured fishes (E);
- iv. Modernize fish farming to avoid the escape of reared specimens, introduce more efficient low cost methods of fish farming (T);
- v. Collate and disseminate information on impacts of alien species in MRB (A); and
- vi. Monitor existence and spread of alien species and their impact on local ecosystems in MRB water bodies (R).

Chapter 4: Implementation mechanism for the Biodiversity Strategy and Action Plan

This Chapter proposes the implementation mechanism for the BSAP including:

- a) International and Regional Institutions;
- b) National Institutions;
- c) Local institutions;
- d) NGOs, CBOs and private individuals;
- e) The Funding mechanisms;
- f) Monitoring, evaluation, and reporting

4.1 International and regional institutions

The EAC Partner States have agreed to cooperate in the management and sustainable development of shared natural resources under the EAC Treaty, the Protocol for Sustainable Development of Lake Victoria Basin and the Protocol on Environment and Natural Resources Management. The Lake Victoria Basin Commission was established to implement the Protocol for Sustainable Development of the LVB, and is responsible for coordinating the actions of national and local organizations and stakeholders. As such, the LVBC will be the primary regional body responsible for guiding the implementation of the BSAP for the MRB. LVBC's responsibilities include mobilising resources for the implementation of the BSAP, coordinating the activities of various actors on the ground, and conducting monitoring and evaluation of the implemented activities.

In 2008, the MRB Trans-boundary Water Users Forum (TWUF) was established to provide a forum for water users from both Kenya and Tanzania in which they could participate in planning and management of the water resources for the MRB. The TWUF also serves as a platform for dialogue on development and conservation of shared water resources of the MRB. As such, the TWUF should be engaged in the implementation of BSAP through coordination of water resource use and development, particularly in regards to conservation of aquatic habitats. The Mara Regional Secretariat (MRS) is also anticipated to be formed in the near future, which will be comprised of representatives from the Mara secretariats of both Kenya and Tanzania to provide a trans-boundary forum of all major stakeholders in the MRB, including representatives from the tribes dwelling in the Mau Forest, the small and large scale farmers, the tourist lodges, mining and other industries, and artisanal fishers, among others. The MRS will be responsible for educating and awareness raising of stakeholders in the basin on the BSAP for the MRB and for encouraging sustainable development and use of the basin's natural resources.

4.2 National institutions

The ministries responsible for environment, water and natural resources (including wildlife, forestry and agriculture) will play a leading role in implementing the BSAP. In Kenya, the Ministry responsible for Environment and Natural Resources, as the Focal Point Ministry for the EAC, will be in charge of coordinating implementation of the BSAP with technically relevant sector ministries and agencies. In Tanzania, the Ministry in charge of Water and Irrigation, which is the Focal Point Ministry, will play a similar role. The technical sector Ministries and Departments, such as Agriculture, Livestock, Water Development, Tourism, Industry, Fisheries, Wildlife and Forestry, will be responsible for determining which priority activities of the BSAP fall within their mandates and for incorporating these activities into their policies and programs in collaboration with other stakeholders.

National secretariats for the Mara have also been developed for both Kenya and Tanzania, which are comprised of representatives from all stakeholder groups in the basin. These fora will be responsible for educating stakeholders in their portion of the basin about the BSAP and for promoting adoption of recommendations and activities of the BSAP into ongoing management plans in the basin.

4.3 Local institutions

The Ministries responsible for Local Government will be in charge of implementation of the BSAP based on their mandates in individual Partner States. The District Council in Tanzania and the District Environmental Committee in Kenya will be the primary implementing agents and will be the focal points on the ground for incorporating activities into their District work plans, for guiding activity implementation (such as site selection, community involvement and monitoring and evaluation), and for ensuring follow-up on data collecting and reporting.

The added value of establishing Technical Advisory Committees (TAC) in the implementation of this BSAP should be recognized. The TAC for MRB has already been established at the basin level. The TAC was formed to establish joint approaches to conservation and management of natural resources in the basin and to present a unified message to stakeholders in the basin in regards to riparian protection, sustainable grazing levels, best management practices for agriculture and livestock and soil and water conservation practices. Through participation in activity planning, the TAC will provide locally relevant technical guidance on the most appropriate ways to implement various activities under the BSAP.

At the grassroots level, water users associations are registered entities with a mandate to participate in management of water resources in the basin. They will work closely with the Water Resource Management Authority in Kenya and the Basin Water Office in Tanzania to ensure that water permits and allocation in the basin allows for the preservation of reserve flows. They will also be responsible for monitoring and reporting on the status of water resources in the basin.

4.4. NGOs, CBOs and Private Individuals

Other international organizations will be involved primarily as sources of funding and technical expertise. WWF-ESARPO, NBI-NELSAP and others are long-term conservation partners on the ground, whose expertise in implementing conservation activities will be critical to the success of the BSAP. Research institutions both within the region and from other countries will be important partners needed to conduct the necessary research for implementation of the BSAP and to train local authorities in technical skills to promote long-term sustainability of project interventions.

4.5 Funding implementation of the BSAP

Successful implementation of this BSAP depends on the acquisition of adequate resources. As the primary coordinating institution responsible for the implementation of the BSAP, LVBC should catalyze the mobilization of necessary resources. These resources shall be mobilized from national sectoral budgets, bilateral and multilateral donors and the private sector. Organizations such as BMZ, NORAD, SIDA, USAID and others are donor organizations with a long history of supporting conservation and sustainable development in the MRB, and the support of these organizations will be critical in providing the funding to carry out the recommended strategies and action plans.

4.6 Monitoring, evaluation and reporting

Implementation of the BSAP for the MRB will require regular monitoring and evaluation of the progress of the different planned activities, which will be based on predetermined performance indicators. This BSAP has been written to elucidate a general strategy and approach to conserve critical biodiversity habitats throughout the MRB. Detailed work plans will need to be developed by the responsible actors for each priority activity, and these work plans will include a list of measurable performance indicators in terms of quantity, quality and timeframe. The implementing actors will be responsible for conducting on-the-ground monitoring, evaluation and reporting of activities and indicators to LVBC, as the overall coordinating body.

It is expected that the governments of Kenya and Tanzania, the EAC and other stakeholders will build on the recommendations made in this BSAP to create a vibrant and effective intellectual and moral framework to support the conservation and management of biodiversity resources. This BSAP is an adaptive and dynamic document, and there will be a continuous need for improved understanding, development and evaluation of the knowledge of biodiversity conservation and socioeconomic policy interface, as well as establishment of feedback loops in its implementation. This process will also support development of biodiversity action plans or initiatives in other trans-boundary ecosystems within the LVB.

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Annex: Some of the biodiversity related policies, laws and plans of Kenya and Tanzania

Kenya

- (i) Sessional Paper No. 10 of 1965: African Socialism and its Application to Planning in Kenya (GoK 1965) recognized that the future development of Kenya depended on the implementation of strategies designed to conserve natural resources while creating a physical environment in which progress could be made.
- (ii) Sessional Paper No. 1 of 1986: Economic Recovery for Renewed Development
- (iii) National Development Plan 1994-1997: This was the first plan prepared after Rio and dedicated to integration of environmental concerns in all development activities towards the sustainable development objective.
- (iv) Sessional Paper No. 1 of 1994: Recovery and Sustainable Development to the Year 2010 (GoK 1994) in which the government addressed the emerging issues on environment and development. Since most policies were sectoral, the government identified the need to develop a specific policy addressing environmental issues.
- (v) National Environment Action Plan (NEAP) (GoK 1994)
- (vi) Sessional Paper No. 6 of 1999: Policy Paper on Environment and Development. (GoK 1999). This policy paper attempts to provide guidelines for achieving sustainable national development. It also underpins the vital role the environment plays in sustainable development. It was also catalytic to the development of the Environmental Management and Coordination Act.
- (vii) National Biodiversity Strategy and Action Plan (NBSAP) (GoK 2000): The document identifies the necessary steps to conserve biodiversity in conformity with requirements of the CBD. Kenya's National Biodiversity Strategy and Action Plan (NBSAP) was prepared in 1993. This strategy specifies the trends and priority goals of environmental management and protection, and sets the main short-term and long-term tasks to be achieved. The priorities presented in the strategy are taken into account when planning environmental activities, developing international co-operation and allocating national funds.
- (viii) Environment Management and Coordination Act 1999 (GoK 1999), which came into effect on 14th January 2000: The National Environmental Management Authority (NEMA) was established through the Environment Management and Coordination Act (1999). NEMA plays a coordination role between Government, Ministries, departments and other relevant institutions as they relate to the environment. Its other functions include developing strategies, monitoring and evaluation of development activities. Environmental Impact Assessment (EIA) is mandatory under the Act for all new projects which impact in some way on their surroundings. NEMA is the custodian of all international environmental conventions and protocols. The Department of Resource Survey and Remote Sensing (DRSRS), which falls under NEMA, is mandated to gather information, including data on livestock, wildlife, infrastructure, agriculture, forestry and other vegetations, and various land uses.
- (ix) National Water Policy (GoK 2000): Provides a framework for sustainable water resources management in Kenya.
- (x) National Tourism Policy (GoK 2006): Was developed to cater for the increased concern for environmental protection, following the adoption of Agenda 21 for the travel and tourism industry. The need to harmonize tourism, wildlife and land-use policies is also crucial for consistency between tourism and wildlife conservation, and to minimize human-wildlife conflict.
- (xi) Water Act (GoK 2002) enacted for the coordination of all development activities in the water sector including conservation, control, apportionment and use, monitoring of river regimes, pollution control and water quality.
- (xii) Agricultural Act Cap 318 Laws of Kenya as revised in 1986. This Act promotes and maintains stable agriculture, provides for soil and water conservation and good land husbandry and management. Biotechnology in agricultural development is key to increased food production and food security.

- (xiii) Sessional Paper No. 3 of 1975: Statement on Future Wildlife Management Policy in Kenya. It stipulates that it is important to protect critical habitats and secure migratory routes of animals outside protected areas (GoK 1975).
- (xiv) Wildlife (Conservation & Management) (Amendment) Act No. 16 of 1989, Cap 376 Laws of Kenya. This Act provides for the protection, conservation, management and utilization of wildlife (fauna and flora) in all areas of Kenya.
- (xv) Seed and Plant Varieties Act (1991), Cap 326 provides for the right of a plant breeder who has the authority to produce propagating material of the variety for commercial purposes.
- (xvi) Fisheries Act 1977, Cap 378 Laws of Kenya, the purpose of which is to protect fisheries resources and provide for the proper exploitation of fishery resources
- (xvii) Plant Protection Act 1979, Cap 324 Laws of Kenya, the purpose of which is to prevent the introduction and spread of destructive diseases to plants
- (xviii) Industrial Property Act 1990 Cap 509 Laws of Kenya, provides for the promotion of inventive and innovative activity and facilitates the acquisition of technology through the grant and regulation of patents, utility models, rationalization models and industrial designs.
- (xix) Suppression of Noxious Weeds Act 1983 Cap 379 Laws of Kenya, provides the Minister with power to declare a plant to be a noxious weed in any area or in the whole of Kenya.
- (xx) Science and Technology Act 1977 Cap 250 Laws of Kenya, the purpose of which is to establish machinery for making available to the Government advice upon all matters relating to scientific and technological activities and research necessary for proper development of the republic of Kenya, and for the coordination of research and experimental development.
- (xxi) Forest Act 979 Cap 385 Laws of Kenya, which provides for the establishment, control and regulation of forest estate, and sustainable forest management in Kenya.
- (xxii) Land Planning Act, Cap 303, Laws of Kenya, makes provision for the planning and use of land in Kenya. This Act promotes public participation in the preparation of plans giving proper consideration to the potential for economic and social development.
- (xxiii) Ministry of Local Government has a mandate to plan for the management of natural resources in their jurisdiction on behalf of the resident local community. The Ministry of Energy is responsible for mineral-based energy and renewable energy in the country. The Ministry plays a major role in management of natural resources since about 80% of the rural population depends on fuel wood for their domestic energy requirements.
- (xxiv) Kenya research and academic institutions (e.g. national universities) mandated to carry out research in their area of specialization.
- (xxv) Local NGOs with a mandate to protect biodiversity such as East African Wildlife Society (EAWS), Kenya Forestry Working Group (KFWG), and Kenya Wetlands Working Group (KWWG).
- (xxvi) Local CBOs whose main concern is benefit sharing from sustainable management of natural resources like forests, wildlife and water as well as rehabilitation of degraded areas.

Tanzania

- (i) Wildlife Conservation Act, No. 12 of 1973: This Act makes provision for the protection, conservation, development, regulations and control of Fauna and Fauna products and for matters incidental thereto and connected with this Act.
- (ii) Wildlife Acts, No 12 of 1974: This act restricts the grazing of any livestock in game reserve without the written permission of the Director.
- (iii) Wildlife Policy, 1998: The Tanzania wildlife policy vision for the wildlife sector is to; promote conservation of biological diversity, administer, regulate and develop wildlife resources, involve all stakeholders in wildlife conservation and sustainable utilisation, as well as in fair and equitable sharing of benefits, promote sustainable utilisation of wildlife resources, raise the contribution of the wildlife sector in country's Gross Domestic Product (GDP) from about 2% to 5%, contribute to poverty alleviation and improve the quality of life of the people of Tanzania, and, promote exchange of relevant information and expertise nationally, regionally and internationally,

- (iv) National Environment Management Act, 1983: The National Environment Management Council was created to advise government on all environmental matters, formulate environmental policies, coordinate institutions and evaluate proposed policies and environmental standards
- (v) National Parks Policy, 1994: This policy encourages protection of National Parks and tourism.
- (vi) Forest Policy, 1998: The policy details the manner in which the forest and tree resources would be managed sustainably to meet the needs and desires of the society and nation.
- (vii) Forest Acts, 2002: The Forest Act, 2002, not only replaces the 1957 Forest Ordinance, but also the Export of Timber Ordinance (Cap. 288) and Grass Fires Ordinance (Cap. 135). The most significant changes are concerned with biodiversity conservation and community forest management. Biodiversity protection is included throughout the Act. Provision is made for establishment of a fund which includes the purpose of assisting Tanzania to benefit from international initiatives and funds for biodiversity conservation. Environmental impact assessments are required in forested areas and watersheds for certain developments. National forest reserves may be declared as nature forest reserves to maintain and enhance biodiversity and genetic resources. Outside the reserves, conservation of trees includes both protection of natural water supplies and biodiversity; and provision is made for protection of wild plants and animals listed in the government gazette. Sovereignty over “biological resources, their derivative products and intangible components” is also affirmed.
- (viii) Fisheries Policy and Strategy, 1997: The National Fisheries sector policy and strategy statement was adopted in December 1997. The statement focuses on the promotion of sustainable exploitation, utilization and marketing to provide food, income, employment foreign exchange earnings and effective protection of aquatic environment to sustain development. The overall goal of the National Fisheries Policy is to promote conservation, development and sustainable management of the Fisheries Resources for the benefit of present and future generations.
- (ix) Fisheries Acts, 2003: Acts provides laws on sustainable development, protection, conservation, aquaculture development, regulation and control of fish, fish products, aquatic flora and it products and for related matters.
- (x) National Environmental Policy, 1997: The policy provides the framework for making fundamental changes that are needed to bring environmental considerations into the mainstream of decision making in Tanzania. It seeks to provide policy guidelines, plans and give guidance to the determination of priority actions, and provides for monitoring and regular review of policies, plans and programmes. It further provides for sectoral and cross-sectoral policy analysis in order to achieve compatibility among sectors and interest groups and exploit synergies among them.
- (xi) Tourism Policy, 1999: The policy ensures sustainable tourism development in Tanzania; here includes establishment of Tanzania Tourist Board, improvement of private sector participation, and the approval of tourism related sectors and projects.
- (xii) Tourism Acts, 2008: This Act provides institutional framework, administration, regulation, registration and licensing of tourism facilities and activities for related matters
- (xiii) Water Policy, 2002: The policy aims at ensuring that beneficiaries participate fully in planning, construction, operation, maintenance and management of community based domestic water supply schemes. This policy seeks to address cross- sectoral interests in water, watershed management and integrated and participatory approaches for water resources planning, development and management. Also, the policy lays a foundation for sustainable development and management of water resources in the changing roles of the Government from service provider to that of coordination, policy and guidelines formulation, and regulation.
- (xiv) Mineral Policy, 1997: The role of this policy is to stimulate and guide private mining investment by administering, regulating and facilitating the growth of the sector through a well organised and efficient institutional framework. The policy provides a clear guidance towards sound exploitation of natural resources for the mutual benefit of private investors, the government and entire people of Tanzania.
- (xv) Mining Act, No. 5 of 1998. GN No. 171 of 1999: This Act provides laws for minerals, mining and dealing with minerals and any other related matters.

- (xvi) Agriculture and Livestock Policy, 1997. The policy goal is the improvement of the well being of the people whose principal occupation and way of life is based on agriculture and livestock. Most of these people are smallholder and livestock keepers. The focus of this policy is to commercialize agriculture so as to increase income levels.
- (xvii) Agriculture and Livestock Acts, 1977: This Act provides laws to implement policy whose goal is the improvement of the well being of the people whose principal occupation and way of life is based on agriculture and livestock.
- (xviii) Lands Acts, 1999: On 11 February 1999 the Tanzanian Parliament passed The Land Act, 1999 and The Village Land Act, 1999. The first deals with general land, including urban areas and private estates outside the customary sector, and the second deals with village lands, the main objectives of these laws are to provide for the basic law in relation to land, management of Land, settlement of disputes and related matters. Act No. 4 deals with Land other than village land and Act No. 5 concerns Village Land.
- (xix) Land Policy, 1996: The Land Policy states that all Land in Tanzania is public Land vested in the President as trustee for all citizens, all Tanzanians men and women above 18 years have rights to acquire and own Land, all existing rights are recognized and protected including customary titles, Land should be used productively and that such use complies with the principles of sustainable development, that land has value, amount of land to be granted to any person or company be regulated, full, fair and prompt compensation be paid to owners in the event that, land is acquired for public purposes, facilitate the operation of market in Land, to provide for an efficient, effective economical and transparent system of Land administration and people of all sexes be represented in all decisions regarding for land issues.

The Lake Victoria Basin Commission is a specialized institution of the East African Commission that is responsible for coordinating the sustainable development agenda of the Lake Victoria Basin. Its vision *is to promote, facilitate and coordinate activities of different actors towards sustainable development and poverty eradication of the Lake Victoria Basin*. The Lake Victoria Basin Commission is striving to:

- establish a trans-boundary agreement to ensure water flows to sustain the biodiversity of the Mara-Serengeti ecosystem
- encourage implementation of harmonized river basin management practices and policies.
- facilitate cross boundary management of natural resources in the Mara River basin.

WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by:

- conserving the world's biological diversity
- ensuring that the use of renewable natural resources is sustainable
- promoting the reduction of pollution and wasteful consumption

