



Government Of Malawi

Fifth National Report To The Convention On Biological Diversity

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ACRONYMS

ASWAP	Agriculture Sector Wide Approach
CBD	Convention on Biological Diversity
CITES	Convention on International Trade of Endangered Species
CGIAR	Consultative Group on International Agricultural Research
DDP	District Development Plan
EIA	Environmental Impact Assessment
ENRM	Environment and Natural Resources Management
ESCF	Environmental Sustainability Criteria Framework
FAO	Food and Agriculture Organisation
FISP	Farm Input Subsidy Program
IAS	Invasive Alien Species
IBAs	Important Bird Areas
IRLAD	Irrigation for Rural Livelihoods and Agricultural Development
IUCN	International Union for Conservation of Nature
LBSAP	Local Biodiversity Strategy and Action Plan
LCBCCP	Lake Chilwa Basin Climate Change Programme
LDF	Local Development Fund
LEAD-SEA	Leadership on Environment and Development - Southern and Eastern Africa
MDGs	Millennium Development Goals
MGDS II	Malawi Growth and Development Strategy II
MEET	Malawi Environmental Endowment Trust
MMCT	Mulanje Mountain Conservation Trust
MMDGR	Malawi Millennium Development Goals Report
MoAFS	Ministry of Agriculture and Food Security
MZ	Malawi Zebu
NBSAP	National Biodiversity Strategy and Action Plan
NCST	National Commission for Science and Technology
NGO	Non-Governmental Organisation
REDD+	Reducing Emissions from Deforestation and Forest Degradation
RIPPLE Africa	Recognising Individual Potential and Promoting Local Education in Africa
SADC	Southern African Development Community
UNFCCC	United Nations Framework Convention on Climate Change
WASH	Water Sanitation and Health

EXECUTIVE SUMMARY

This fifth National Report to the Convention on Biological Diversity (CBD) outlines the measures taken by the Malawi Government to implement the convention through the National Biodiversity Strategy and Action Plan (2006) and progress it has made towards implementation of the Global Biodiversity Strategic Plan and its Aichi Targets.

The report is organised into three chapters. Chapter 1 provides an overview of the status and trends of biodiversity in Malawi since 2009 and the threats to biodiversity. Chapter 2 reports on the progress made in implementing the 2006 NBSAP, referred to as first NBSAP in this document. Chapter 3 reports on the progress made in implementing the Aichi Targets and the revised NBSAP, here referred to as NBSAP II.

Malawi has unique and diverse ecosystems, flora and fauna that support the country's economic growth and human well-being. The major ecosystems in Malawi include terrestrial (forests, mountains, etc.) and aquatic (wetlands, lakes and rivers) ecosystems. The greatest diversity of plants and animals are in the 97 protected areas, comprising 87 Forest Reserves, five National Parks and Four Wildlife Reserves. The most biologically diverse areas in the country are the highlands, such as Nyika Plateau, which support large patches of evergreen forests and high altitude grassland, and Mulanje Mountain, which represents the largest area of montane forests Malawi. Aquatic ecosystems cover about 20% of the total surface area of Malawi and are habitats to a diversity of species such as fish, amphibians, reptiles and water lilies.

Malawi has a total of over 6,000 flowering plant species of which 122 are endemic and 248 species are threatened of extinction. Genetic resources of different plant species are conserved at the National Plant Genetic Resource Centre, Agricultural Research Stations, Botanical Gardens, Academic Institutions and Forestry Research Institute of Malawi. As of 2012, the Malawi Genetic Resource Centre gene banks had over 4,613 accessions from 32 species and of these 4,097 are seed samples and 516 are vegetative materials collected from all districts of Malawi.

Animal species in Malawi comprise both vertebrates and invertebrates. Vertebrates include amphibians, mammals, reptiles, birds and fish. There are about 192 mammal species in Malawi, of which eight are listed as threatened under IUCN, 2013. About 83 species of amphibians have been recorded in Malawi, of which six species are endemic and 12 are threatened. The country has 145 species of reptiles, of which 12 are endemic and six are rare. There are 664 known bird species, of which four are endemic and seven threatened. The total number of fish species found in Malawi is estimated to be in excess of 850. Over 800 fish species have been described in Lake Malawi, 95% being

Executive Summary

haplochromine cichlids, and 99% of which are endemic to the Lake.

Malawi's animal genetic resources are comprised of ruminant livestock, mammalian monogastrics and poultry. About 95% of the livestock are of the indigenous type that has low fertility and growth performance, low milk yield (1 litre/day for cattle) and early ages at maturity, resulting into smaller mature body sizes.

Malawians heavily depend on the diverse biological resources to supply their income, food and other needs. However the biological resources are under threat due to:

- **Habitat loss and Fragmentation-** driven by increasing population (annual growth rate of 2.8%) and unsustainable land use changes (deforestation rate of 2.4%).
- **Overexploitation of Biodiversity-** driven by overdependence and unsustainable harvesting of biological resources (97% of the population depend on biomass energy).
- **Invasive Alien Species (IAS)**– the number of invasive alien species has increased from 29 to 31 and these IAS reduce species diversity and lower genetic diversity of native species.
- **Pollution-** pollution of water and land, which are habitats to species, resulting from unsustainable management of agriculture, industrial and domestic waste
- **Climate Change-** most ecosystems are vulnerable to climate change because species within the ecosystems fail to tolerate the stresses climate changes bring.

The First NBSAP addressed some of these threats. Although its implementation has been slow, uncoordinated and poorly monitored, the following achievements have been made through its implementation;

- Promoted species and habitat restoration programs.
- Increased population and distribution ranges of rare and threatened species.
- Designed and implemented in situ and ex situ agricultural diversity conservation programmes with full participation of local communities.
- Strengthened policies and legislation to enhance biodiversity conservation, sustainable utilisation and benefit sharing.
- Developed a cost-effective invasive alien species management programme.
- Strengthened the participation of communities and the private sector as equal partners in biodiversity conservation, sustainable use and equitable sharing of benefits.
- Built the capacity of institutions to collect, interpret, manage and disseminate quality and relevant biodiversity information and biological collections effectively and efficiently.
- Strengthened the capacity of institutions to manage biodiversity information.

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Since the formulation of the NBSAP in 2006, biodiversity issues have been mainstreamed into Malawi's policies, strategies and plans. At the national level biodiversity has been integrated in the Malawi Growth and Development Strategy II (MGDS II), whilst at local level biodiversity has been integrated into and District Development plans. Further sectoral strategies have been developed to mainstream biodiversity including the draft Agrobiodiversity Strategy.

Sustainable management of biodiversity requires good coordination amongst all stakeholders and adequate financing of biodiversity activities. The revised strategy serves as a plan of action for the period 2014 - 2020 and has been prepared through a consultative process involving government ministries, research organizations, NGOs, the private sector and community-based organizations.



Chapter One

Overview of Biodiversity Status, Trends and Threats



1.1 INTRODUCTION

Malawi is located in the southern part of Africa with a total area of 119,140 km², of which 20% is water. The country is bordered with Tanzania to the north; Mozambique to the east, south and southwest; and Zambia to the west, as shown in Figure 1. It is located between latitudes 9° 22' S and 17° 03' S and longitude 33° 40' E and 35° 55' E. The country has a tropical climate with variable temperatures, relative humidity and fertile soils. The country's Gross Domestic Product (GDP) was estimated at US\$3.5 billion in 2011, equivalent to per capita income of about US\$360 (UNDP, 2011). Currently, the population of Malawi is estimated at 15.4 million with an average density of 139 people/km² and population growth rate of 2.8% per annum (NSO, 2008). This population is highly dependent on biological resources for its livelihood.

1.2 IMPORTANCE OF BIODIVERSITY IN MALAWI

Biodiversity in Malawi is important for economic, socio-cultural and ecological purposes. Economically, biodiversity contributes significantly to the Gross Domestic Product (GDP) of Malawi. For example, agro biodiversity was estimated to contribute about 40% of GDP and more than 90% of employment and merchandise export earnings in 2010. The fisheries, forestry and wildlife sectors contributed 12.8% towards the GDP in the year 2010 (Yaron et al, 2010).

Biodiversity satisfies a number of socio-cultural functions in Malawi. Spiritually, most Malawian ethnic groups believe in the existence of a supernatural being or ancestral spirits that are associated with graveyards or mountain areas covered by forest biodiversity. For example, the Mang'anja of Nsanje worship their ancestral spirit M'bona in Khuluvi Forest. Gule wa Mkulu from the Chewa tribe

and the Ingoma dance from the Ngoni tribe also have their regalia based on plants and animal products. These practices contribute to knowledge and conservation of biodiversity in sacred sites.

In addition, biodiversity provides other social benefits such as recreation and tourism. Major tourist attractions in the country includes water bodies, national parks, wildlife reserves, mountains and cultural heritage that provide site seeing, photographic safaris and mountain hiking opportunities. Lake Malawi National Park, for example, is of global importance for biodiversity conservation due particularly to its fish diversity. It is a home to many hundreds of cichlid fish, nearly all of which are endemic to Lake Malawi, and are known locally as "mbuna."

Biodiversity is also important for food, medicinal and cosmetic purposes. For example, Lake Chilwa wetland provides food such as wild birds and fish to the surrounding communities. It is estimated that more than 250,000 people along the major fishing areas depend on fish as a source of food and livelihood. The fisheries sector provides 60-70% of total animal protein in Malawi.

Medicinal and aromatic plants have been used for many years in the country. Malawi has over 131 plant species that are used as medicinal plants. These include Kombe (*Strophathus kombe*) that are locally used for healing stomach ulcers and Sexually Transmitted Infections (STIs).

Furthermore, biodiversity provides ecological services such as recycling of nutrients, control of local microclimates, regulation of local hydrological processes, regulation of the abundance of undesirable organisms and detoxification of noxious chemicals.

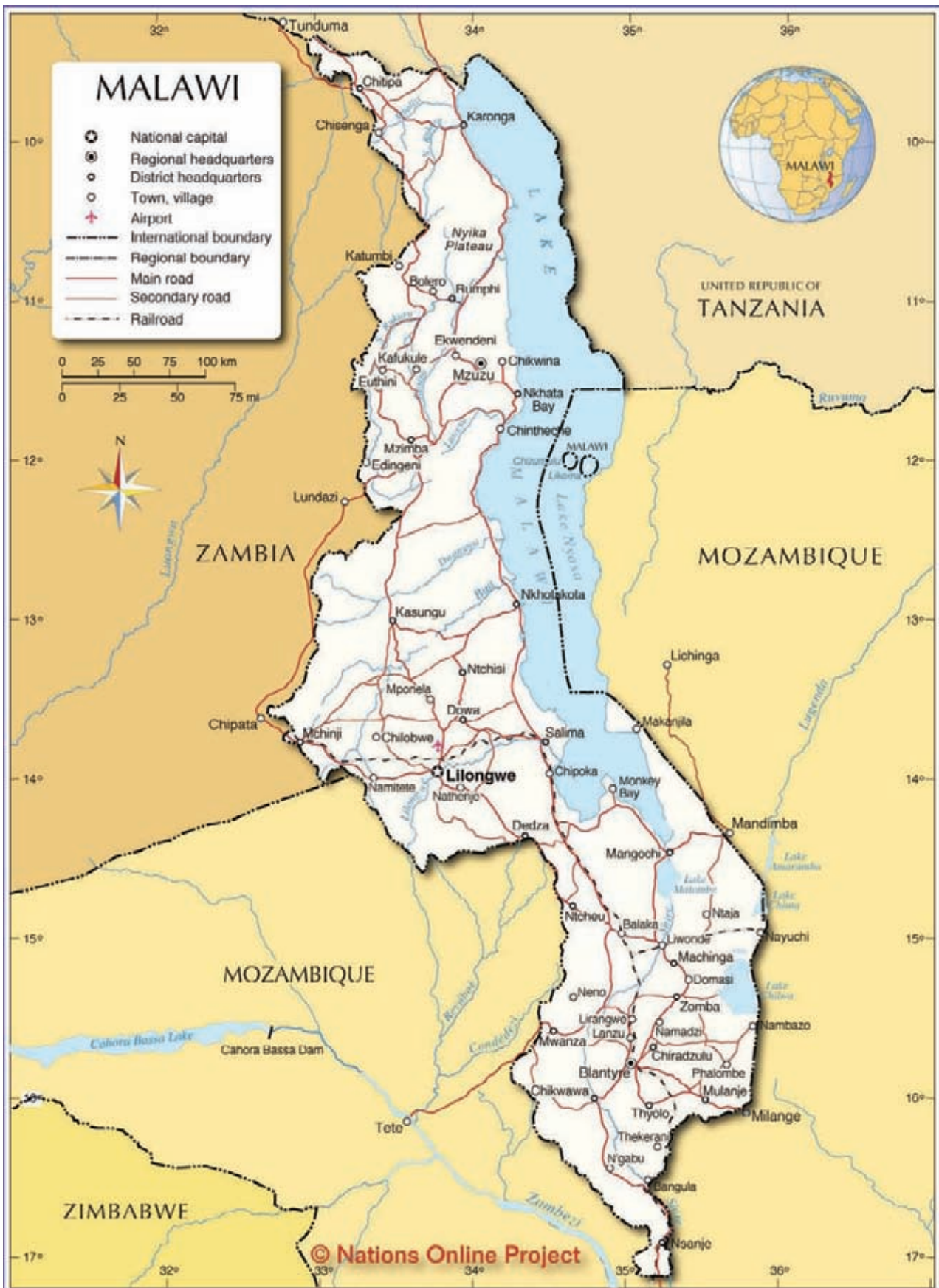


Figure 1: Map of Malawi

Chapter 1: Overview of Biodiversity Status, Trends and Threats

1.3 STATUS AND TRENDS OF BIODIVERSITY

Generally, the status of biodiversity in Malawi is declining. Terrestrial and aquatic ecosystems of the country are being modified, degraded and species composition is being altered due to unsustainable utilisation and management of natural resources. This section describes ecosystem, species and genetic diversity.

1.3.1 Ecosystem Diversity

1.3.1.1 Terrestrial Ecosystems

Terrestrial ecosystems in Malawi include forests, mountains and grasslands. Malawi has 87 forest reserves, five national parks, four wildlife reserves and three nature sanctuaries. National parks, wildlife reserves and nature sanctuaries are intended to preserve Malawi's natural heritage and to promote their use for scientific and recreational purposes. They generally protect important wildlife

populations, major water catchment areas and landscapes of high aesthetic value. Table 1 below presents basic information on the National Parks and Wildlife Reserves in the country.

Malawi's forest resources, on the other hand, comprise both planted and natural forest plantations. The forest reserves act as water catchment areas that are an important habitat for flora and fauna. Malawi's forest resources have been decreasing primarily due to increasing human population. High population growth has led to expansion of agriculture into marginal lands, increasing demand for fuel wood and charcoal by rural and urban promoting the exploitation of remaining forest resources. The demand for wood for industrial estates and local tobacco curing and brick production has also resulted in loss of forest resources. A recent study conducted in the southern part of Malawi revealed that most forest reserves have shown huge land cover transitions compared to the amount of land cover that had been designated as

Table 1: National Parks and Wildlife Reserves of Malawi and Their Characteristics

Protected Area	Area (KM ²)	Habitat Description	Important Features
1. Lengwe National Park	887	Deciduous woodland and thicket	Lengwe's topography consists of open deciduous forests and dense thickets. It is the home of Nyala antelope. The climate of Lengwe is hot and dry, and the only source of consistent water is from rain. Many man-made water holes have been constructed to attract and maintain the animal population.
2. Nyika National Park	3,134	Montane grassland with forest patches and miombo woodland	The grasslands of Nyika are rich in wildflowers such as orchids. The montane vegetation supports large numbers of antelope like duiker, eland, roan and zebra. There are a number of species of smaller mammals such as warthog and bush pig. Elephants and buffalo usually keep to the lower ground on the northern edge of the park. Lions and elephants have only recently been seen on the high plateau. Over 400 species of bird have been recorded in the park. The rare Denham's bustard and the wattled crane are among those to be seen, as is the red-winged francolin - endemic to Nyika.

Protected Area	Area (KM ²)	Habitat Description	Important Features
3. Lake Malawi National Park	94	Islands and lakeshore and inshore waters	A fresh water park that was created to protect fish and aquatic habitats. Lake Malawi National Park, a UNESCO Heritage site, is famous for its cichlids, which are endemic to the lake, come in different colours and there are over 800 species. Despite this, Lake Malawi National Park does include a fair amount of land, including several small islands in Lake Malawi. It is also home to other animals such as baboons.
4. Majete Game Reserve	691	Deciduous woodland	The reserve consists of approximately 70,000 hectares of land and contains about 4,000 animals, including elephant, eland, zebra, giraffe, leopard, baboons, many species of monkeys and warthogs. Large numbers of hippos and crocodiles are found in streams and along the banks of the Shire River. Majete is very dry and hot in the summer, and several man-made watering holes have been constructed to maintain the wildlife population.
5. Nkhotakota Game Reserve	1,802	Miombo	The reserve is home to several mammals including buffaloes, bushbuck, bush pig, common duiker, eland, elephants, grysbok, kudu, reed buck, roan, sable, warthog, water buck, zebra, baboon, leopard and lion.
6. Liwonde National Park	548	Acacia and mopane woodland, with baobab	The park is home to several species of antelope (impala, kudu, waterbuck, etc.), elephants, buffalo, crocodiles, hippopotamus, lions and many other mammals. The park contains all the big five. Also there are more than 400 species of bird found in this park.
7. Vwaza Marsh Game Reserve	986	Some mopane woodland and miombo	Typically the reserve has large herds of buffalo and elephants and a large variety of antelope, including roan, greater kudu, Lichtenstein's hartebeest, eland and impala.
8. Mwabvi Game Reserve	135	Mopane, Combretum and brachystegia woodland, as well as open savanna, dambo, and riverine areas.	Located in the Southern Part of Malawi, the reserve is a home to several mammals including kudu, impala, buffalo and other antelopes.
9. Kasungu National Park	2,316	Miombo and seasonal riverine forest	A number of rivers flow through the park, notably Dwangwa and Lingadzi and its tributary, Lifupa, which creates an important spot for hippo viewing in the park at Lifupa Lodge. Kasungu is known for its high population of elephants although it is threatened by poaching. Other animals common in the park include Sable antelope, roan antelope, kudu, impala, hartebeest, zebra and buffalos.

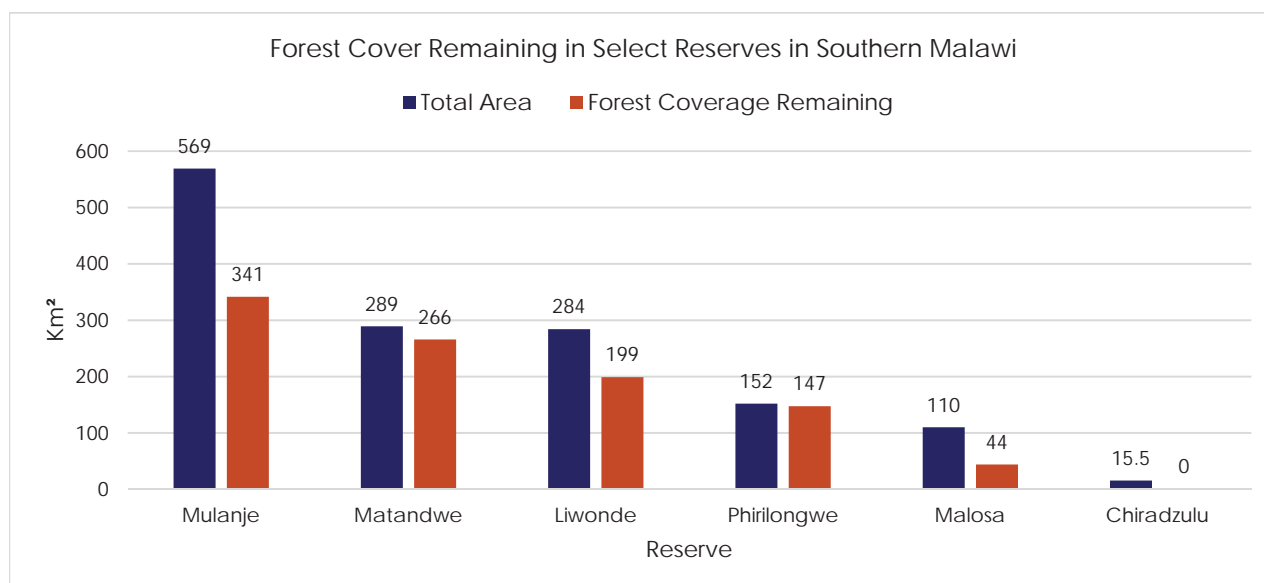


Figure 2: Forest Degradation in Some Forests Reserves in Southern Malawi

forest reserves. Figure 2 above indicates the amount of hectares that remains covered with trees in some of the major forest reserves in the southern region.

As it can be seen from Figure 2, most forest reserves have a big area that is no longer covered with trees due to continuous degradation that is happening caused by surrounding areas. For example, Liwonde Forest Reserves designated boundary covers 284 hectares; however, observed trends indicate that the forest cover as of 2013 was 70 hectares. Most of these forests have been degraded due to logging and clearing for subsistence agriculture. To curb this problem, the government has been promoting forests' co-management with communities within the fringes of the reserves. This has improved the management of the reserves in some areas and enhanced the benefits communities get from these forests.

1.3.1.2 Aquatic Ecosystems

Aquatic ecosystems cover about 20% of the total surface area of Malawi and are habitats to a diversity of fish and other aquatic fauna and flora. Major aquatic

ecosystems in Malawi include lakes (Malawi, Malombe, Chilwa, Kazuni and Chiuta), rivers (Songwe, South Rukuru, North Rukuru, Dwangwa, Linthipe, Shire and Bua River), wetlands and other small water bodies. The small water bodies include lagoons and man-made reservoirs. The largest lagoon is Chia, which harbours more than 24 fish species.

Wetlands such as Elephant Marsh and Lake Chilwa play an important ecological function as bird sanctuaries and destinations for migratory birds. In 1996, Malawi ratified the Ramsar Convention and Lake Chilwa was designated as a wetland of international importance in 1997.

Aquatic ecosystems are under threat due to human population growth, siltation, pollution and climate change. For example, the periodic drying up of Lake Chilwa due to degradation of its catchment areas and climate change threatens the survival of both birds and fish species.



Nyika National Park

1.3.2 Species Diversity

1.3.2.1 Flora

Malawi has a rich plant diversity that comprises flowering and non-flowering plants. The country has over 6,000 flowering plant species (GoM, 2010), of which 122 are endemic and 248 species are threatened based on the IUCN Red Data List (2013). However, there are more species of flora that are threatened but are not included on the IUCN Red Data List because of inadequate information about their conservation status.

There is a great diversity of wild flowers in Malawi. Most of the flowers are found in national parks, wildlife reserves, forest reserves and protected hill slopes. The country has a large number of orchids species, which are estimated to be over 400 species.

Malawi grows a wide range of cereals, pulses and tubers. Currently, cultivation of local landraces is decreasing due to farmers' preference for hybrids because of their high productivity. However, local

landraces carry traits such as disease resistance and drought tolerance that plant breeders could use for improving productivity.

1.3.2.2 Fauna

Vertebrates

Mammals

The majority of mammal species has undergone severe decline in numbers, especially in recent years, mainly due to poaching and habitat loss. There are about 192 mammal species, of which eight are listed as threatened under IUCN (2013) as shown in Table 2 on the following page. Animals like hippopotamus show a declining trend due to habitat loss and conflict with human activities. Hippopotamus and otters are probably the only mammals that have a true affinity for aquatic habitats. Substantial hippopotamus populations are protected within Liwonde National Park, Kasungu National Park and Vwaza Wildlife Reserve. Two species of otters are recorded in Malawi, the Cape clawless (*Aonyx*



Black Rhino

Table 2: Threatened Mammal Species of Malawi

Scientific Name	Common Name	Degree Of Threats	Current Location
<i>Diceros bicornis</i>	Black Rhino	Endangered	Liwonde National Park, Majete Wildlife Reserve.
<i>Hippopotamus amphibius</i>	Hippopotamus	Vulnerable	Elephant Marsh (lower Shire River), the south-west arm of Lake Malawi, Upper Shire River, Lake Malombe and Liwonde National Park.
<i>Loxodonta africana</i>	African Elephant	Endangered	Nyika, Kasungu and Liwonde National Parks; Vwaza, Majete and Nkhotakota Wildlife reserves; Thuma and Namizimu forest reserves.
<i>Rhynchocyon cirnei</i>	Checkered Sengi	Vulnerable	Nyika and Kasungu National Parks.
<i>Acinonyx jubatus</i>	Cheetah	Vulnerable	Formerly widespread in protected areas; now probably extinct in Malawi.
<i>Panthera leo</i>	Lion	Vulnerable	Liwonde National Park and Majete Wildlife Reserve, Nkhotakota Game Reserve.
<i>Paraxerus palliatus</i>	Red Bush Squirrel	Vulnerable	Liwonde National Park, Lower Shire, Mulanje and Ntchisi mountains, South Viphya plateau.
<i>Lutra maculicollis</i>	Spotted-Necked Otter	Vulnerable	Present where suitable riverine habitat occurs, even in Lilongwe Nature Sanctuary; also in Shire River, Lake Chilwa, Nkhotakota

Source: IUCN, 2013

capensis) and the spotted-necked otter (*Lutra maculocollis*). Black rhinos, which were extinct, have been reintroduced in Liwonde National Park and Majete Wildlife Reserve. Majete Wildlife reserve has also reintroduced 217 elephants, 11 black rhino and over 300 buffalos. Following this re-introduction, the big five are now found in two wildlife reserves: Liwonde and Majete.

Although statistics show a declining trend on large mammal populations, the population census conducted in Nyika National Park in 2013 revealed that there was an increased trend in some large mammals in the park, as shown in Table 3 on the following page. This was attributed to the Nyika Vwaza Transfrontier Project, which is aimed at sustainably managing the Nyika Vwaza Conservation area.

Amphibians

About 83 species of amphibians have been recorded in Malawi, of which 6 species are endemic. About 12 amphibian species are threatened and 11 species are listed in the IUCN Red Data-list, as shown in Table 4 on the following page.

Reptiles

The country has 145 species of reptiles that belong to 19 families and 72 genera. The majority are snakes of the family Colubridae (43 species), lizards of the families Scincidae (20 species) and Geckonidae (16 species). There are eight endemic species, six of which are restricted to Mulanje Mountain, while the remaining two occur in Nyika Plateau, Misuku Hills and Ntchisi Forest

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Table 3: Comparative Figures of Large Mammal Populations in Nyika National Park for 2009 and 2013

Species	2009 Survey Results	2013 Survey Results
Elephant	0	47
Eland	656	625
Roan	341	461
Zebra	112	279
Reedbuck	471	1787
Bushbuck	10	51
Warthog	24	106
Duiker - Common	10	93
Duiker - Red	0	2
Bushpig	18	0
Klipspringer	0	10
Total	1642	3461

Table 4: Threatened Amphibians in Malawi

Scientific Name	Common Name	Degree Of Threats	Endemicity	Current Location
<i>Arthroleptis francei</i>	France's Squeaker	EN	Endemic	Mulanje
<i>Arthroleptis reichei</i>	Eiche's Squeaker	NT		Misuku hills
<i>Mertensophryne nyikae</i>	Nyika Dwarf Toad	VU		Nyika plateau
<i>Hyperolius pictus</i>	Variable Reed Frog	LC		Nyika plateau
<i>Hyperolius spinigularis</i>	Spiny Throated Reed Frog	LC		Mulanje mountain
<i>Phrynobatrachus stewartae</i>	Stewart's Puddle Frog	DD	Endemic	
<i>Phrynobatrachus ukingensis</i>	Ukinga Puddle Frog	DD		Misuku, Rumphu, Zomba
<i>Amietia johnstoni</i>	Johnston's River Frog	EN	Endemic	Mulanje mountain
<i>Nothophryne broadleyi</i>	Mongrel Frog	EN		Mulanje mountain
<i>Scolecophorus kirkii</i>	Kirk's Caecilian	LC		Southern Malawi
<i>Ptychadena broadleyi</i>	Broadley's Ridged Frog	EN	Endemic	Mulanje mountain, Zomba plateau

Key: EN (endangered), NT (near threatened), VU (vulnerable), LC (least concerned), DD (data deficient).

Source: IUCN, 2013

Chapter 1: Overview of Biodiversity Status, Trends and Threats

Table 5: Threatened Species of Reptiles

Scientific Name	Common Name	Family
<i>Crocodylus niloticus</i>	Nile Crocodile	Crocodylidae
<i>Chamaeleo mlanjensis</i>	Mulanje Dwarf Chameleon	Chamaeleonidae
<i>Chamaeleo goetzei nyikae</i>	Nyika Dwarf Chameleon	Chamaeleonidae
<i>Rhampholeon nchisiensis</i>	Pitless Pigmy Chameleon	Chamaeleonidae
<i>Lygodactylus bonsi</i>	Dwarf Gecko	Geckonidae
<i>Melanoseps ater</i>	Legless Skink	Scincidae
<i>Proscelotes mlanjensis</i>	Arnold's (Mulanje) Skink	Scincidae
<i>Dipsadoboa flavida flavida</i>	Cross-barred Tree Snake	Colubridae

Source: Malawi State of Environment and Outlook Report, 2010

Reserve. There are eight species that are threatened, as shown in Table 5.

Birds

Malawi has over 630 recorded bird species. The Yellow-throated Apalis, *Apalis flavigularis*, is Malawi's only endemic bird. It is listed as an endangered species by IUCN and its distribution is restricted to three massifs in Southern Malawi (Mt. Mulanje, Mt. Zomba and Mt. Malosa). The Thyolo Alethe, *Alethe choloensis*, and the Spotted Ground Thrush, *Zoothera guttata*, are among other globally endangered birds whose distribution has been highly affected by habitat loss. There are a number of species that are not considered to be of great conservation concern globally but need to be considered critically endangered in Malawi. These include the Wattled Crane, *Bugeranus carunculatus*, whose population has greatly reduced in Nyika plateau. Previously, over 60 individuals of the Wattle Crane were reported on the Nyika plateau, but currently, only one to two pairs are present.

All vultures are also locally critically endangered, having disappeared from the majority of protected areas. The restocking of Majete Wildlife reserve in the Lower Shire, however, has resulted in the significant increase in vulture numbers in the area. Lilian's Lovebirds in Liwonde

National Park are globally considered as near-threatened, but face a large threat from poachers who poison waterholes in the park. Thus, Lilian's Lovebirds are locally considered vulnerable.

There are 22 globally recognized Important Bird Areas (IBA's) in Malawi, most of which still play an important role in bird conservation. This list, however, needs to be updated urgently. Table 6 on page 14 gives an account for some of the key species of global conservation concern known from Malawi.

Fish

The total number of fish species found in Malawi is estimated to be in excess of 850. Of these, over 800 fish species have been described in Lake Malawi, 95% being haplochromine cichlids, and 99% endemic to the Lake. Apart from the lake, major rivers such as Shire and Bua have important fisheries made up of cyprinids (mpasa, kadyakolo, sanjika) and catfish that usually migrate from Lake Malawi during spawning season, which coincides with rainy season. Fish landings have been declining over the years mainly due to the concentration of fishing in shallow waters. Figure 3 on page 15 indicates the catches of fish for the past four years in Lake Malawi.

From Figure 3, it can be noted that



White-Headed Vulture



Spotted Ground-Thrush



Blue Swallow



White-Backed Vulture



Southern Ground-Hornbill



Secretary Bird



Grey Crowned Crane

Table 6: Bird Species of Global Conservation Concern Known From Malawi

Scientific Name	Common Name	Global Status	Current Localities
<i>Hirundo atrocaerulea</i>	Blue Swallow	Vulnerable	Nyika National Park, Mulanje, South Viphya and possibly Misuku and North Viphya
<i>Alethe choloensis</i>	Thyolo Alethe	Endangered	Satemwa Tea Estate, Mulanje Forest Reserve, Zomba Forest Reserve and possibly Chikala Hills
<i>Zoothera guttata</i>	Spotted Ground Thrush	Endangered	Very rare. Most Recent record is from Satemwa Tea Estate. Possibly still present in mid-altitude forests of Mulanje and Chikala hills
<i>Apalis flavigularis</i>	Yellow-Throated Apalis	Endangered	Locally common on Mt Mulanje Forest Reserve and the Zomba-Malosa Forest Reserve
<i>Gyps africanus</i>	White-Backed Vulture	Endangered	The Lower shire is the current stronghold of the species. Breeding in Majete Wildlife Reserve and Lengwe National Park. No longer seen in Liwonde and Kasungu National Parks. Present in Nyika National Park
<i>Necrosyrtes monachus</i>	Hooded Vulture	Endangered	Lengwe National Park and Majete Wildlife Reserve
<i>Trigonoceps occipitalis</i>	White-Headed Vulture	Vulnerable	Lengwe National Park and Majete Wildlife Reserve
<i>Torgos tracheliotos</i>	Lappet-Faced Vulture	Vulnerable	Lengwe National Park and Majete Wildlife Reserve
<i>Bugeranus carunculatus</i>	Wattled Crane	Vulnerable	Nearing local extinction. Few numbers still recorded on the Nyika
<i>Balearica regulorum</i>	Grey Crowned Crane	Endangered	Species in wetlands and floodplains. No recent records. Occasional sightings in Lilongwe, South Rukuru, Kasungu and Dwangwa dambos.
<i>Ardeola idae</i>	Madagascar Pond-Heron	Endangered	No recent records. Possibly still present in wetlands in the Lower Shire and lake Chilwa
<i>Acrocephalus griseldis</i>	Basra Reed Warbler	Endangered	A Palearctic migrant widespread in the Lower Shire but under-recorded in the rest of the country
<i>Bucorvus leadbeateri</i>	Southern Ground Hornbill	Vulnerable	Mostly restricted to protected areas
<i>Sagittarius serpentarius</i>	Secretary Bird	Vulnerable	Very rare. Erratic and nomadic. Formerly recorded on the Nyika in dry season. No recent records.
<i>Apalis chariessa</i>	White-Winged Apalis	Vulnerable	Breeding on Zomba and Satemwa Tea estate

Source: Birdlife International Data Zone, Dowsett-Lemaire and Dowsett 2006, Mzumara et al. 2012

chambo (*Oreochromis* species) catches decreased from 2,237 tons in 2010 to 1,501 tons in 2013. This could be attributed to the fact that chambo is the most highly demanded fish on the market; as such, it is overexploited for economic gains. It can also be noted from the table that usipa (*Engraulicypris engraucyprisardella*), followed by utaka (*Capadichromis* species), which are smaller fishes, have high catches throughout the period. Though much research has not been conducted to establish the causes of the high catches in these species of fish, the dwindling stocks of larger fishes like chambo has been assumed to lead to a favourable environment for the smaller fishes to boom since they have reduced number of predators.

Invertebrates

More than 8,770 invertebrate species have been documented, the majority being insects. Nematodes, crustacea, molluscs and insects are well studied compared to earthworms, myriapods and arachnids. Amongst the studied taxa, molluscs comprise 47 endemic species from a total of 183 species. Eight species are listed by IUCN as either vulnerable (*Bulinus*

nyassanus, *Planorbidae*); or endangered (e.g. *Bulinus succinoides*, *Lanistes nasutus*, *L. nyassanus*, *L. solidus*; and *Bellamyia ecclesia*). Other invertebrates identified on the shores of Lake Malawi are Ostracoda, Hydracarina and Chironomidae. Most insects, including hydropsychid caddisflies, heptageneid mayflies and dryopoids, are lotic forms.

1.3.2.3 Other Species

Microorganisms

About 700 species of microorganisms have so far been identified in Malawi. Approximately 60 species of bacteria belonging to 20 genera have been recorded representing 1.5 % of the world bacteria species. About 500 species of microorganisms, which includes 53 species are edible mushrooms, are commonly found in miombo woodlands. A total of 89 species of viruses are recorded in Malawi; of these 42 are reported from agricultural crops (largely polyviruses) and 30 (Paramyxoviruses and Poxviruses) on various livestock. Other microorganisms such as algae and protoctists have 66 and 23 species, respectively (GOM, 2010).

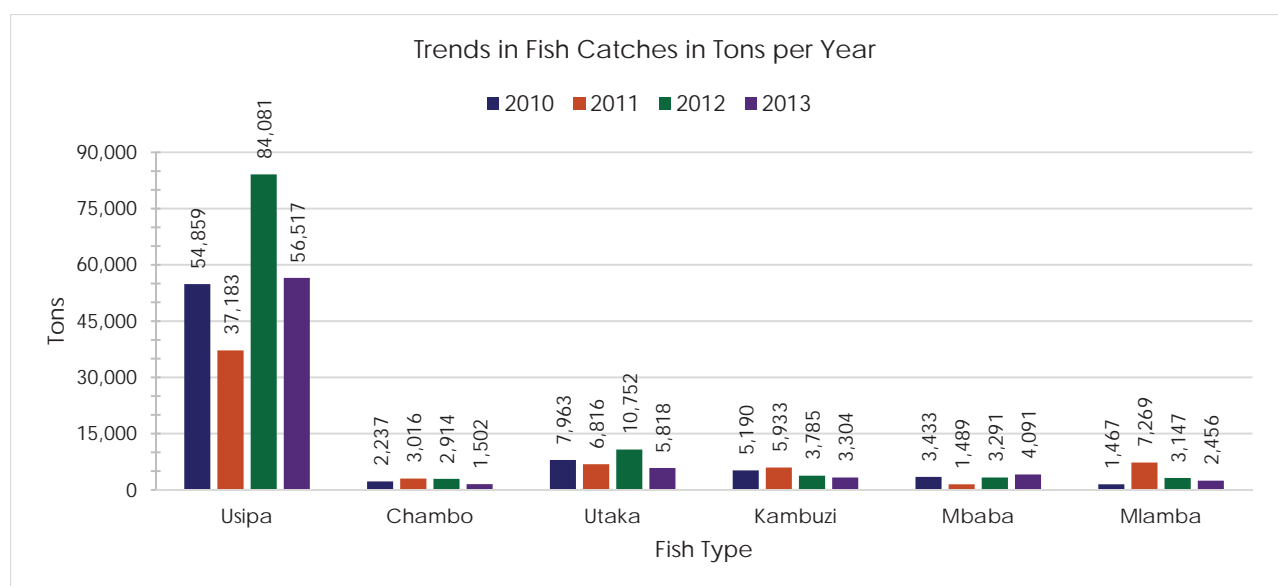


Figure 3: Trends in Fish Catches in Tons Per Year



Usipa

1.3.3 Genetic Diversity

Malawi has been selecting, domesticating, improving and using species that are valuable for agricultural, pharmaceutical and industrial functions. The country, however, has been experiencing genetic erosion mostly on agriculture species. In other species, the challenge has been inadequate taxonomic information on what is available.

Genetic resources of different species are conserved at the National Plant Genetic Resource Centre, Agricultural Research Stations, Botanical Gardens, Academic Institutions and the Forestry Research Institute of Malawi. As of the year 2014, the Malawi Genetic Resource Centre gene banks had over 2,513 accessions from 32 species. Of these, 2,344 are seed samples and 169 are vegetative materials collected from all districts of Malawi.

Malawi's animal genetic resources are comprised of ruminant livestock,

mammalian monogastrics and poultry. About 95% of the livestock are of the indigenous type, which has low fertility and growth performance, low milk yield (1 liter/day for cattle) and early ages at maturity, resulting into smaller mature body sizes. These species are at risk of genetic erosion due to uncontrolled cross-breeding programmes, stock thefts and diseases. There are also smaller populations of exotic breeds and their crosses, which are mainly on large/commercial farms. The indigenous Malawi zebu (MZ) cattle account for more than 90% of all cattle found in Malawi.

Among domesticated small livestock, goats (*Capra hircus*) are the most popular in Malawi. The indigenous local goats are abundant, whilst the Boer goat is rare. Sheep (*Ovis aries*) are present in three genotypes in Malawi: the indigenous (local) types, the Dorper (an introduced breed from South Africa for mutton) and the Dorper crosses. The local sheep are highly abundant, the Dorper crosses



being less abundant and the Dorper pure-breed extremely less abundant.

Poultry species raised in Malawi include chickens, pigeons, ducks, turkeys and guinea fowls. Data from Ministry of Agriculture and Food Security (MoAFS) shows an increasing trend for chickens, guinea fowl and ducks but decreasing numbers for turkeys (GoM, 2010).

1.4 THREATS TO BIODIVERSITY

The threats to biodiversity in Malawi are mainly human-induced and include habitat loss, over-exploitation of biological resources and fragmentation, introduction of alien species, pollution and climate change.

1.4.1 Habitat Loss and Fragmentation

Over the past years, increasing human population and economic development have led to several land use changes in Malawi that have driven biodiversity loss. Malawi's human population was estimated at 13 million in 2008 and is projected to reach 20 million by 2020 (NSO, 2008). This high population growth has influenced land use changes in Malawi by creating a demand for settlement and agriculture land as well as high demand for natural resources such as fisheries and forest resources. This has resulted in loss of habitats and species diversity. The major causes of deforestation include: indiscriminate cutting of trees, commercial harvesting and conversion of forest land to settlement and agricultural.

Alternative land uses for urban development, agricultural expansion, infrastructure development and mining have contributed to reduction or degradation of important habitats and ecosystems in the country.

Bushfires are also a major contributing factor to habitat destruction leading to



Selling Charcoal by the Road

changes in species composition of both flora and fauna. The problem is mainly pronounced during the dry season when temperatures are high and the vegetation is flammable. The occurrence of bushfires has impacted negatively on the grazing land for both domestic and wildlife species.

1.4.2 Over-Exploitation of Biological Resources

There are a number of underlying factors resulting in overexploitation of biological resources in the country. Overexploitation results from high rates of population growth; poverty that leads to unsustainable exploitation biological resources, lack of employment opportunities and/or socio-economic opportunities to avoid resource overexploitation; lack of awareness about sustainable resource management amongst stakeholders and policy-makers; and lack of a cohesive, inter-departmental government approach to management and development of resources within the zones.

The most over-exploited resource in the country is forests. Forests are overexploited because of Malawians' overdependence on biomass energy and forest-based livelihoods. It is estimated that 96% of

CASE STUDY: DEFORESTATION OF DZALANYAMA FOREST RESERVE

Dzalanyama forest reserve is located 60 km southwest of Lilongwe City, the Capital of Malawi, and its designated boundary covers 93,500 hectares (ha). The reserve is a catchment area for Lilongwe River and is a habitat of a number of bird species like Stierling's Woodpecker (*Dendropicos stierlingi*), Brown-necked Parrot (*Poicephalus robustus*) and the African Paradise-Flycatcher (*Terpsiphone viridis*). Despite all the ecosystem services it provides, Dzalanyama Forest Reserve is one of the most threatened natural ecological systems in Malawi due to tobacco curing, brick burning and firewood and charcoal selling (Munthali et al, 2012). The dominant land cover in the reserve between 1990 and 2000 used to be forest, wetlands and grassland. However, by 2008, bare land had taken over grasslands and wetlands as the second dominant land cover in the reserve. Observed trends indicate that the forest cover as of 1990 was 65,775 ha, of which 22,031 ha were lost by the year 2010. Sixty-four percent of this loss occurred between 2000 and 2008, where 73% of forest land was converted to bare land (Munthali et al, 2012). Figure 4 below highlights the land use changes that have occurred in Dzalanyama over the years.

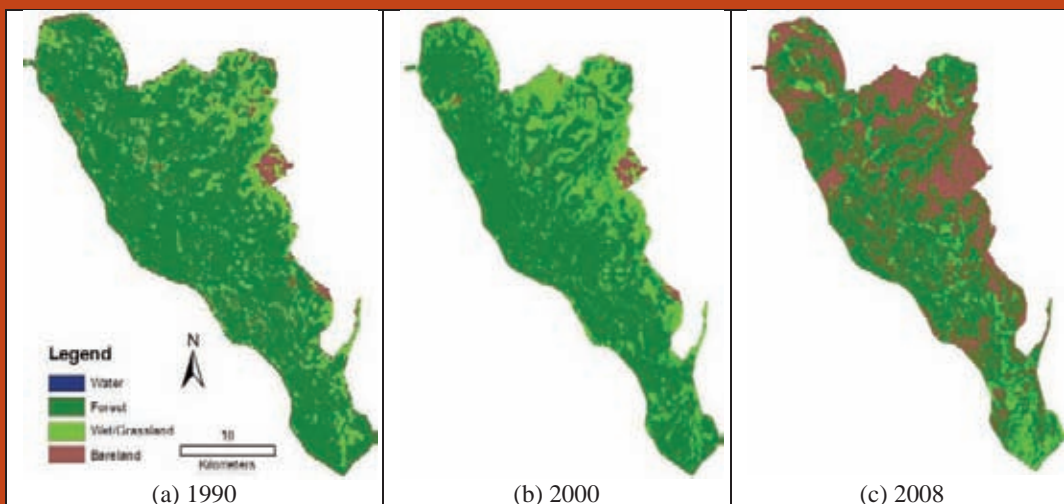


Figure 4: Land Cover Change In Dzalanyama Forest Reserve
Source: Munthali et al, 2012.

Dzalanyama forest reserve has suffered this loss because of its proximity to the urban area of Lilongwe, which heavily depends on this forest for charcoal and other forest products. It is predicted that forest loss in Dzalanyama will continue to occur if the causes of this loss remain unstopped and that in the future it will not be worth calling the reserve a forest reserve anymore. This requires the Government of Malawi to cease considering biodiversity loss as a rural problem, but also direct attention and resources to urban areas where demand for biodiversity resources is on the increase.

rural Malawians use firewood for cooking, whilst 43% of urban Malawians depend on charcoal for cooking (NSO, 2008). Of the amount of charcoal used in urban areas, the highest consumption was noticed in Lilongwe city, whose population growth rate is at 4.4%. Most of the charcoal to

this urban area comes from Dzalanyama Forest Reserve, which is one of the most threatened natural ecological systems in Malawi due to tobacco curing, brick burning, firewood and charcoal selling (Munthali et al, 2012). The overexploitation of forest resources has resulted in loss of

species important for use in traditional medicine, timber and food.

Another over-exploited resource in Malawi is fisheries. Fishermen bring about over fishing not only by increased fishing effort but also by the employment of destructive gears and techniques.

1.4.3 Invasive Alien Species

Ecosystems in the country have suffered the invasion of Alien Species, which are found in form of plants and animals. The number of known Invasive Alien Species (IAS) has increased in Malawi from 29 to 31 with the inclusion of black wattle and Eucalyptus bug. (GOM, 2010)

Water Hyacinth is the most notable and harmful IAS, widely spread in Shire River and other productive water bodies like wetlands. The weed has covered most parts of the lakes, blocking sunlight and hindering the growth of plankton, an important part of the food chain in aquatic ecosystems. In addition, water hyacinth is known for its detrimental effect on biodiversity by reducing oxygen content in the aquatic ecosystems. It also hinders economic development of the country by affecting generation of hydroelectric power and irrigation programs.

Terrestrial Alien Species, for example *Lantana camara*, are also affecting biodiversity through invasion of pasturelands, thereby outcompeting palatable species, resulting in a reduction in carrying capacity. In some cases when consumed in large doses, *Lantana camara* becomes poisonous, particularly to cattle. The thorny bushes also restrict access and movement of animals, humans thereby disrupting ecosystem functions.

Other IAS like *Pinus patula*, *Rubus ellipticus* (Himalayan raspberry) and *Pteridium aquillinum* (Bracken fern) are found on Mulanje Mountain. *Pinus patula* was introduced on Mulanje Mountain as a nursery crop to nurture the Mulanje cedar, but eventually it became necessary to maintain it in pure stands to increase timber production in Malawi. Over time, mature *Pinus patula* started shedding seed that germinated and became invasive, thereby hindering indigenous plant species growth. By June 2012 the Government, through the Mulanje Conservation Trust (MMCT), made a great achievement in the eradication of *Pinus patula*, and since 2010, over 300 hectares of pine have been cleared. Figure 5 below shows the hectareage of IAS cleared on Mulanje Mountain within a ten year period.

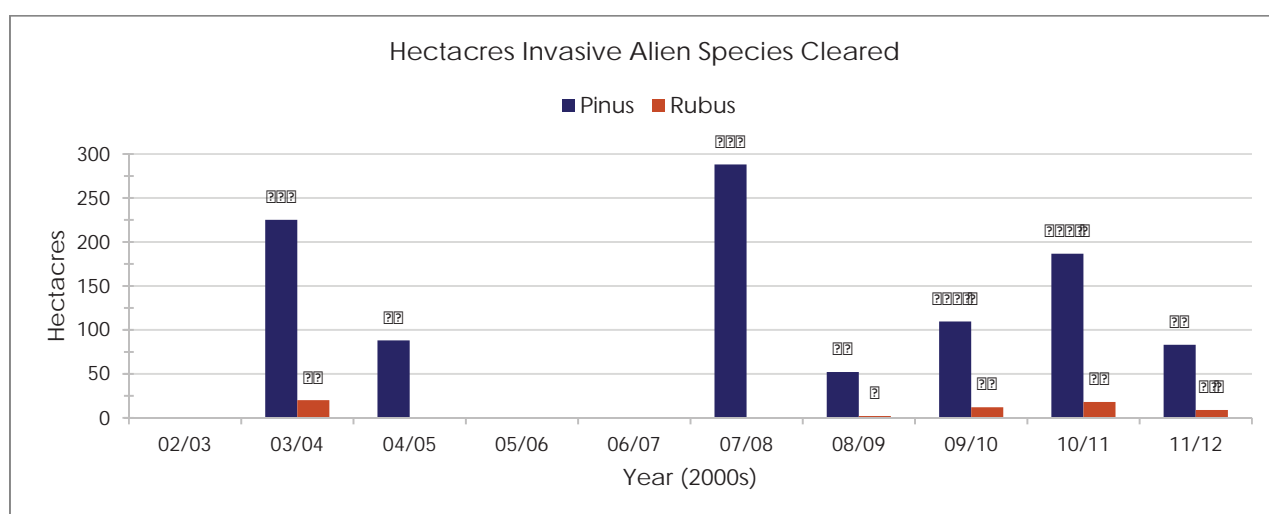


Figure 5: Invasive Alien Plant Species Clearing on Mount Mulanje

Invasive alien invertebrate species, including cassava mealy bug, cassava green mite, larger grain borer and spotted stalk borer, have caused great losses in agriculture. However, a comprehensive assessment of IAS has not been done in Malawi to identify their actual number and extent.

1.4.4. Pollution

Biodiversity in Malawi is also threatened by pollution from agricultural runoff, sewage and industrial wastes. Although the Malawi Government encourages use of organic fertilizers, the Farm Input Subsidy Programme (FISP), currently being implemented across the country, has increased the number of inorganic fertilizer users. Currently, over 70% of the farming population in Malawi uses inorganic fertilizers to enhance agriculture productivity. This type of reliance on agriculture chemicals has a negative ecological impact on biodiversity habitats like water and soil, which are continuously being contaminated.

Toxic substances and domestic or commercial sewage have also affected Malawi's biodiversity. Previous research on stream water and effluent from wastewater treatment plants in Blantyre revealed high phosphate levels ranging from 50 mg/l to 250 mg/l (Sajidu et al., 2007). These phosphate levels, which are likely to be higher now, stimulate excessive growth of plants and toxic cyanobacteria in stagnant receiving water bodies, hence posing a threat to aquatic life and water quality. A study to monitor concentrations of sulphate, sodium, magnesium, calcium, chloride, iron, nitrate and total dissolved solids in some rivers in Malawi showed that the concentration of parameters increased towards the dry season and that these chemicals were more pronounced in the intestines and the liver of most fish, threatening their survival (Kumwenda et al, 2012).

Pollution of rivers and other water bodies is also as a result of poor waste management in the cities. For example, only 30 percent of the total wastes generated (20,754 tonnes) in Lilongwe city is collected (UN Habitat, 2010) and the rest ends up in rivers or land where it is washed away when it rains. In some places like Kauma in Lilongwe, sewer wastes have been reportedly discharged into the rivers.

Although air pollution is not yet a big environmental problem in Malawi, generally, in major urban areas gaseous emissions from industries, car exhaust fumes as well as burning of old tires pollute the air. In the rural areas, uncontrolled bush-fires also pollute the air, apart from destroying vegetative cover. Air pollution also arises from quarrying and coal mining activities (GoM, 2008). With the increased scope of these activities, air pollution could be a serious problem for biodiversity in Malawi.

1.4.5 Climate Change

Malawi is vulnerable to adverse effects of climate change. Floods and droughts are the most common occurrences that affect biodiversity in the country. Climate change, together with other drivers like siltation, is responsible for the declining water levels or even drying up of water bodies, resulting in low fish production. Severe droughts that have occurred over the years have caused major fish habitats like the Lake Chilwa wetland to dry up, leading to losses in fish stocks.

Changes in the rainfall pattern have affected the growing period, making it difficult for indigenous crop varieties to survive. This has resulted in more people planting hybrid seed and other improved varieties, thus threatening the maintenance of indigenous seed varieties. For example, in 2012, 70% of land under groundnut cultivation was under improved varieties, most of which

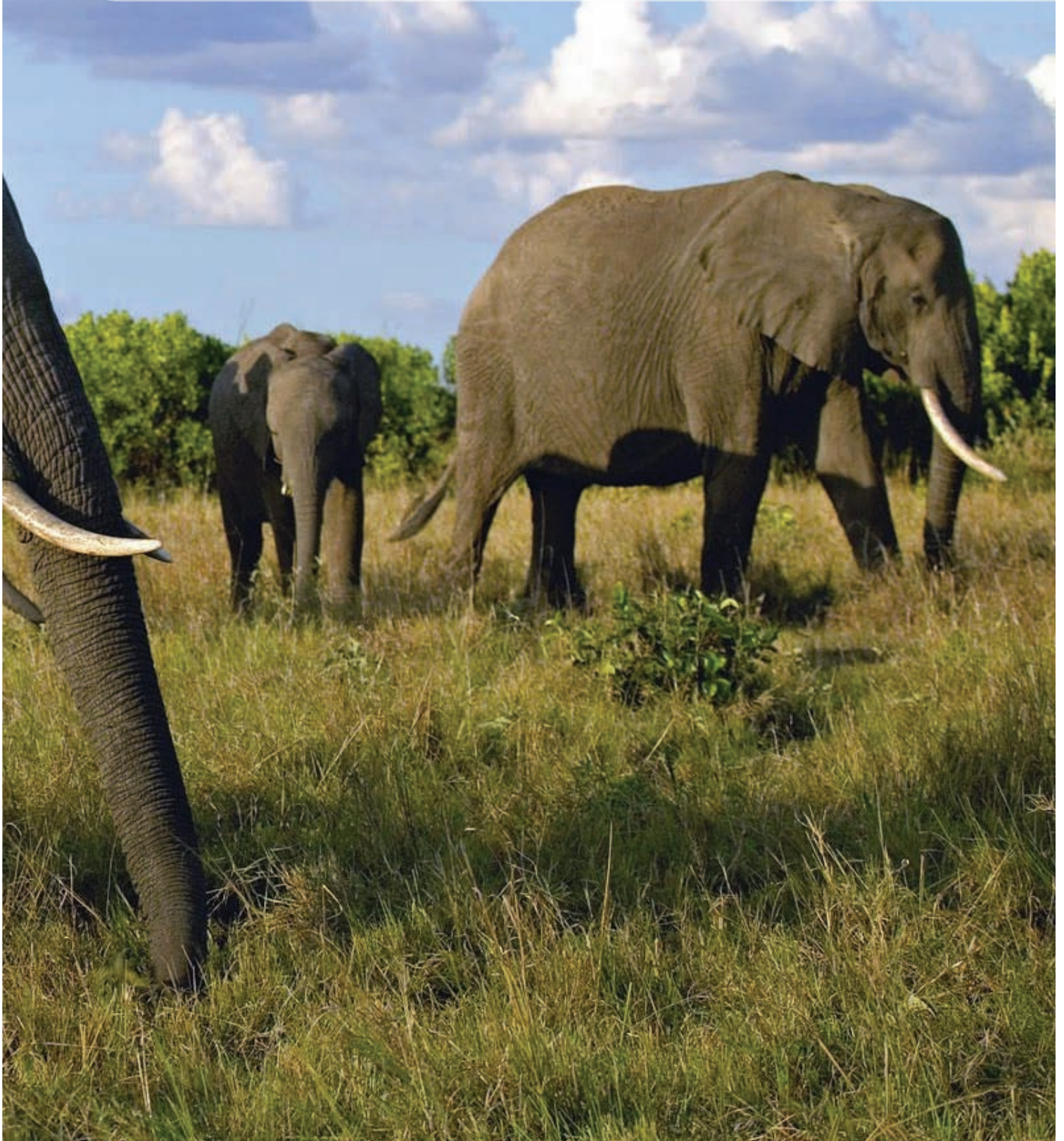
have a short maturation time, whilst only 30% land was under indigenous varieties (ICRISAT report, 2013). If this kind of trend continues in most crops, indigenous crop varieties that carry unique genetic traits could be eroded in the near future. In some instances, promotion of improved crop varieties to ensure high yields per hectare has led to genetic erosion, where improved varieties have completely replaced local varieties and landraces.

Although not scientifically proven, climate change impacts appear to affect Malawi's fragile ecosystems such as the montane forests. For instance, higher and previously cooler places on Mt. Mulanje have become warmer and species compositions are changing, allowing low-altitude plant species to flourish. This may have direct result in the loss or poor performance of species that were/are adapted to cold temperatures like the Mulanje cedar (Nangoma, per-com, 2014).



Chapter Two

The National Biodiversity Strategy and Action Plan, Its Implementation and Biodiversity Mainstreaming



2.1 OVERVIEW OF THE NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN

Malawi developed its first NBSAP in 2006 with an aim of improving the status of biodiversity through effective implementation of conservation programs for human wellbeing. The strategy has four goals that aim at highlighting Malawi's commitment for biodiversity conservation, sustainable use and equitable sharing of benefits arising from the use of the biological resources at national, regional and international levels. The goals are as follows:

- Actively protect, conserve and maintain protected areas, mountains and species within them; Promote restoration of degraded and vulnerable ecosystems and habitat recovery of rare and endemic species.
- Enhance sustainable use of biological diversity, including agricultural production through active protection and management of biological resources and support initiatives that encourage fair and equitable sharing of benefits arising from the use of the genetic resources.
- Enhance and improve the biodiversity knowledge base through research; Strengthen and build human and infrastructure capacity for effective information dissemination and research.
- Enhance community understanding and appreciation of biodiversity, and support coordinated community action and incentives to conserve and sustainably use biodiversity.

In order to achieve these goals the NBSAP has the following strategies that are being implemented in the country;

- Restore areas of degraded habitats and ecosystems and support initiatives and programs that have priority in

species restoration, conservation and sustainable use of biodiversity.

- Increase population and distribution ranges of rare and threatened species and prevent additional ones from becoming threatened.
- Design, develop and implement in situ and ex situ agrobiodiversity conservation programmes with full participation and involvement of local communities.
- Develop cost-effective invasive species management programmes.
- Raise the appreciation of the communities on the value of biodiversity in sustaining life.
- Strengthen the participation of communities and the private sector as equal partners in biodiversity conservation and sustainable use and equitable sharing of benefits.
- Build the capacity of institutions to collect, interpret, manage and disseminate quality and relevant biodiversity information and biological collections effectively and efficiently.




2.2 PROGRESS ON IMPLEMENTATION OF NBSAP

Malawi has made considerable progress in implementing the NBSAP since the Fourth National Report to the Convention on Biological Diversity in 2010. The following are some of the notable achievements;





- Promoted species and habitat restoration programs.
- Increased the population and distribution ranges of rare and threatened species.
- Designed and implemented in situ and ex situ agricultural diversity conservation programmes with full participation of local communities.
- Strengthened policies and legislation to enhance biodiversity conservation, sustainable utilization and benefit sharing.
- Developed cost-effective invasive

- species management programmes.
- Strengthened the participation of communities and the private sector as equal partners in biodiversity conservation and sustainable use and equitable sharing of benefits.
- Built the capacity of institutions to collect, interpret, manage and disseminate quality and relevant biodiversity information and biological collections effectively and efficiently.
- Strengthened the capacity of institutions to manage biodiversity information.







A detailed summary of the progress is presented in the tables below where each strategy and its associated output targets are measured. It should be noted that the targets in the first NBSAP had no clear indicators; as such, the level of achievement is aligned to the progress made. The level of achievement is presented with Red, Yellow and Green score as follows:






-  = Fully Achieved
-  = Partially Achieved
-  = Not Achieved





Tables 7 - 13: NBSAP Strategies, Outputs and Achievements

Strategy 1: Restore areas of degraded habitats and ecosystems and support initiatives and programs that have priority in species restoration, conservation and sustainable use of biodiversity.		
Output Target	Progress	Score
Biodiversity survey and assessment to identify habitats and ecosystems of high species diversity conducted.	Biodiversity Assessments have been conducted in Nyika National Park, Dzalanyama Forest Reserve, Mulanje Mountain, Bua Watershed Area and Elephant Marsh. In Nyika National Park, the study focused on status and trends of large mammals that include: elephants, buffaloes, hippopotamus, roans and sable. The study established that the park had a total of 1,633 large mammals in 2013, as compared to 1,104 in 2009.	
	A biodiversity survey on species diversity was conducted in Dzalanyama Forest Reserve. The survey established that 189 plant species exist in the reserve. An assessment on birds in Mulanje Mountain revealed that there are a total of 93 bird species inhabiting the mountain. The mountain has been classified as an important bird area. The country has also identified Bua, Linthipe and North and South Rukuru river mouths as spawning areas for Mpsa (<i>Opsaridium microlepis</i>) fish species. Efforts are being made to protect these river mouths.	
Sectoral policies and legislation related to biodiversity conservation harmonized.	The Forestry Policy has been reviewed and has integrated issues of biodiversity management such as Reducing Emissions from Deforestation and Forest Degradation (REDD+) and Payment for Ecosystem Services (PES).	
	The Climate change policy has been developed. It promotes REDD+, PES, Biodiversity Offset and Clean Development Mechanisms (CDM) activities.	



Fifth National Report to the Convention on Biological Diversity




Strategy 1: Restore areas of degraded habitats and ecosystems and support initiatives and programs that have priority in species restoration, conservation and sustainable use of biodiversity.		
Output Target	Progress	Score
Strategies and programmes for restoring habitats developed and implemented;	A management plan for restoration of Mulanje Cedar in Mulanje Mountain was developed and implemented. A total of 187.9 hectares of land has been planted with Mulanje Cedar.	
	A plan has been developed to create a conclusive corridor of wildlife between Liwonde National Park, Mangochi Forest Reserve and Namizimu Forest Reserve. The plan is aimed at restoring the habitat between these protected areas.	
	Government is promoting Public-Private Partnerships (PPP) to help in restoring and protecting degraded habitats. For example, African Parks Limited is in a concession agreement of 25 years from 2003 to restore and manage Majete Wildlife Reserve. To date, 2,559 animals, including 217 elephants, have been stocked into the reserve.	
	Government is implementing collaborative management in protected areas with communities where revenue collected is shared between government and communities. The communities are trained on sustainable use of the resources within the protected areas and are also encouraged to embark on other mechanisms to generate income for their livelihood such as bee keeping. This arrangement is promoting conservation of biodiversity within the fringes of the protected areas	
Programs for sustainable utilization of biodiversity promoted.	Guidelines for Sustainable Use of Biodiversity have been developed. The guidelines promote conservation and sustainable use of biodiversity in Malawi and ensure that elements of biodiversity that are important in the functioning of various ecosystems and in the sustenance of livelihoods of local communities are enhanced and maintained. The guidelines also seek to promote understanding among stakeholders on how a healthy balance of these ecosystem elements can be achieved at the national level.	
	Government is implementing a number of programs to promote sustainable utilisation of biodiversity for example: <ul style="list-style-type: none"> • Government is promoting a rural electrification program that reduces dependence on fuel wood as a source of energy for cooking and lighting. For example, Mulanje Mountain Conservation Trust is implementing a small-scale electrification project in Mulanje and Phalombe districts. • LEAD SEA and World Fish Centre are training communities on sustainable utilization of natural resources with Lake Chilwa Basin through the Lake Chilwa Basin Climate Change Adaptation Program. • Promotion of programmes on aquaculture to meet demands for fish. 	







Strategy 2: Increase the population and distribution ranges of rare and threatened species and prevent additional ones from becoming threatened.		
Output Target	Progress	Score
The National Red Data List updated.	National Herbarium and Botanical Gardens of Malawi is conducting surveys on plant species to update the National Red Data List.	
Connectivity between protected areas increased.	Plans have been developed to connect the following protected area: <ul style="list-style-type: none"> • Lengwe - Mwabvi - Matando corridor, • Mangochi - Liwonde corridor, • Nyika Malawi - Nyika Zambia corridor, • Musalungu - Vwaza corridor 	
Species that have been locally extinct in some wildlife reserves reintroduced.	Elephants, rhinos and leopards have been restocked in Majete Wildlife Reserve. Currently, the Wildlife Reserve has 217 elephants, 12 rhinos, nine leopards and five lions.	
Strategies to manage threatened and endangered species developed and implemented.	Management plans for restoration of lion and rhino species have been developed and are being implemented. Currently, lion and rhino species have been re-introduced in Majete Wildlife Reserve.	
	Through the Mulanje Cedar restoration program, research is being conducted to identify other areas that can be favourable for growing Mulanje Cedar to expand it forestation in Zomba mountain and Nyika plateau.	



Strategy 3: Design, develop and implement in situ and ex situ agrobiodiversity conservation programmes with full participation and involvement of local communities.		
Output Target	Progress	Score
Collect all agro-biodiversity species, including their wild relatives, threatened and/ or endangered species, with full participation of communities and preserve them on farm, in field gene banks, seed banks and botanic gardens.	A draft Agrobiodiversity Strategy has been developed. The Strategy will enhance conservation of biodiversity.	
	Malawi Plant Genetic Resources Centre (based at Chitedze Agricultural Research Station) is holding 2,344 seed and 169 vegetative samples for future use. Furthermore, community seedbanks have been established in various districts for storage of local seed varieties.	
	Other players like ICRISAT, SARNNET also collect and store genetic resources. e.g A total of 7,000 lines of groundnuts are kept in the gene bank at ICRISAT addressing different stresses depending on the different types of environments like droughts.	
	Satellite ranches for animal genetic resources like Dzalanyama, Diamphwi, Likasi, Thuchila and Dwambadzi were re-established to conserve animal genetic resources.	

Fifth National Report to the Convention on Biological Diversity

Strategy 4: Develop cost-effective invasive species management programmes.		
Output Target	Progress	Score
Programs to monitor and prevent the spread of invasive species in ecosystems, including early detection and coordinated management efforts at the community, national and regional levels, developed and implemented.	Government is developing an inventory of IAS. This will enhance the conservation of important biodiversity species by identifying and developing programs to control them. Malawi is observing and appropriately monitoring incidences of new IAS and informing the public. Currently, Blacken Fern and its pathways have been identified in Nyika Plateau and programs are being developed to control and eradicate it.	
	Management plans to eradicate <i>Pinus patula</i> , which competes with Mulanje Cedar, were developed and implemented. Since 2010, over 300 hectares of pine have been cleared and have been completely eradicated.	

Strategy 5: Raise the appreciation of the communities on the value of biodiversity in sustaining life.		
Output Target	Progress	Score
An effective public awareness strategy developed and implemented.	The country has developed effective communication strategies to increase community awareness on biodiversity. For example, a National Environment and Climate Change Communication Strategy was developed in 2011 and is being implemented. The strategy enhances biodiversity conservation by promoting public awareness and participation in conservation programs.	
	Biodiversity programs are being aired on radio and television as one way of implementing the strategy. Learning support materials were developed and distributed to schools enhance knowledge and participation on biodiversity management. In addition, policy briefs have been developed to enhance decision making in biodiversity management.	
	A Biodiversity Clearing House Mechanism was developed and operationalised. The mechanism enhances exchange of information on biodiversity conservation. It is accessible on www.chmmw.org .	

Strategy 6: Strengthen the participation of communities and the private sector as equal partners in biodiversity conservation and sustainable use and equitable sharing of benefits.		
Output Target	Progress	Score
The involvement of the local communities, local leaders and NGOs in decision-making regarding the management of biological diversity and ecosystems through village natural resources management committees promoted.	Decentralized Environmental Management Guidelines were revised in 2012. The revised guidelines are an important tool for stakeholders at the local level to report on the state and trends of biodiversity. The guidelines are also important for sustainable biodiversity management.	
	Communities and NGOs participate in decision-making processes for different biodiversity components that affect them. For example, the Environmental Impact Assessment (EIA) process promotes public consultation before implementation of development projects.	
	A number of NGOs are implementing programmes on biodiversity conservation. These include: RIPPLE Africa, Total Land Care, WESM, CURE and others. For example, Total Land Care is implementing the KULERA Biodiversity Project, which is aimed at improving biodiversity in selected protected areas in Malawi and the livelihoods of rural communities living around their borders.	
Biodiversity management integrated in school curricula.	Biodiversity has been integrated into secondary school curriculum	
	An Upper Primary School Teachers Guide on Biodiversity was developed by the Lilongwe Wildlife Centre to strengthen the capacity of teachers in teaching biodiversity management. The guide is being used resource book for teachers in primary schools in Lilongwe district.	
	A Learner's guide on birds of Lake Chilwa was developed by WESM in 2012. The guide provides information of local and migratory birds.	

Strategy 7: Build the capacity of institutions to collect, interpret, manage and disseminate quality and relevant biodiversity information and biological collections effectively and efficiently.		
Output Target	Progress	Score
Develop human and institutional capacity to identify, monitor and manage biodiversity.	Institutions of higher learning in Malawi are offering programs on Biodiversity Management. For example, Mzuzu University, LUANAR and University of Malawi are offering programmes on Environmental Management, in which Biodiversity Management is a core course.	
	LUANAR is implementing a Fish Node Project that aims to build capacity of Fish Taxonomists, in partnership with international universities. The Project has trained five students at master's level and one at PhD level.	

2.3 EFFECTIVENESS OF THE NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN

The NBSAP has been used as a guiding document for institutions working on biodiversity management. From the NBSAP implementation progress presented in the previous tables, it seems that positive progress has occurred in implementing some of the strategies that were outlined in the first NBSAP. Conservation projects have been under development as joint or individual efforts by government and non-governmental organisations. There has also been a significant number of conservation strategies and programmes for specific biodiversity components that have been developed as a step towards implementation of the strategy. Three government organisations already report that they have strategies in place for biodiversity conservation and management. Two are quite far in the process of developing strategies and according to the report, the Ministry of Agriculture and Irrigation is far ahead in developing its Agrobiodiversity Strategy. Clear progress has also been made in the advancement of Public-Private Partnerships in National Parks, which has led to the quick reintroduction and restocking of over four important species of animals in Malawi.

Although there has been significant progress in implementing of some of the NBSAP's planned actions, there are some areas that have not been effectively implemented. For example, the target for updating the Red Data list has not been met, although some work has been done to identify hot spots and species with conservation importance. Similarly, the target to develop programmes to monitor and prevent the spread of Invasive Alien Species (IAS) has not been met, although steps are being taken to start the process. In some instances, actions to implement the strategy have been progressing very

slowly. For example, actions on fishery management, including fisheries inside protected areas and management plans for commercially exploited fish species, are progressing very slowly and there will be need for more action in these areas.

Due to inadequate data, it is difficult to draw conclusions on the implementation of the NBSAP. Information on the status and trends of some components of biodiversity, like microorganisms and IAS, was not adequate and not much information was generated on the activities that have been taking place in these sectors. Another difficulty in assessing the status of the NBSAP's implementation is the fact that many of the biodiversity actions were not well defined and there were no clear targets or indicators to assess whether the actions have been completed or not. The NBSAP did not have a monitoring and evaluation framework or coordination mechanisms in place, which affected the way the strategy was implemented and monitored. Further, resources were inadequate to enable implementation of the activities in the strategy.

If any conclusions can be made about the scores from the sectors reflected in the previous tables, it is that the status of biodiversity in those sectors is not promising and there is need to do much more. The revised NBSAP took most of the issues into consideration and developed coordination mechanisms, a resource mobilization strategy and a monitoring and evaluation framework to ensure effective implementation of the NBSAP II.

2.4 BIODIVERSITY MAINSTREAMING

The Malawi Millennium Development Goals Assessment Report (2013) identified that loss of biodiversity and degradation of natural resources are some of the barriers to the achievement of Millennium Development Goals. This is because sectors like agriculture, energy, trade,

manufacturing and irrigation that have a potential to promote economic development and reduce poverty are greatly affected by biodiversity loss. At the same time, actions taken to attain economic development and poverty reduction contribute to biodiversity loss. The inclusion of biodiversity as a priority in the Malawi Growth and Development Strategy II (MGDS II) is a step towards preventing biodiversity loss.

Apart from the MGDS II, considerations for biodiversity have been integrated in most Government sectoral policies, especially those that trigger land use changes like agriculture, land, irrigation and mining policies. These sectors are required by law to conduct Environmental Impact Assessments (EIA) prior to implementing projects that have potential impacts on biodiversity. These sectors have thus incorporated these requirements into their policies by providing the need to reduce negative impacts on biodiversity when implementing their activities. Some sectors have even gone further to produce sectoral strategies on how they will conserve biodiversity. For example, the Agriculture sector has produced the draft Agrobiodiversity Strategy, which highlights how the sector will conserve biodiversity. Furthermore, the Malawi Plant and Genetic Resource Center, under the Ministry of Agriculture and Food Security, is a custodian of plant gene bank. The Irrigation Sector, on the other hand, through national programmes like the Irrigation, Rural Livelihoods and Agriculture Development (IRLAD), implements environmental safeguards that promote biodiversity conservation.

In addition, the Government of Malawi Decentralized Environmental Management Guidelines integrates biodiversity considerations in the District Environmental Plans. Local Environmental Committees are engaged in formulation of these plans, which form part of the

District Development Plan. Through these plans, biodiversity is implemented in all sectors at the local level. As such, projects from other organizations are scrutinized at local level to ensure that they do not have negative impacts on biodiversity. Furthermore, Lilongwe City Council is developing a Local Biodiversity Strategy and Action Plan (LBSAP) that highlights particular species and habitats to be protected in the city and how biodiversity and development can go together with the city's development activities.

2.5 INTERNATIONAL COMMITMENTS

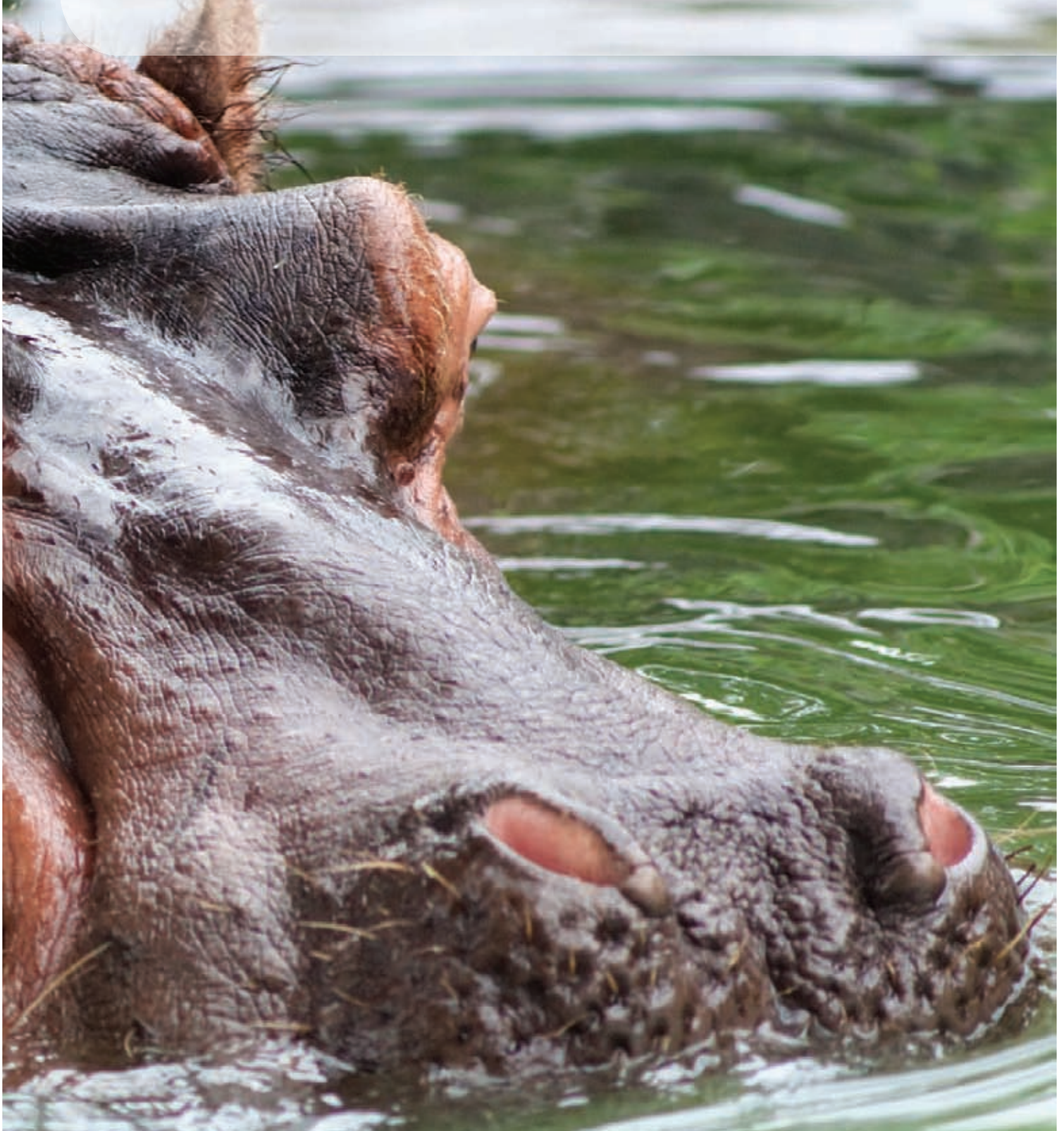
Malawi is party to several international and regional environmental conventions, treaties and protocols. Apart from CBD, Malawi signed the following conventions that are related to biological diversity:

1. Convention on Wetlands (Ramsar Convention).
2. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
3. Convention on the World Heritage Sites.
4. United Nations Framework Convention on Climate Change (UNFCCC).
5. The Convention to Combat Desertification and Drought.
6. International Treaty on Plant Genetic Resources for Food and Agriculture.
7. Montreal Protocol on the Protection of the Ozone Layer.
8. Convention on International Plant Protection.
9. United Nations Convention on the Law of the Sea.
10. Protocol on Shared Watercourse Systems and Revised Protocol on Shared Watercourses.
11. Protocol on Wildlife Conservation & Law Enforcement.
12. SADC Policy and Strategy for Environment and Sustainable Development.



Chapter Three

**Progress Towards the 2020 AICHI
Biodiversity Targets and Contributions
to the Relevant 2015 Targets of the
Millennium Development Goals**



3.1 INTRODUCTION

Malawi has revised its first NBSAP in line with the Aichi Biodiversity Targets. The revised strategy serves as a plan of action for the period 2014 - 2020 and has been prepared through a consultative process involving government ministries, research organizations, NGOs, the private sector and community-based organizations. The NBSAP II has five strategic objectives that are aimed at promoting biodiversity conservation and its sustainable use. These objectives are to:

1. Improve capacity and knowledge on biodiversity issues.
2. Mainstream biodiversity management into sectoral and local development plans.
3. Reduce direct pressures on biodiversity.
4. Safeguard ecosystems, species and genetic diversity.
5. Enhance access and benefit sharing from biodiversity and ecosystem services.

The strategic objectives have 13 national targets that were formulated in line with the Aichi Targets, as follows:

1. By 2020, human and institutional capacity for science and technology related to biodiversity is improved.
2. By 2015, sustainable financing mechanisms for effective implementation of biodiversity programmes developed.
3. By 2020, traditional knowledge, innovations and practices of local communities are respected and harnessed in line with national and international legislation.
4. By 2020, biodiversity values are integrated into national, sectoral and local development policies and plans.
5. By 2020, at least 50% of the Malawi population is aware of the values of biodiversity to ensure its conservation and sustainable use.

6. By 2020, at least 50% of the degraded terrestrial habitats are restored and protected.
7. By 2020, aquatic biodiversity is managed and harvested sustainably within safe ecological limits.
8. By 2020, area under forest cover is increased by 4% and managed sustainably, ensuring conservation of biodiversity.
9. By 2020, invasive alien species and their pathways are identified and prioritized for control and prevention from movement and spreading in and out of the country.
10. By 2020, pollution is reduced to minimize ecosystem degradation and biodiversity loss.
11. By 2020, anthropogenic pressures on vulnerable ecosystems are minimized, thereby improving ecosystems' resilience to climate change.
12. By 2020, the extinction of known threatened species is prevented and their conservation status is improved and sustained.
13. By 2020, the genetic diversity of domesticated plants and animals; and their wild relatives is maintained and safeguarded.

3.2 PROGRESS TOWARDS ACHIEVEMENT OF THE 2020 AICHI BIODIVERSITY TARGETS

Malawi, as a party to the CBD, is implementing various biodiversity programmes in order to improve its status in accordance with the Global Strategy for Biodiversity and the Aichi Targets. This section reports on the progress made towards implementation of the NBSAP II. The progress is reported by indicating what actions have been conducted to achieve the targets outlined under each strategic goal.

Strategic Goal 1: Capacity and knowledge on biodiversity issues improved

By 2020, human and institutional capacity for science and technology related to biodiversity is improved

Malawi has made some progress to improve human and institutional capacities related to biodiversity management. Higher learning institutions such as Mzuzu University, LUANAR and University of Malawi have introduced courses and programs on biodiversity. For example, LUANAR is implementing a Fish Node Project that aims at building capacity of Fish Taxonomists, in partnership with international universities. The Project has so far trained four students in a Master's program on biodiversity. Other institutions such as NCST, MEET, MMCT and World Fish Centre have promoted research and trainings on biodiversity conservation.

By 2015, sustainable financing mechanisms for effective implementation of biodiversity programmes developed

Malawi has developed a resource mobilization strategy that is promoting investment opportunities on biodiversity management. The strategy is a key instrument for mainstreaming biodiversity management in the national development agenda. The strategy promotes Public-Private Partnerships on management of biodiversity resources. For example, African Parks Limited has a concession with the government to manage Majete Wildlife. This arrangement has improved the management of biodiversity resources in the reserve and it has also increased revenue collection.

In addition, government is developing regulations on Access and Benefit sharing. The regulations will promote revenue collection through issuance of licenses.

By 2020, traditional knowledge, innovations and practices of local communities are respected and harnessed in line with national and international legislation

Malawi is implementing various programs on traditional knowledge practices. For example, the Forestry Research Institute of Malawi (FRIM) is implementing a Useful Plants of Malawi project, where traditional knowledge is used to identify plants that are useful for nutrition, cosmetics and pharmaceuticals. It also identifies threatened species and aims to restore them. Furthermore, government, through the Museums of Malawi, is conducting an inventory of plants and their associated traditional knowledge in Khuruvi Forest. The inventory will determine the designation of the forest as a national heritage site.

Strategic Goal 2: Biodiversity mainstreamed in national, sectoral and local development plans

By 2020, biodiversity values are integrated into national, sectoral and local development policies and plans

Biodiversity-related issues have been mainstreamed in a number of development strategies, policies and plans in the country. The Malawi Growth and Development Strategy II (2011-2016), which is the overarching development strategy for Malawi, has prioritized biodiversity management programs among other socio-economic and environmental issues. Other Environment and Natural Resources Management (ENRM) sectoral policies that have embraced biodiversity concerns include the Climate Change Policy and Forestry Policy, which have been

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developed and/or revised recently. In addition, government, through the Ministry of Education, has spearheaded the integration of biodiversity into the secondary school curriculum.

At the local level, the Lilongwe City Council has developed a Biodiversity City Profile. The city is also developing Local Biodiversity Strategy and Action Plan (LBSAP). The LBSAP highlights particular species and habitats to be protected and conserved.

Other sectors have also developed strategies that integrate biodiversity include the Forest Biodiversity Strategy and the Strategy for Plant Genetic Resources for Food and Agriculture, among others. In addition, government, through the Environmental Affairs Department, developed an Environmental Sustainability Criteria and Monitoring and Evaluation Frameworks in 2010 to mainstream environmental considerations into policy and planning processes and track progress towards achieving MGDS and MDGs.

By 2020, at least 50% of the Malawi population is aware of the values of biodiversity to ensure its conservation and sustainable use

Malawi is implementing programs that promote participation of all stakeholders on biodiversity management. Recently, a National Environment and Climate Change Communication Strategy (2012-2016) was developed with the aim of increasing public awareness and promoting positive behavioral change for sustainable development. So far, programs on biodiversity are being aired on the national television and radio stations. Learning support materials were developed and distributed to enhance knowledge and participation

on biodiversity management. In addition, policy briefs have been developed to enhance decision making in biodiversity management.

The private sector is also taking part in disseminating information to the public on biodiversity issues. For example, WESM has promoted the establishment of wildlife clubs and CBOs in schools and communities to promote conservation of biodiversity in their areas.

Strategic Goal 3: Direct pressures on biodiversity reduced.

By 2020, at least 50% of the degraded terrestrial habitats are restored and protected

Government is implementing various programs aimed at restoring and protecting terrestrial habitats. The PPP arrangement that government signed with the African Peace Parks to restore and manage Majete Wildlife Reserve has assisted in restoring the degraded habitats within the reserve.

The government developed and implemented habitat restoration management plans for Mulanje Mountain and Dzalanyama Forest Reserves. The habitats within these forest reserves have been restored; for example, 66 hectares of land in Mulanje Mountain Forest Reserve has been planted with Mulanje Cedar.

Furthermore, government is implementing collaborative management with communities in the fringes of protected areas such as the Nyika-Vwaza Conservation Area and Liwonde and Kasungu National Park. The program is enhancing conservation of biodiversity through reduced poaching and deforestation. Kandole Hill in Nkhata Bay district was designated a protected area

using community bylaws.

Other efforts included the implementation of environment and natural resource management legislations. According to EMA, 1996, prescribed development projects undergo Environmental Impact Assessments before implementation to ensure environmental sustainability. This provision has helped to reduce environmental impacts on habitats.

By 2020, aquatic biodiversity is managed and harvested sustainably within safe ecological limits

Malawi has promoted and implemented programs that have improved the management of aquatic biodiversity. The programmes include enforcement of regulations for sustainable fishing, promotion of aquaculture and demarcation of bird conservation areas (restricted bird sanctuaries) on Lake Chilwa wetland to protect bird breeding sites.

Government also enhanced protection of rivers that have important biodiversity, including the Bua, Linthipe, North and South Rukuru river mouths that are spawning areas for mpasa fish species.

By 2020, area under forest cover is increased by 4% and managed sustainably, ensuring conservation of biodiversity

Malawi has been promoting and implementing afforestation programs. One program implemented on annual basis is the national tree planting season. In the 2011-2012 tree planting season, the government of Malawi planted 60 million trees. Most species are indigenous, endangered and of high value.

In order to complement government efforts, some NGOs are supporting biodiversity conservation programs. For example; RIPPLE Africa (Recognizing Individual Potential and Promoting Local Education in Africa) is working with communities to reduce deforestation through use of energy-efficient cooking stoves (changu changu Moto Stoves) and formulation of bylaws to protect community forests.

By 2020, Invasive alien species and their pathways are identified and prioritized for control and prevention from movement and spreading in and out of the country

Government, through the Environmental Affairs Department, is establishing an inventory of Invasive Alien Species. This will enhance the conservation of important biodiversity species by identifying and developing programs to control them. Currently, Malawi is observing and appropriately monitoring incidences of new IAS and informing the public. For example, Blacken Fern and its pathways have been identified in Nyika Plateau and programs are being developed to control and eradicate it. Similar effort has been implemented in Mulanje, where the management plans to eradicate *Pinus patula*, which competes with Mulanje Cedar, were developed and implemented. Since the year 2010, over 300 hectares of pine have been cleared and completely eradicated.

By 2020, pollution is reduced to minimize ecosystem degradation and biodiversity loss

Government approved protocols to implement the polluter pays principle. The polluter pays principle requires that all cost

of pollution and damage caused should be borne by the polluter. The rationale is to curb the level of environmental degradation caused by the polluters by holding them accountable to their actions. This will help to minimize ecosystem degradation and hence contribute to conservation of biodiversity. Similarly, government has issued a ban on the production and importation of thin plastics. The ban targets plastics with thickness of less than 60 micron meters.

By 2020, anthropogenic pressures on vulnerable ecosystems are minimized, thereby improving ecosystems resilience to climate change

Programmes on reducing pressures on vulnerable ecosystems are being promoted and implemented by government and the private sector. For example, LEAD SEA is implementing a Lake Chilwa Basin Climate Change Adaptation Programme where communities are being trained on sustainable management of the Lake Chilwa Basin. The Lake Chilwa Basin Climate Change Adaptation Programme is also promoting solar drying for fish, as well as energy-saving fish smoking kilns that reduce use of firewood by 60%.

Strategic Goal 4: Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

By 2020, the extinction of known threatened species is prevented and their conservation status is improved and sustained

Programs to conserve threatened species have been developed and implemented. For example, elephants were extinct in

Majete, and Government translocated elephants from Phiri, Longwe to the Reserve for conservation. In addition, conservation of the remaining elephant population in Thuma Forest Reserve has been strengthened by the construction of a solar-powered electric fence and beehive fence by LEAD SEA.

By 2020, the genetic diversity of domesticated plants and animals and their wild relatives is maintained and safeguarded

Government, through Malawi Plant Genetic Resources (MPGRC), which is the lead institution in the in situ management of plant genetic resources for food and agriculture in Malawi, is implementing a number of initiatives for sustainable management of agrobiodiversity. Currently, government is developing an Agrobiodiversity Strategy that prioritizes issues of agrobiodiversity. The Malawi Plant Genetic Resources Centre is holding 3,540 seed and 516 vegetative samples for future use. Furthermore, community seed banks have been established in various districts to store local plant varieties. Similarly, satellite ranches for livestock genetic resources like Dzalanyama, Diamphwi, Likasi, Thuchila and Dwambadzi were established to conserve animal genetic resources.

Government, through the Forestry Research Institute of Malawi (FRIM), operates a seed center whose overall goal has been the provision of high-quality tree seeds in sufficient quantities. These are mostly indigenous species, but in some cases also include other commercially useful species.

To complement government efforts, other non-state actors are implementing similar activities to preserve agrobiodiversity. For example, a total of 7,000 lines of

groundnuts are kept in the gene bank at ICRISAT addressing different stresses depending on the different types of environments, like drought.

Strategic Goal 5: Enhance the benefits to all from biodiversity and ecosystem services

By 2015, Malawi has developed, adopted as a policy instrument and commenced implementing an effective participatory and updated NBSAP

Malawi has revised its first NBSAP in line with the global biodiversity strategy and the Aichi Targets. The revised strategy will guide on implementation of biodiversity programmes in the country.

3.3 PROGRESS TOWARDS ACHIEVING MILLENNIUM DEVELOPMENT GOALS

Malawi adopted the Millennium Development Goals (MDGs). A full review of progress towards meeting these goals will not be presented in this report. However, Target 9 of Goal 7 of the MDGs is relevant to biodiversity as it requires integration of the principles of sustainable development into policies and programmes and reversing the loss of environmental resources.

Malawi has made substantive progress to achieve the millennium development goals (MDGs) by 2015 through the implementation of the MGDS II, which covers the period 2011 to 2016. The 2013 assessment on progress achieved in attaining the eight MDGs showed some progress in achieving Goal 7. Table 14 below summarizes the status of achievement of the MDGs.

Malawi has made considerable efforts through the implementation of the NBSAP to achieve environmental sustainability. Through efforts by government and non-state actors to conserve biological diversity, Malawi would have achieved environmental sustainability by 2015. However, very high population growth places great pressure on the country's natural resources resulting in the decrease in forest cover as well as biodiversity loss.

Table 14: Malawi's Progress Towards Achieving Goal 7 of the MDGs

Goal/Target	Indicator	Current Status (as of 2013)	2015 Target	Feasibility of Achieving Goal
Ensure Environmental Sustainability	Proportion of land covered by forests	36.2%	50%	Not likely to be met
	Proportion of area protected to maintain biological diversity	0.16%	0.18%	
	Proportion of population using solid fuel	98%	0%	



CONCLUSION

The report has shown that Malawi has a lot of ecosystems, biological resources and the highest fish diversity in the world. The Table 15 below highlights some of the records present on the available number of species in Malawi as indicated in this report.

The table indicates some of the records of the number of species of plants and animals in Malawi. While this does not mean that Malawi is adequately surveyed, the information indicated below shows the gap in information and the need to consolidate more data for monitoring species and ecosystems. In Malawi, biodiversity conservation requires improving the status of biodiversity by dealing with habitat loss, overexploitation, invasive alien species, pollution and the impacts of climate change on ecosystems. The NBSAP has been used as a guiding tool in implementing strategies to prevent further loss of biodiversity caused by these threats. Through implementation of NBSAP, local communities have been sensitized on the importance of biodiversity, which has promoted their participation in biodiversity conservation and sustainable use. Success has also been made in mainstreaming biodiversity considerations into national programmes and plans.

The progress in implementing the NBSAP met barriers like inadequate coordination

amongst sectors that are implementing the Convention, affecting dissemination of biodiversity-related information and making it difficult for stakeholders to implement their activities in line with the objectives and actions provided in the NBSAP. Most recently, the revising of the first NBSAP to align it to the Aichi Targets has sets forth new directions and parameters for sustainable management of biodiversity in the country. It has refined the strategic goals for biodiversity, clearly defined monitoring indicators and proposed how resources are going to be mobilized.

To make the best out of biodiversity interventions, therefore, framework legislation on biodiversity should be formulated to strengthen coordination of biodiversity issues. In addition, an appropriate Communication, Education and Public Awareness strategy has to be prepared for the revised NBSAP.

Table 15: Ecosystem Diversity in Malawi

	Total Species	Endemic Species	Threatened Species
Plants	>6,000	122	245
Mammals	192	Not known	8
Birds	630	1	16
Amphibians	83	6	12
Reptiles	145	8	8
Fish	>850	800	Not known
Insects	8,770	Not known	8
Microorganisms	700	Not known	Not known

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APPENDIX 1


A. PROCESS OF PREPARATION OF NATIONAL REPORT

A task force team of ten members led by officers from the Environmental Affairs Department of Malawi, the biodiversity coordinating office, was created to prepare this report. The task force conducted literature review, a data collection exercise, data analysis and consolidation of the report. Literature from government documents, research papers and other relevant documents was undertaken to get an overview of past and present activities on biodiversity conservation and management in Malawi. This provided a basis for determining methodologies for data collection and sources of the missing information.

To ensure a more accurate and comprehensive reflection of the views and priorities of national stakeholders, the following stakeholders were consulted: universities (University of Malawi, Mzuzu University and LUANAR); Government departments (Forestry Department, Department of National Parks and Wildlife, National Herbarium and Botanic Gardens of Malawi, Fisheries Department, Forestry Research Institute of Malawi, Museums of Malawi, National Commission for Science and Technology, Department of Agricultural Research Services, Crops Department, Department of Animal Health and Industry; international organizations like USAID, FAO, Norwegian Embassy, JICA; NGOs (e.g. Wildlife and Environment Society of Malawi, Malawi Environment Endowment Trust, Mulanje Mountain Conservation Trust, Coordination Union for the Rehabilitation of the Environment, World Fish Centre, ICRISAT, RIPPLE Africa, Centre for Environmental Policy and Advocacy; and the private sector, like African Parks Majete and Lilongwe Wildlife Centre. These stakeholders verified information collected and provided additional information to update information from literature. Information from stakeholders and the literature was used to prepare a draft report.

The draft report was discussed at a stakeholder's workshop, which was attended by members of the National Biodiversity Steering Committee and representatives of key biodiversity institutions. From this workshop, final comments and contributions were made on the report and an endorsement was made by the committee to submit the draft report to UNEP.

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Submission	
Signature of officer responsible for submitting national report	
Date of submission	July 22, 2014

C. FURTHER SOURCES OF INFORMATION

- <http://www.chmmw.org> (Malawi Clearing House Mechanism)
- Malawi Poverty Initiative Economic Report May 2010 (Yaron et al, 2010)



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