Malawi Fourth Country Report

To the Convention on Biological Diversity (CBD)

Environmental Affairs Department
Ministry of Natural Resources, Energy and Environment
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Executive summary

Malawi is a land locked country in Southern Africa, located between Mozambique to the East and South, Tanzania to the North and Zambia to the West. The population is estimated to be 13 million people with a growth rate of 2.2%. About 85% of the population is rural and the rest is urban. Thus, making Malawi the least urbanised country in Africa.

The temperature ranges from 12 to 32^{o}C but can be as high as 38^{o}C in the Rift Valley. Rainfall can be as high as 00 in high rainfall areas and as low as 00 in the lower shire. The topography ranges from near sea level to 3000 metres above sea level. The topographical various couples with varied temperature and rainfall has supported a wide range of soil, vegetation, plants and animals.

(a) Overall status and trends in biodiversity, and major threats;

Status and trends of terrestrial and aquatic biodiversity

Malawi's diverse temperature, rainfall, soils and topography support a wide range of organisms. Malawi occupies about 0.06% of the world land area and has the world's eighth largest fresh water body (Lake Malawi). Despite the small area, Malawi is one of the countries with rich fish diversity. It contributes about 14% of world fresh water fish and about 4% of world fishes. About 95% of Lake Malawi fish species are endemic to Malawi. Ninety-five percent of these species are haplochromine cichlids, which are internationally recognized as an outstanding example of rapid speciation, with a potential to provide greater insights into the understanding of the evolutionary process. Because of their sedentary habits, most of the cichlids rarely migrate long distances from their locality. This has created species endemic not only to the lake but to certain restricted areas within the lake. This aspect has led to adaptive speciation, which is more diverse than the finches of the Galapagos Islands. Malawi has two biosphere reserves, Mulanje Mountain and Lake Chilwa Wetland. Lake Chilwa also happens to be a wetland of international importance being a Ramsar site.

i) Terrestrial biodiversity

Terrestrial biodiversity comprises terrestrial ecosystems, habitats and species within them. Terrestrial ecosystems are described based on major vegetation types. According to White's classification, vegetation in Malawi may be perceived to comprise the following major vegetation types: i) Zambezian Woodland (Divided into miombo, mopane, and undifferentiated woodlands), ii) Transition woodland, iii) Deciduous forests and thickets, iv) Evergreen forest (subdivided into riparian, lowland, mid altitude and Afromontane rain forests), v) Undifferentiated Afromontane forests, such as *Hagenia abyssinica* forest, *Juniperus procera* forest, *Widdringtonia whytei* forest, vi) Afromontane Bamboo, vii) Afromontane evergreen bushland and thicket, viii) Afromontane shrubland.

Most forests are found in National Parks and Wildlife Reserves, Forest Reserves, and protected hill slopes, and natural woodland on customary land. Forests in Malawi are under severe threat of depletion. The total cover is estimated to be declining at the rate of 1.0 to

2.8% annually due to deforestation for fuelwood, charcoal and settlements. For example, Forest Resource Mapping and Biomass Assessment of 1991 showed that in 1973, *Brachystegia* forests occupied 45% of total land area of Malawi (36.5% if Lake Malawi is included) while in 1990/91 land under forest cover was estimated to be 25.3 (20.5% if Lake Malawi is included). This indicates that land under *Brachystegia* forest reduced by 44% between 1972/73 and 1990/91 period.

In 1998, Malawi had a total of 94 protected areas (comprising 85 Forest Reserves, 5 National Parks and four Wildife Reserves) and occupied a total of 1,869,974 Ha. Currently there are 88 forest reserves and together with national parks and wildlife reserves, they occupy about 2,018,198 Ha. This suggests that land under protected areas has increased by 148224 ha (8%). Currently about three forest reserves are proposed for protection and if approved by parliament this will bring the number of protected areas to about 100. Although there appear to be an increase in land under protected areas, there has been extensive encroachment into some forest reserves such as Thyolo, Ndilande, Kalwe, Zomba-Malosa. In addition the current list include some forest reserves that were degazetted. This means that the actual area under Protected Areas may be less than that reported in official documents.

Terrestrial species such as plants, mammals, birds etc are also threatened by human activities. The most recent avian checklist gives 648 species comprising 456 residents, 94 intra-African migrants of regular occurrence, most of which probably breed in Malawi. A total of bird 9 species are listed in IUCN Red Data. Many of the biome-restricted species found in Malawi may be considered to be under conservation threat since their distribution in now restricted to a small number of sites.

Approximately 6000 plant species have been recorded in Malawi. Of these only eleven have legal protection but this excludes the endangered *Wildringtonia whytei,* aloes and orchids. The National Red Data List identified 248 species of which 128 species are regarded as threatened. In addition, the Millennium Seed Bank Project undertook full conservation assessment of 63 species determined as having either the highest extinction threat, or as being data deficient. It was found out that 23 species can be classified as threatened based on IUCN Red List categories and criteria.

Malawi has about 192 recorded mammal species of which the Black Rhinoceros is critically endangered. Two mammals (African Wild dogs and Ozungwe vlei rat) are classified as endangered whilst elephants, cheetah, lions and hippopotamus are classified as vulnerable. Eleven mammal species are near threatened. Black rhinos were locally extinct but these were reintroduced in Liwonde and Majete national Parks and its population is now estimated to be 15 (7 in Majete and 8 in Liwonde National Park).

Conservation status of invertebrates, reptiles and amphibians is not well known. In general however, invertebrates are poorly studied and it is not surprising that despite the high number of insect species only one species is classified as critically endangered.

ii) Aquatic biodiversity

Aquatic ecosystems constitute about 22% of the total surface area of Malawi and most of these comprise the areas occupied by the four major lakes (Lakes Malawi, Malombe and Chilwa). There are four major types of aquatic ecosystems in Malawi: lakes, rivers, small water

bodies (e.g. lagoons) and other wetlands e.g. marshes and swamps. The 1998 (as part of the NBSAP process) ecosystems assessment observed significant human activity in wetlands leading to significant ecological transformation. There is significant degradation in the lakes Malawi, Malombe and Chilwa mainly due to sediment load, nutrient input, pollutants and contaminants.

Malawi's aquatic biodiversity is rich but most aquatic biodiversity groups with the exception of fish are poorly known. Fish is economically important to Malawi and also happens to be the most studied group. There are over 1000 species of fish in Malawi of which 800 are in Lake Malawi alone and contribute to about 14% of world fresh water fish. About 95% of Lake Malawi fish are endemic. Despite the high endemism no fish has been recorded to have gone extinct in Malawi although there have been records of some fish species being locally displaced from their original habitats. For example, *Labeo mesops* (ntchila) and *Opsaridium microlepis* (mpasa) are more abundant on Tanzanian and Mozambique side of Lake Malawi because of pristine environments and very little overfishing.

Fish production declined from an estimated 70,000 metric tonnes to 50,000 metric tonnes between 1980 and 2000. Chambo alone declined to about 9,000 metric tonnes per year. This decline was due to overfishing, use of inappropriate fishing gear and pollution. Currently about 102 fish species are listed on IUCN Red Data List as endangered.

The conservation status of the recorded 164 amphibian species cannot be determined with certainty. Despite this the IUCN Global Amphibians Assessment for Africa of 2002 recorded 37 threatened amphibian species from central and southern African. Of these 12 amphibians species are reported in Malawi.

There are about 139 reptile species (crocodile, monitor lizard, terrapin and turtles) that are most closely associated with freshwater habitats in Malawi. The conservation status of reptiles is not known but it has been observed that crocodile populations are in the decline, mainly due to habitat competition with people.

Hippopotamus and Otters are probably the only mammals that have a true affinity for aquatic habitats. Two species of otters are recorded in Malawi, the Cape Clawless (*Aonyx capensis*) and the spotted Necked (*Lutra maculocollis*). Both species are rare and are now listed in IUCN Red Data list as threatened.

Agricultural biodiversity (the variability among animals, plants and microorganisms that are used or indirectly used for food and agriculture) are the main driving force of the agricultural sector and Malawi's economy. It comprises the diversity of varieties and breeds used for food, fodder, fuel and pharmaceuticals and species that support production such as soil microorganisms and pollinators. In Malawi agrobiodiversity is viewed in terms of domesticated plants and animals. The agrobiodiversity is threatened by preference to high yielding exotic species, indiscriminate crossbreeding programmes, stock thefts and diseases.

iii) Threats to biodiversity

In general terms major threats affecting Malawi's biodiversity may be placed into five groups; loss and fragmentation of natural habitats, over harvesting or over exploitation of natural resources, invasive species, pollution and climate change.

Alternative land uses for urban development, agricultural expansion, infrastructure development and mining have contributed to reduction or degradation of important habitats and ecosystems. A good example is the clearing of Kalwe Forest Reserve for the construction of the new Nkhata Bay District Hospital. High population and density also contribute to habitat fragmentation since more land is cleared for settlement and is in search for fertile land to increase food production. This directly contributed to reduction in forest cover from 44% to in 1970s to 28% in the 1990s. Thus as long as population growth rate remains high, pressure on land for settlement, agriculture and resource use will remain high and this will continue to exert pressure on the remaining habitats.

Poverty is among the factors that force Malawian to over harvest natural resources. Malawi is one of the poorest countries in the world being listed 163 out of 174 in the United Nations Development Annual Report for the year 2009. About 52% of the 13 million people live below the poverty line whilst 22% live in dire poverty. About 90% of the population are forced by this low income base to trade-off long term sustainable resources for short term consumption of stocks since they depend entirely on the existing natural resource endowment for a living and other needs. Inadequate enforcement of the policies and inadequate pricing policy have also contributed to over exploitation of natural resources in Malawi. For example, Malawi timber has for the past decades been the cheapest in Southern Africa and this promoted uncontrolled and unsustainable harvesting of timber in Chikangawa Pine Plantation for export to neighbouring countries and beyond.

Studies have shown that invasive alien species have caused various levels of damage to Malawi's biodiversity. Central American mesquite (*Prosopis juliflora*) due to it allopathic educed growth, has overgrown and replaced indigenous vegetation in same parts of Lake Chilwa wetland (Swang'oma area). In was established also that cypress aphids killed exotic conifer trees worth over 40 million US dollars in the 1990s. Invasive alien fish especially Nile Tilapia if introduced in Lake Malawi have potential to hybridize with their relatives and this can lead to fish genetic erosion and collapse of endemic fish species. Introduction of alien fish into the Lake Malawi Basin is however prohibited by law.

Pollution is considered to be one of the factors that threaten biodiversity. The existing data indicate that bush fires, dust gases and car exhaust fumes are major sources of atmospheric pollution in Malawi. However, the damage caused by pollution to biodiversity in Malawi has never been quantified.

Finally, climate change also has potential to threatened biodiversity. With the projected 1-3^{o}C in temperature water levels in all major lakes of Malawi may be reduced and thereby threatening fish biodiversity. The increase in temperature may also change species composition of some plants in favour of species better adapted to drier environmental conditions. Changes in rainfall and temperature patterns may lead to extinction of less resilient organisms of economic importance such as soil micro organisms and pollinators. A good example of the threat to biodiversity by climate change is the drying up of Lake Chilwa in 2001. Fish breeding site were affected and as a result *Oreochromis shrinus* were restocked

with Lake Malawi genotypes. This suggests that the genetic diversity of the original Lake Chilwa genotypes may have changed.

iv) Implication of biodiversity loss

Malawi's economy and human society is entirely dependent and based on the biological diversity and services provided by the ecosystems. Extrapolated from the contribution of biodiversity components to the national economy (the Gross Domestic Product) it has been proved that the biodiversity of Malawi is instrumental in providing sources of livelihood needs in form of food and fibre, fuel wood, medicine and shelter. The economy also depends on the use of biodiversity as sources of raw materials for agro-industrial development and exports. For example it has been estimated that the fisheries, tourism and forestry sector contribute between 1.5 and 4% toward GDP each.

The economic value of ecosystems services (for nutrient recycling, provision of clean water and air, control micro environment and erosion) to the economy is difficult to estimate. These functions are important such that the value of ecosystem services to the Malawi may be more than the National Gross Domestic Product (GDP).

Perhaps the most significant importance of biodiversity is it contribution to the well being of 90% of the Malawi population. The majority of Malawians depend on natural resource endowment for a living as sources of fuelwood, poles and timber, bamboo, crafts, thatching grass, medicines, spices, flowers, cosmetics, edible fruits, tubers, vegetables, mushrooms, fodder, and extractives (dyes, oils, gums, latex, resins). Grass is used extensively for thatching, especially in rural areas. Wood fuel (firewood and charcoal) remains the dominant source of energy accounting for approximately 90% of the household and industrial energy requirement. At the household level wood is also used for construction and furniture and joinery, and as a source of energy. This means that loss of biodiversity will have serious implications for the people who depend on them and any value cannot adequately convey the level of dependence on natural resources for the survival of the people.

Habitat loss and degradation, and loss of species have an impact on the economy of Malawi in the sense that the Government of Malawi spends billion of dollars managing the effects of environmental degradation. For example degradation of Shire River catchment leads to clogging of electricity supply which leads to massive power cuts costing Malawi billion of dollars in maintenance and business failure. The Malawi Poverty and environment Initiative economic study estimated the cost of unsustainable use to be equivalent to giving up about 5.3% of GDP each year. Taking into consideration the MGDS aims for *total* annual GDP growth of 6%, MPEI Economic study report hypothesized that Malawi would have been richer by MK 27.1 billion (US$195 million) each year in 2007 prices if soil, forest, fishery and wildlife resources were used sustainably.

(b) Key actions taken in support of the Convention's three objectives and to achieve the 2010 target and goals and objectives of the Strategic Plan of the Convention

In response to the Rio agreements, Malawi in 1994 developed a National Environmental Action Plan (NEAP). The NEAP provides a framework for integrating environmental considerations into national economic and social development programmes and plans. To

implement the NEAP, Malawi in 1994-95 prepared the Environmental Support Programme (ESP) whose overall objective is to integrate environmental concerns into the socio-economic development of Malawi. The ESP provided a planning framework for the government's activities and interventions in environment but only a few of the identified interventions have been implemented.

To facilitate implementation of Malawi's environmental aspirations as enshrined in the Constitution, Malawi in 1996 adopted the Environmental Management Act. This is cross – cutting in nature and provide legal frameworks for the development and/or revision of sectoral policies and legislation in environmental and natural resource management. Thus as required by EMA, Malawi undertook a review and reform of environmental and natural resources management policies and legislation. The reviews were designed to address deficiencies and the over reliance on central government control over the use of natural resources and lack of community participation on natural resource management. The reform was also in response to the requirements of CBD article 6b. Both NEP and EMA do not address biodiversity issues comprehensively. In recognition of this inadequacy, Malawi in 2006 initiated a process to revise the EMA. The revised EMA when passed by Parliament will have comprehensive guidelines and legal framework for access and benefit sharing and for creation of an Environmental Protection Authority to coordinate environmental activities in Malawi.

Malawi published its NBSAP in 2006. The goal of the NBSAP is to conserve, protect and manage by the year 2020 all forms of life for all people with full participation of all stakeholders and to use the biodiversity sustainably and where benefits accrue to share them fairly and equitably. The strategy established four goals as follows:

- Actively protect, conserve and maintain protected areas, mountains and species within them,
- Enhance and improve biodiversity knowledge base through research and capacity building,
- Enhance sustainable use of biodiversity including agricultural biodiversity,
- Enhance community understanding and appreciation of biodiversity.

The NBSAP identified 192 actions. Of these 22 were priorities to be implemented in order to establish good basis for implementation of the global 2010 targets and for implementation of complex targets. The actions were grouped into eleven thematic areas which were selected in such a way that they respond or contribute to the implementation of CBD articles and programme of works. Thus, the NBSAP is a long term comprehensive strategy for the conservation and sustainable use of biodiversity components.

Malawi has made significant progress in the implementation of the NBSAP. In addition to revising EMA, Malawi has also initiated a process to develop the National Agrobiodiversity Policy. This initiative is in keeping with the requirements of Article 15 on sustainable use of agrobiodiversity and decision V\5 of CoP5 regarding the work programme on Agricultural Biodiversity. When approved, the policy will provide for mechanisms for protection of indigenous knowledge and benefit sharing that may arise from using the genetic materials collected from farmers. Another, example related to achievements made in the implementation of the NBSAP is the significant progress made in the implementation Cartagena Protocol. In response to the requirements of the Cartagena Protocol, Malawi in 2002 adopted the Biosafety Act. This was followed by development and adoption of

regulations and guidelines for management of GMOs and approval by parliament of a comprehensive National Biotechnology Policy and Biosafety Policy in 2008. These achievements are a testimony that Malawi has made significant progress in the implementation of the requirements of Article 19 (on handling of biotechnology and distribution of its benefits).

(c) Areas where national implementation has been most effective or most lacking

Implementation has focused on the implementation of the NBSAP. The NBSAP was developed as a tool to guide biodiversity planning and implementation. Some of the outputs and areas of significant achievement related to biodiversity conservations are highlighted below:

Malawi is now better prepared to handle issues of biotechnology and genetically modified organised having enacted a Biosafety Act in 2002. Between 2002 and 2008, Malawi developed Biosefety regulations, approved a National Biotechnology and Biosafety Policy and standing operating procedure manuals for Confined Field Trail guidelines, Trail Managers and Field Inspectors handbooks. Malawi has also trained adequate human capacity to undertaken reasonable work in biotechnology. The achievements Malawi has made in this respects are a contribution to the implementation of Article 19 of the Convention.

Mainstreaming of biodiversity into policies, strategies and programmes is another area where Malawi has achieved significant results. Mainstreaming refers to inclusion or integration of action related to biodiversity conservation and sustainable use into economic sectors whose core business is not biodiversity conservations such as agriculture, tourism, fisheries, forestry, and mining. This entails also integration of biodiversity considerations into national programmes and policies. In keeping with Article 6b of the Convention, Malawi undertook a review and reform of environmental and natural resources management policies and legislation (the National Forestry Policy, The National Fisheries and Aquaculture Policy, The National Parks and Wildlife Policy etc). Although some of the policies and legislation were revised in line with EMA and NEP, some e.g. the National Parks and Wildlife Act, the Forestry Act, EMA did not address biodiversity issues adequately. In this regard the National Parks and Wildlife Act was amended in 2004 to include provisions on collaborative management. The Forestry Department has also initiated a process to revise the Forestry Act with a view to strengthen and provide more powers to the Forestry Department on law enforcement. In addition, the revised Act will provide guidelines for collaborative management in forestry management.

Considerable efforts has also been made in mainstreaming biodiversity considerations into national programmes such National Adaptation Programme of Action (NAPA), Malawi Growth and Development Strategy, Malawi Growth and Development Strategy (MGDS), Public Works Programme.

Realising that land use practices have contributed to biodiversity problems, several tool have been put in place to facilitate integration of biodiversity considerations into land use planning and decision making. The Environmental Management Act is the primary mechanism or instrument at the national level for ensuring that environmental considerations are considered in national plans and decision making across all sectors. It is therefore

requirement that all projects shall not be implemented unless an environmental impact assessment is carried out. In general biodiversity considerations are integrated in EIAs by making sure that the following issues are taken into consideration in making environmental impact assessments:

a) That the project should not cause damage to biodiversity (wildlife, plants and habitats)
b) That the project promotes sustainable use of natural resources,
c) That the project promotes ecosystem maintenance – i.e. the project will not affect any environmentally sensitive areas e.g. wetlands, areas containing rare and endangered species.

Incentive measures for biodiversity conservation are not widely used to promote biodiversity conservation and sustainable use in Malawi. Despite this, incentive measure being promoted by the Department of National Parks and Wildlife and the Department of Forestry have demonstrated that incentive measures have potential to promote community participation and also contribute to sustainable use of biodiversity. For example DNPW promote collaborative management in National Parks through Resource Use Programme and revenue sharing with communities who legitimately use the land on which wildlife occurs. Resource Use Programme (RUP) allows harvesting selected wildlife resources by adjacent communities. Through this programme Nyika-Vwaza communities have earned enough income that have been used for community development activities within the area. In return communities have participated in construction of fences, law enforcement and have voluntarily surrendered muzzle loading guns leading to reduced poaching.

Due to a number of factors ranging from inadequate human capacity and funding, Malawi has made little progress on following up a number of CoP decisions. Despite Malawi being aware of Decision VII/30 which invited parties to develop national and regional targets and indicators and incorporate them into national programmes and strategies, an attempt to adopt some target into the NBSAP was made but no institutions was designated to follow up implementation of the targets. Similarly targets for the Global Strategy for plant protection have not been integrated into national programmes and strategies. Another area where Malawi has been ineffective is in the implementation of programme of work for Protected Areas, Invasive species, agrobiodiversity since there are limited or no national programme or activities targeting these thematic areas.

(d) Major obstacles encountered in implementation;

Major achievements of the NBSAP implementation include the revision of the Environmental Management Act to strengthen biodiversity provisions; initiatives to develop an Agrobiodiversity policy; enactment of the Biotechnology and Biosafety policy in 2008; development of Biosafety Regulations and Standing Operating Procedures documents to guide management and handling of Genetically Modified Organisms in Malawi. Despite these achievements however, implementation of biodiversity activities has been constrained by a number of challenges. The first obstacle is inadequate funding. Biodiversity funding through the national budget is inadequate when compared to the magnitude of environmental problems in Malawi. Despite this however, Malawi continue to be the primary donor of key

biodiversity departments and institutions e.g. the Forestry Department, Fisheries Department, the Department of National Parks and Wildlife through the national budget. This funding has enable Malawi to provide basic requirements for the protection of protected areas and conservation of endangered species.

Although Malawi benefits from external funding, this has been irregular. In the 1990s support to biodiversity from both bilateral and multilateral donors was significant. Currently the number of true biodiversity project has dropped and the focus at the national, regional and international levels has shifted to climate change.

Implementation of biodiversity activities has also been affected by inadequate coordination. The Environmental Affaires Department has the overall responsibility for coordinating implementation of biodiversity activities. The EAD however, do not develop a plan for disseminating and distributing the NBSAP, a key tool for planning and implementation of biodiversity activities, and as such key stakeholders are virtually unaware of the documents and do not use it as an effective tool for planning and implementation of biodiversity activities in Malawi. The other problem with the current implementation arrangement is that although the EAD is the main institution to coordinate implementation of the NBSAP, there is no legal obligation to force institutions to implement provisions or to include the provisions of the NBSAP into their programmes. This means that the implementation of the NBSAP is haphazard, voluntary, ad hoc and often not prioritised.

(e) Future priorities.

Although, Malawi has put in place conducive legislation, policies, strategies and programmes to facilitate biodiversity conservation and sustainable use, biodiversity conservation is still problematic. There are a number of priority issues that must be implemented first if Malawi is to make strides in biodiversity conservation. The 22 priority actions identified in the NBSAP are still relevant today. Of these 11 priority actions were considered of high priority on the basis that they also address priority issues as identified by the National Capacity Self Assessment for biodiversity conservation (Box 1). In addition to these the following have also been identified as priority action that must be implemented first in order to establish a solid background for effective implementation of the Conventions and its three objectives:

- The Department of Environmental Affairs should establish Coordinating unit and a Monitoring and Evaluation Unit. This will provide basis for measuring success as Malawi implements various elements of the Convention.
- In order to raise the profile of biodiversity on the national agenda, biodiversity should be included into the Malawi Growth and Development Strategy.
- To improve coordination of biodiversity programmes in Malawi the current institutional arrangement has to be strengthened, and the coordinating role of EAD must be clarified. All partner institutions must designate biodiversity desk officers. In this regards, the EAD should lobby parliament to speed up approval the revised Environmental Management Act.

- An overall National Biodiversity policy should be developed to guide implementation of biodiversity conservation and sustainable use including agrobiodiversity. Implementation of specific areas such as agrobiosiversity, invasive alien species, incentive measures etc may be guided by strategies.

Box 1: Future priorities as identified in the NBSAP

Priority Strategy 1: Enhancement of protected areas management

Priority Action 1: Formulate a policy framework that would promote conservation of species, habitats and ecosystems that are important but not represented within the existing protected area networks or are vulnerable, fragile or are at risk of irreversible loss or decline of biodiversity.

Priority Action 2: Develop and implement programmes for sustainable conservation of important ecosystems of biodiversity importance including miombo ecosystems, mountain ecosystems, wetlands and biosphere reserves.

Priority Action 3: Encourage and support the protection, maintenance and restoration of areas of particular importance for the conservation of selected indigenous species.

Priority Strategy 2: Promotion of sustainable use of genetic resources

Priority Action 4: Develop and enact regulations for access to and equitable sharing of benefit arising from the use of genetic resources.

Priority Action 5: Develop methodologies to monitor, prevent and arrest the spread of invasive species in shared ecosystems, including early detection and coordinated management efforts at the community, national and regional levels.

Priority Action 6: Assess and identify available incentive measures important for biodiversity conservation, sustainable use as well as benefit sharing and promote the adoption of best practices.

Priority Strategy 3: Enhancement and maintenance of partnerships

Priority Action 7: Promote the involvement of the local communities, local leaders, the private sector and NGOs in decision-making regarding the management of biological diversity and ecosystems through community based natural resources management communities.

Priority Action 8: Promote joint management of biodiversity and ecosystems along national boundaries for the management of shared biological resources.

Priority Strategy 4: Strengthen infrastructure and human capacity

Priority action 9: Establish alternative financing mechanisms that will minimize resource expenditure and encourage close collaboration between sectors.

Priority action 10: Promote enforcement and compliance to policy, legislation and international convention through the creation and empowerment of an independent Environmental Protection Authority.

Priority action 11: Develop human, institutional and national capacities to identify, monitor and manage biodiversity through training.

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ACRONYMS AND ABBREVIATIONS

AnGr	Animal Genetic Resources
APM	African Parks (Majete)
ASWAp	Agricultural Sector Wide Approach
CAMPASS	
CBD	Convention on Biological Diversity
CBNRM	Community Based Natural Resources Management
CCANR	Cabinet Committee on Agriculture and Nature Resources
CEPA	Centre for Environmental Policy and advocacy
CHM	Clearing House Mechanism
CITES	Convention on International Trade in Endangered Species
COP	Conference of the Parties
CURE	Coordination Union for the Rehabilitation of the Environment
DANIDA	Danish International Development Aid
DEAPS	District Environmental Action Plans
DEC	District Executive Committee
DESC	District Environmental Subcommittee
DNPW	Department of National Parks and Wildlife
DNPW	Department of National Parks and Wildlife
DREA	Department of Research and Environmental Affairs
EAD	Environmental Affairs Department
EDOs	Environmental District Officers
EIAs	Environmental Impact Assessments
EMA	Environmental Management Act
ESP	Environmental Support Programme
FISNA	Forest Invasive Species Network for Africa
FRIM	Forestry Research Institute of Malawi
GBI	Greenbelt Initiative
GDP	Gross Domestic Product
GEF	Global Environment Facility
GMOs	Genetically Modified Organisms
GoM	Government of Malawi
GTZ	German Agency for Technical Cooperation
HIV/AIDS	Human Immunovirus / Acquired Immunodeficiency Syndrome
IAS	Invasive Alien Species
IGAs	Income Generating Activities
IUCN	The World Conservation Union (International Union for the Conservation of Nature)
JICA	Japanese International Cooperation Agency
LDC	Least Developed Country
MACC	Management for Adaptation to Climate Change
MBERU	Molecular Biology and Ecology Research Unit
MDGs	Millennium Development Goals
MEET	Malawi Environment Endowment Trust
MGDS	Malawi Growth and Development Strategy
MMCT	Mulanje Mountain Conservation Trust
MoAFS	Ministry of Agriculture and Foods Security

MoNREA	Ministry of Natural Resources and Environmental Affairs
MoREA	Ministry of Research and Environmental Affairs
MZ	Malawi Zebu
MZUNI	Mzuzu University
NAPA	National Adaptation Programme of Action
NBSAP	National Biodiversity Strategy and Action Plan
NCE	National Council for Environment
NCSA	National Capacity Self Assessment
NEAP	National Environmental Action Plan
NEP	National Environmental Policy
NEPAD	New Partnership for Africa's Development
NGOs	Non-Governmental Organisations
NHBG	National Herbarium and Botanic Gardens of Malawi
NISM	National Information Sharing Mechanism
NPDP	National Planning and Development Plan
NPGRC	National Plant Genetic Resources Centre
NRM	Natural Resources Management
NSSD	National Strategy for Sustainable Development
PAs	Protected Areas
PCANR	Parliamentary Committee of Agriculture and Natural Resources
PEI	Poverty and Environment Initiative
PGRFA	Plant Genetic Resources for Food and Agriculture
PPP	Public Private Partnerships
PROTA	Plant Resources of Tropical Africa
REDD	Reduced Emissions from Deforestation and Degradation
RUP	Resource Use Programme
SABONET	Southern African Botanical Network
SADC	Southern African Development Community
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
SEAs	Strategic Environmental Assessments
SMART	Specific Measurable achievable realistic and time bound
SOER	State of Environment Report
TCE	Technical Committee on Environment
TFCA	Transfrontier Conservation Area
TLC	Total LandCare
TV	Television
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Education, Scientific and Cultural Organisation
UNIMA	University of Malawi
USAID	United States Agency for International Development
VNRMCs	Village Natural Resources Management Committees
WESM	Wildlife and Environment Society of Malawi
WWF	World Wildlife Fund for nature

Chapter One

Overview of Biodiversity Status, Trends and Threats

1.1 Introduction

The first comprehensive study of the trends and status of various components of biodiversity in terms of inventory, distribution, socio economic importance, and conservation status was conducted as part of the National Biodiversity Strategy and Action Plan (NBSAP) process. Further assessments were also undertaken during the preparation of the National Strategy for Sustainable Development (NSSD) in 2004 and during the National Capacity Self-Assessment on Biological Diversity in 2006. The Ministry of Agriculture and Food Security is in the process of developing an Agrobiodiversity Policy and has since commissioned studies on trends and status of various components of agrobiodiversity (such as domesticated crops and animals, aquatic biodiversity, non timber forest products and other terrestrial biodiversity residing outside forests). It must be pointed out that both previous and currents biodiversity assessments have never been compiled and published into a single report but these are here considered as a starting point in term of knowledge base on biodiversity status and trends in Malawi. In addition, neither indicators nor baseline data were included in the available biodiversity studies. For the sake of this report however, information presented in the Third Biodiversity Report shall be considered baseline data but due to lack of indicators, the status of biodiversity presented in this chapter is not compared to any indicator and only estimates are provided.

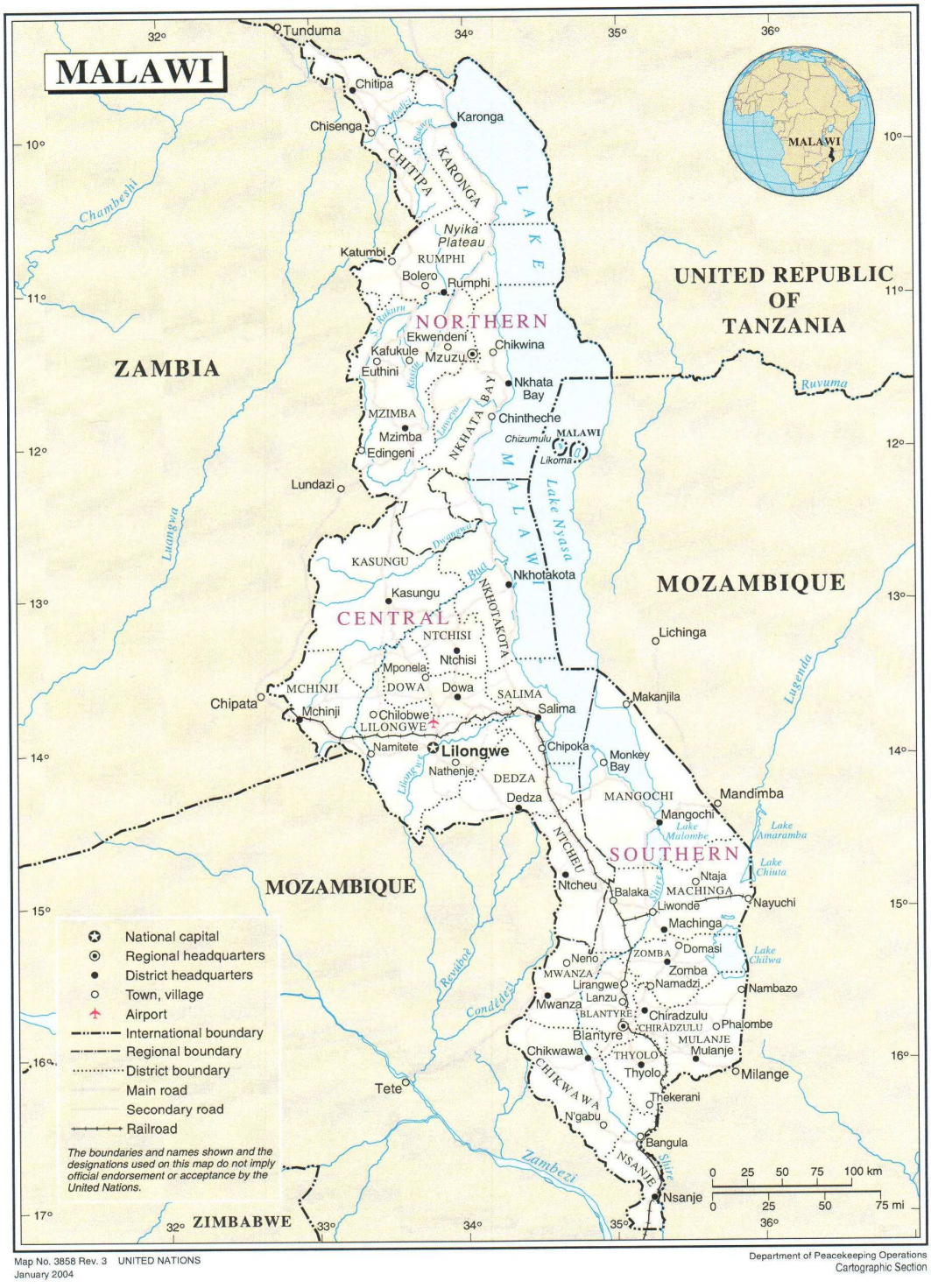
1.2 Brief Background information on Malawi

Malawi is a Least Developed Country (LDC) located between latitudes $9^0\,22^1$ and $17^0\,03^1$ S and longitude $33^0\,40^1$ and $35^0\,55^1$ E. It shares boundaries with Mozambique to the south, east and west; Tanzania to the north and Zambia to the west (Figure 1). Malawi's topography varies from near sea level in the lower shire (i.e. 50 m above the sea level) to about 3000 metres above sea level on high mountains. The mean annual minimum and maximum temperatures range from 12°C to 32°C but can be as high as 38°C in the rift valley and along the lakeshore. Lowest temperatures are common in high altitude areas.

The total area is 119,140 km^2 of which 20,902 km^22 (representing 22%) is made up of inland waters, largely occupied by the four major lakes (Lakes Malawi, Malombe, Chilwa and Chiuta). Lake Malawi is the largest water body covering about 20% of Malawi's total surface area and the most significant water body in terms of fish production and biodiversity.

The population of Malawi was estimated in 2008 to be 13 million people. The population is about 85% rural, has a national density of 139 persons per sq. km and is growing at the rate of 2.8 percent. This is an increase from 11 million people from the previous census in 1998. Population density has increased from 85 persons per sq. km in 1987, to 105 persons per sq. km in 1998 and to 139 per sq. km in 2008. Urban population has increased from 850,000 persons in 1987 to 2,000,000 persons in 2008. This makes Malawi one of the least urbanised countries in Africa. The population increase coupled with low rate of urbanisation means that pressure on land is even greater than in the 1990s.

Figure 1. Map of Malawi



Source: www.un.org/Depts/Cartographic/map/profile/malawi.pdf

1.3 Status and trends of important biodiversity components

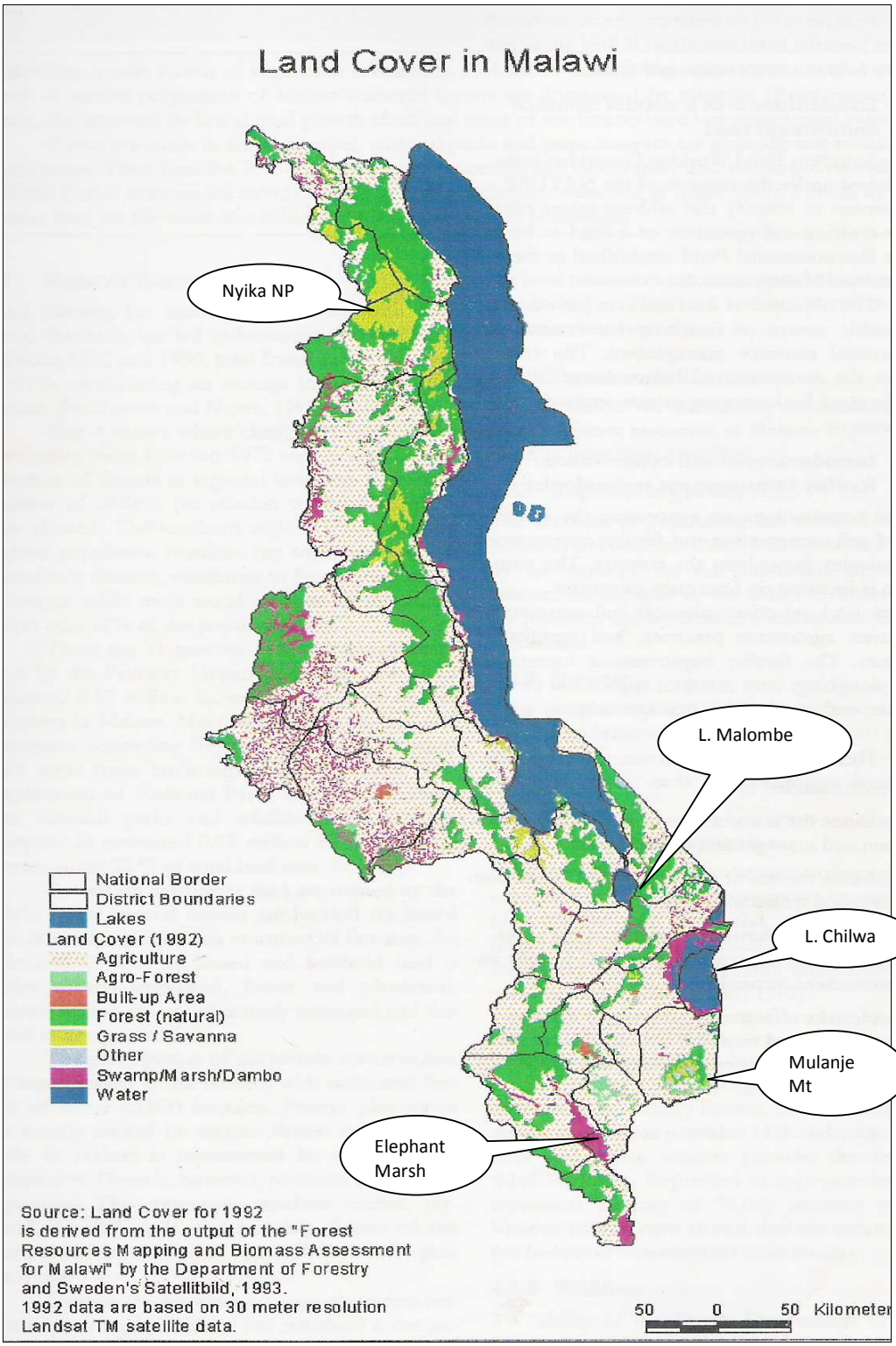
The NBSAP placed biodiversity comonent into three broad categories; agrobiodiversity, aquatic biodiversity and terrestrial biodiversity. The status of each biodiversity component in term of changes in number of species, distributional range of species ecosystems and conservation status will be the focus of this section.

1.3.1 Status of terrestrial biodiversity

Terrestrial biodiversity comprises terrestrial ecosystems, habitats and species within them. Terrestrial ecosystems are described based on major vegetation types and may further be grouped into forests, grasslands and agro-ecosystems. Malawi's vegetation is comparable with the diversities of topography, geology, climate and soil types. According to White's classification (and modified by Dowsett-Lemaire in 2001), vegetation in Malawi may be perceived to comprise the following major vegetation types: i) Zambezian Woodland, ii) Transition woodland, iii) Deciduous forests and thickets, iv) Evergreen forest, v) Undifferentiated Afromontane forests, vi) Afromontane Bamboo, vii) Afromontane evergreen bushland and thicket, viii) Afromontane shrubland. These vegetation types are further grouped into two major terrestrial ecosystems; forests and grasslands. According to FAO Statistics, forests (comprising indigenous forests and plantations) are estimated to occupy about 3,336,000 Ha representing about 36% of Malawi's land area. This is an increase from 1991 as estimated by the Forest Resources Mapping and Biomass Assessment (1993) which estimated 2638,010 Ha to be under forest cover (or 27% of Malawi's land area). It is evident from Table 1 that the indigenous forest reduced by over 41% 1973 in 1991 whilst the forest plantations showed a general increase. Some of the vegetation types of Malawi are shown in Figure 2 whish shows that most of the land is disturbed.

Most forests are found in National Parks and Wildlife Reserves, Forest Reserves, and protected hill slopes, and natural woodland on customary land. Forests in Malawi are under severe threat of depletion. The total forest cover is estimated to be declining at the rate of 1.0 to 2.8% annually due to deforestation for fuelwood, charcoal and settlement. For example, Forest Resource Mapping and Biomass Assessment of 1991 showed that in 1973, *Brachystegia* forests occupied 45% of total land area of Malawi (36.5% if Lake Malawi is included) while in 1990/91 land under forest cover was estimated to be 25.3 (20.5% if Lake Malawi is included). This indicates that land under *Brachystegia* forest reduced by 44% between 1972/73 and 1990/91 period. It was further estimated that reduction of *Brachystegia* forests in flat areas was nearly 62% mainly due to agricultural growth. In the absence of comprehensive and country wide forest assessments it can only be estimated that land under forest cover is less than the 1993 estimate and less than current estimates (Table 1).

Figure 2. Land cover map of Malawi based on the 1993 Forest Resources Mapping and Biomass Assessment form Malawi



Land under protected area has increased steadily from 1897 when Lake Chilwa and Elephant marsh game reserves were created. Available information appear to suggest that over 70% of land under Protected Areas network was already gazetted before independence (in 1964). In 1998, Malawi had a toasl of 94 protected areas (comprising 85 Forest Reserves, 5 National Parks and four Wildife Reserves) and occupied a total of 1,869974 Ha (Table 2). Data from Forestry Department shows that the number of forest reserves has increased to 88, giving a total of 97 protected Areas and occupying a total of about 2,018,198 Ha. This means that land under protected areas has increased by 148224 ha (8%). Currently about three forest reserves are proposed for protection and if approved by parliament this will bring the number of protected areas to about 100. In addition, there are over 240,000 Ha of ungazetted land that is being considered for formal protection.

The primary reason for forest reserves is catchment protection. In addition to this function forest reserves also play a crucial role of biodiversity conservation, forest production, protection of water supply, erosion control, nutrient recycling, carbon capture and storage etc. Public Lands Utilization Study (PLUS) of 1998 reported that three forest reserves were originally created for conservation of biological diversity. Currently fourteen forest reserves are valued for biodiversity conservation and presence of rare and unique species.

Although there appear to be an increase in land under protected areas, there has been extensive encroachment into some forest reserves such as Thyolo, Ndilande, Kalwe, Zomba-Malosa such that the actual area under forest cover may be less than that reported in official documents. In addition, other reserves with valuable timber such as Mulanje cedar (*Widdringtonia whytei*) are prone to extensive exploitation. Recent studies to assess the status and distribution of Mulanje Cedar reported a decline in area under cedar from 1462 Ha in 1989 to 845.3 Ha in 2004. This represents a 617 Ha decrease within 15 years, or the cedar was being cleared at the rate of 40 Ha per years.

Grasslands are divided into montane, wetlands and savanna. Most montane grasslands are under protection in Forest Reserves and National Parks, but wetlands especially those outside protected areas are subjected to cultivation or overgrazing (Table 3). It is estimated that montane grasslands have reduced by 2.6% whilst wetlands have reduced by 3.5%. This is likely to continue especially with the current agricultural policy which promotes winter cropping.

Table 1.Trend in forest cover

	1973	1991	change	2000		2007
Evergreen forest	87,990	82,620	-5,370			
Brachystegia forest hilly	2,399,610	1,685,850	-713,760			
Brachystegia forest flat	1,913,300	733,110	-1,180,190			
Forest plantations	50,620	136,430	85,810			
Total Forests	4,451,520	2,638,010[1]	**-1,813,510**	2,562,000[2]	**-76,010**	3,336,000[3] **(36% land area is forest cover)**

Table 2. Number, type and size of Malawi's protected areas

Type of Protected Areas	Adapted from Public Land Utilisation Study 1998			Based on current data from Forestry Department	
	Number	Area (Ha)	% of Total Area	Number	Area (Ha)
Forest Reserves	85	769822	41%	88	9180462
National Parks	5	710421	38%	5	710421
Wildlife Reserves	4	389730	21%	4	389730
Total	95	1869974		97	2018198

Terrestrial species such as plants, mammals, birds etc are also threatened by human activities. The most recent avian checklist gives 648 species comprising 456 residents, 94 intra-African migrants of regular occurrence, most of which probably breed in Malawi. A total of bird 9 species are listed in IUCN Red Data (Table 4). However, many of the biome-restricted species found in Malawi may be considered to be under conservation threat since their distribution in now restricted to a small number of sites. Those species whose main distribution lies outside of existing large protected areas may be vulnerable to local extinction. For many of these species, little is known of their exact population status although a large number are considered to be uncommon or rare or have a restricted-range, found in only one or a few biomes.

[1] Forest Department, Forest Resources Mapping and Biomass Assessment 1993
[2] Earth Trends 2003
[3] FAOSTAT 2010

Table 3 Bird species of global conservation concern found in Malawi

Species	Common Name	Global Status	Status in Malawi
Falco fasciinucha	Taita Falcon	Vulnerable (C1,D1)	Rare – found only in cliffs near Neno
Falco naumanni	Lesser Kestrel	Vulnerable (A1ace)	Uncommon – a visitor to grassland and open country
Grus carunculatus	Wattled Crane	Vulnerable (A2cd,C1)	Rare – found in Kasungu and Nyika National Parks and Vwaza marsh
Crex crex	Corncrake	Vulnerable (A1ac)	Uncommon – a visitor with a few recent records in the South
Hirundo atrocaerulea	Blue Swallow	Vulnerable (Alc+2c, C1+2a)	Locally common – montane grassland in Nyika (300 breeding pairs) and Mulanje Plateaux
Alethe choloensis	Thyolo Alethe	Vulnerable (B1+2c)	Uncommon – restricted to evergreen forest in Thyolo and Mulanje Mountain Forest Reserve
Apalis chariessa	White-winged Apalis	Vulnerable (Bl+2bc)	Rare – confined to Blantyre (Michiru) Conservation Area) and Thyolo Mountain Forest Reserve
Sheppardia gunning	East Coast Akalat (Gunning's Robin)	Vulnerable (B1+2bc)	Uncommon – evergreen forest from Mzuzu to Nkhata Bay; Nkwadzi Forest Reserve
Zoothera guttata (Turdus fischeri)	Spotted Thrush (Natal Thrush)	Endangered (C2a)	Sub-montane forest in Thylo, Mulanje and Soche Forest Reserve

Source (SADC GEF, 2001).

Approximately 600 plant species have been recorded in Malawi. Of these only eleven have legal protection but this excludes the endangered *Wildringtonia whytei,* aloes and orchids. Limited work has been done to determine the conservation status of plant species of Malawi. The first of such work was done under the SABONET project which listed 248 species in the National Red data List, of which 128 species are regarded as threatened. A study of the conservation status of plant undertaken during the NBSAP process recommended a total of 16

plant species for legal protection because their distributional range and populations have reduced due to human use and habitat loss. The Millennium Seed Bank Project undertook full conservation assessment of 63 species determined as having either the highest extinction threat, or as being data deficient and it was found out that 23 species can be classified as threatened based on IUCN Red List categories and criteria.

Table 4 shows that Malawi has about 192 recorded mammal species of which the Black Rhinoceros is critically endangered. Two mammals (African Wild dogs and Ozungwe vlei rat) are classified as endangered whilst elephants, cheetah, lions and hippopotamus are classified as vulnerable. Eleven mammal species are near threatened. According to IUCN (2010) cheetahs which used to be found in Kasungu are known to have been extirpated in Malawi mainly due to habitat loss, conflicts with farmers and poaching. There are plants to introduce chetetahs in Majete wildlife Reserve by 2012. Black rhinos were locally extinct but these were reintroduced in Liwonde and Majete national Parks. Currently there are 15 rhinos in Malawi (7 in Majete and 8 in Liwonde National Park). Populations of elephants have increases recently (approximately 215 in Majete Wildlife Reserve, 178 in Kasungu National Park, 652 in Liwonde National Park, 342 in Vwaza Wildlife Reserve) due to extensive conservation measures. One such measure is the relocation of elephants from Phirilongwe Forest Reserve (where the human conflict was high leading to extensive poaching) to Majete Wildlife Reserve.

Table 4. Conservation status of Mammals of Malawi

Species	**Global Status**	**Status in Malawi**
Lycaon pictus (African Wild Dog)	Endangered (C1)	Occasional vagrant in border protected areas (Kasungu and Nyika NPs – no resident population.
Acinonyx jubatus (Cheetah)	Vulnerable (A1d+2d, C1)	Rare and endangered in Kasungu NP.
Panthera leo (Lion)	Vulnerable (Alcd)	Kasungu and Liwonde NPs; Vwaza Marsh and Nkhotakota WRs – populations likely to be declining.
Loxodonta africana (African Elephant)	Endangered (Alb)	Resident in Kasungu and Liwonde NPs; occasional in Nyika NP, Vwaza Marsh and Nkhotakota WRs, Namizumu, Thuma and Phirilongwe FRs extinct in Majete WR.
Diceros bicornis (Black Rhinoceros)	Critical (Alabc)	Extinct, but reintroduced into Liwonde NP and Majete Wildlife Reserve.
Paraxerus palliatus	Vulnerable (Alc)	Status unknown.
Rhynchocyon cirnei (Chequered Elephant-shrew)	Vulnerable (B1+2c)	Status unknown.

Source: IUCN (1996)

Conservation status of invertebrates, reptiles and amphibians is presented in Table 5 below. In general invertebrates are poorly studied and it is not surprising that despite the high number of insect species only one species is classified as critically endangered. 8 species are listed by IUCN as either vulnerable or endangered. According to IUCN Global Amphibians Assessment (GAA) for Africa of 2002 about 12 amphibians are currently threatened in Malawi

Table 5. Conservation status of selected biodiversity group of Malawi

Biodiversity group	Total number	Conservation status			
		Critically endangered	Endangered	vulnerable	Threatened
Invertebrates					
Nematodes	173				
Insects	7800	1		7	1
Vertebrates					
Reptiles	140				
Amphibians	146		4	1	1

Source IUCN (1996)

1.3.2 Status of aquatic biodiversity

Aquatic ecosystems constitute about 22% of the total surface area of Malawi and most of these comprise the areas occupied by the four major lakes (Lakes Malawi, Malombe and Chilwa). There are four major types of aquatic ecosystems in Malawi: lakes, rivers, small water bodies (e.g. lagoons) and other wetlands e.g. marshes and swamps. Considered in this way aquatic ecosystems are synonymous to wetlands as defined by the Ramsar Convention (Ramsar Convention Bureau 1997) and are placed into three broad categories (riverine, lacustrine and palustrine).

Table 6. Wetlands of Malawi

Category	Examples	Comments
Riverine		
Perennial rivers	Shire, Ruo, Bua	Sections of rivers passing through protected areas (e.g. Nkhota kota Wildlife Reserve for Bua, Liwonde National Park for Shire River and Mulanje Mountain FR Ruo) are protected. In addition, cultivation along river banks is prohibited by law.
Flood plains	Northern tributaries of Rukuru River	An important habitat for 15 endemic plant species.
	Kasungu plain and Bua River	Bua river is a breeding ground for migrating cyprimid species e.g. *Opsaridium microlepis*.
Lacustrine	Lake Malawi	Important habitat for over 800 endemic cichlids of Malawi.
	Lake Chilwa	Habitat for 13 species of fish one of which is endemic (*Oreochromis shiranus chilwae*). A Ramsar site and Man and Biosphere reserve.
Palustrine- marshes	Vwaza marsh	An important location for waterfowl and large mammals.
	Elephant marsh	Important location for insectivorous plant *Utricularia inflexa* var. *Inflexa*. Impartant habitant for endangered species such as crocodiles and hippopotamus.
	Ndindi marsh	Also important habitat for crocodiles and hippopotamus.
- Swamps	Limphasa swamps	Has high fish diversity.
	Nkhota kota swamps	Its rivers are breeding site for *Opsaridium microlepis*.

Conservation status of aquatic ecosystems of Malawi is presented in Table 7. The 1998 ecosystems study (as part of the NBSAP process) observed significant human activity in wetlands leading to significant transformation. There is significant degradation in the lakes Malawi, Malombe and Chilwa mainly due to sediment load, nutrient input, pollutants and

contaminants. Water quality studies on lake Malawi showed an increase in sediment loads from its inlets and an increase in nutrients such as nitrogen, phosphorous and silicon derived from agricultural activities in the catchment. Rivers of most inlets of Lake Malawi run though customary land and as a result they are a source of sediments and nutrients to the Lake.

Cultivation in river banks is prohibited by law. Despite this provision however, most river banks are cultivated, leading to sedimentation of rivers and reducing the habitats for aquatic biodiversity. It must be pointed out that no rivers systems are protected by law except for the part that flow through protected areas. As a result almost all the rivers in Malawi are modified. It may be argued therefore that almost all rivers in Malawi are threatened. This may be attested by the fact that rivers which used to be perennial have now turned annual and their water flow and discharge has reduced.

No extensive cultivation has been reported in estuaries but these have been heavily degraded by siltations and nutrient loads. Land Management studies of Lake Chilwa catchment recorded degradation of Lake Chilwa inlets to the extent that fish that used to be abundant in Lake Chilwa rivers were more abundant in estuaries in the Mozambizan side of the Lake Chilwa where river degradation was minimal. This also applies to most species that depend on rivers for breeding such as mpasa (*Opsaridium microlepis*) which are now more abundant in the Tanzanian and Mozambican side of Lake Malawi.

Table 7. Conservation Status of major marches and swamps of Malawi

Ecosystem	**Conservation status**	**Conservation Status**
Marshes of Ruwenya Hills	V	The area is sparsely populated and is not protected. Human activity is minimal.
Marshes of Chitipa	E	Not protected, currently threatened by shifting cultivation
Northern tributaries of South Rukuru River system	V	Part of the wetland is within Nyika NP. Bush fires and shifting cultivation are major threats to the wetlands
Vwaza Marsh	P/V	Approximately 100,000 ha of the marsh is protected in the Vwaza Marsh Game Reserve, this include the whole of Luwewe River and its flood plains. The eastern corner of the marsh is however not protected and has been used for settlement.
South tributaries of South Rukuru River	V	Part of the river is protected within the Vwaza Marsh WR
Marshes of Kasungu Plain & the Bua River	E	The plain has been extensively deforested. The northern part of the plain (between Bua and Dwangwa Rivers) is reserved through Kasungu National Park whilst part of the lower course of Bua

		river is protected in Nkhota-kota WR.
Lake Malawi	P/V	Most of the islands and a few sections of the mainland in the SE and SW Arms were gazetted as a national park in 1980. Marshes associated with lake Malawi are not protected
Karonga Lakeshore Plain	E	Much of the plain is under cultivation and no part is protected.
Lake Chilwa	E	Not protected but in 1997 it was designated a RAMSAR site. Lake Chilwa biodiversity is threatened by cultivation, invasive species and over fishing.
Shire Marshes (Elephant marsh, Ndindi marshes)	V	The entire wetland system is not protected and is threatened by cultivation and waterweeds like water hyacinth, *Eichhornia crassipes; Salvinia molesta* and *Azolla nilotica*.

Source: Ecosystems of Malawi; issue paper prepared for the NBSAP process.

Legend (Adapted from South African Biodiversity Act)
Critically Endangered Ecosystems (CE) - ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation.
Endangered ecosystems (E) - ecosystems that have undergone degradation of ecological structure, but are not critically endangered.
Vulnerable Ecosystems (V) - ecosystems that have high risk of undergoing significant degradation as a result of human intervention.
Protected Ecosystems (P) - ecosystems that are of high conservation value or of high national importance although they are not within the protected areas network.

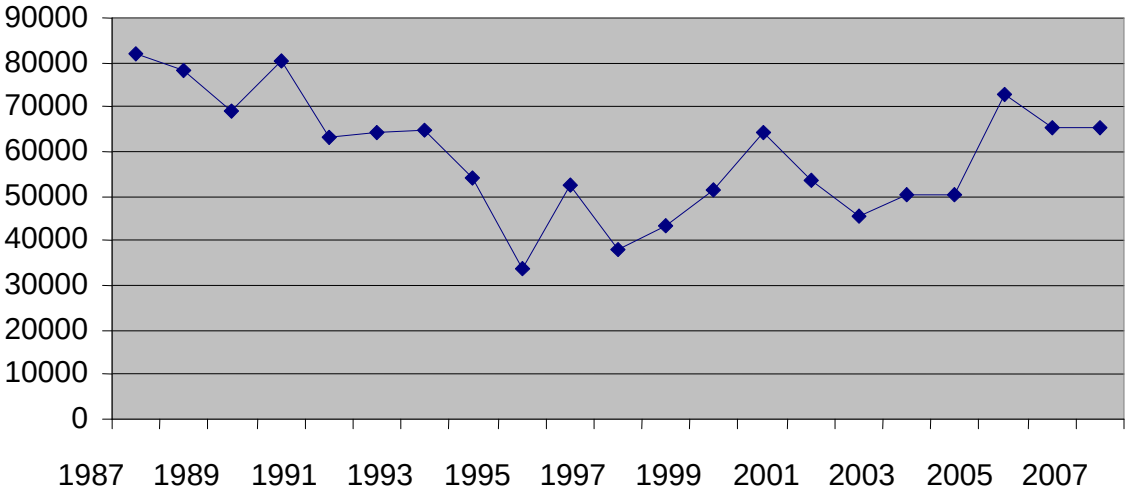
Malawi's aquatic biodiversity is rich but most aquatic biodiversity groups with the exception of fish are poorly known. Fish is economically important to Malawi and also happens to be the most studied group. According to NBSAP there are over 1000 species of fish in Malawi of which 800 are in Lake Malawi alone and contribute to about 14% of world fresh water fish. About 95% of lake Malawi fish are endemic. Despite this no fish species has been recorded to have gone extinct in Malawi although there have been records of some fish species being locally displaced from their original habitats. For example, *Labeo mesops* (ntchila) and *Opsaridium microlepis* (mpasa) are more abundant on Tanzanian and Mozambique side of Lake Malawi because of pristine environments and very little overfishing. River and catchment degradation can lead to local loss of fish populations and local damage to lake populations near the river mouths. A few of the fish that migrate up stream for breeding such as *Opsaridium microlepis* (mpasa), *O. macrocephalus* (Sanjika), *Labeo mesops* (Ntchira), *Barbus eurystomus* (Kadyakolo), *Burbus litamba* (Thamba) are endemic and rare due to catchment

degradation. These species are more abundant in the Mozambican and Tanzania side of the Lake

The fish biodiversity in Malawi is also threatened by exotic species such as the common carp and Nile Tilapia. These fish species have potential to hybridize with their relatives and these can lead to fish genetic erosion and collapse of the endemic fish species. In order to protect Malawi's unique fish biodiversity the Fisheries Act limits the use of exotic fish species within Lake Malawi basin. The artisanal fishermen which exploit mostly inshore fisheries resources are also a threat to fish biodiversity. Artisanal fishermen target cichlids of which 99.9% are endemic in Malawi. It is believed that overfishing and use of inappropriate fishing gears have contributed to the reduction in abundance and distribution of *Oreochromis species* over the past 30 years. In addition to overfishing, the Chambo nursery grounds have disappeared as shoreline vegetation is removed by seining and development of hotels and resort. These are some of the factors that have contributed to decline in fish production over the past 30 years.

Fish production declined from an estimated 70,000 metric tonnes to 50,000 metric tonnes between 1980 and 2000 (Figure 3). Chambo alone declined to about 9,000 metric tonnes per year (Figure 3). This decline was due to overfishing, use of inappropriate fishing gear and pollution. As a result about 102 fish species are listed as endangered.

Figure 3. Trends in fish production



Source: Malawi Poverty and Initiative economic Report (May 2010).

The total number of amphibian species is not known although some studies have recorded 146 species. Studies conducted in the 1990s recorded 101 amphibians in Lake Malawi catchment alone. Of these about 23% are endemic to Lake Malawi basin. However, the conservation status of amphibian species cannot be determined with certainty. Despite this

the IUCN Global Amphibians Assessment for Africa of 2002 recorded 37 threatened amphibian species from central and southern African. Of these 12 amphibians species are reported in Malawi. There is an urgent need therefore to assess and evaluate the conservation status of amphibians in Malawi.

There are about 139 reptile species (crocodile, monitor lizard, terrapin and turtles) that are most closely associated with freshwater habitats in Malawi. Studies to determine conservation status of reptiles are unavailable, thus making it difficult to determine their conservation status. In the absence of these studies, all endemic reptile species should be treated as being under conservation threat. For example, crocodile populations are in the decline, mainly due to habitat competition with people. In addition, the following reptiles are under threat for extinction in the basin; *Chamaelo muelleri, Chamaelo mlanjensis, Rhampholeon elatyceps, Platysaurus mitchelli, Lygodactylus rex*.

There are no obligate freshwater avian species in Malawi. However, previous studies recorded about 153 species that live part of their life cycles in water and 14 riparian communities (terrestrial species that live have close association with aquatic habitats). Many of the biome-restricted and endemic birds may be considered to be under considerable threat because their distribution is now become narrow due habitat degradation and fragmentation.

Hippopotamus and Otters are probably the only mammals that have a true affinity for aquatic habitats. The Hippopotamus show a declining trend due to habitat loss and conflict with human activities. 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 capensis*) and the spotted Necked (*Lutra maculocollis*). Both species are rare and are now listed in IUCN Red Data list as threatened in 2010.

1.3.3 Status of agricultural biodiversity

Agricultural biodiversity (the variability among animals, plants and microorganisms that are used or indirectly used for food and agriculture) are the main driving force of the agricultural sector and Malawi's economy. It comprises the diversity of varieties and breeds used for food, fodder, fuel and pharmaceuticals and species that support production such as soil microorganisms and pollinators. In Malawi agrobiodiversity is viewed in terms of domesticated plants and animals.

Malawi was a country of sorghum (*Sorghum bicolor*) and millets (*Pennisetum* spp. and *Eleusine coracana*) before the introduction of maize. Current policies favour maize production and as a result sorghum and millets have been marginalised. The local maize variety (*Zea mays*) that has been in production has largely been local flint types but with introduction of hybrids local genotypes are now infused with newer hybrids. *Ex situ* conservation of the local type is constrained by lack of storage facilities at the National Plant Genetic Resource Centre (NPGRC).

Beans (*Phaseolus vulgaris*) have high genetic diversity. The diversity is eroded due to market forces that demand red kidney classes. Bambara groundnut (*Voindzaea subterannea* also referred to as a crop of our ancestors), are more nutritious and contributes more biologically

fixed nitrogen than groundnuts. Bambara groundnuts are not widely grown and are listed in IUCN Red Datalist as threatened species. It is one of the crops which have received considerable attention when it comes to *ex situ* conservation in Malawi.

Malawi's animal genetic resources (AnGR) comprise ruminant livestock, mammalian monogastrics, and avian monogastrics. Majority of the livestock (95%) are of the indigenous type which have low fertility and growth performance, low milk yield (1 litre/day for cattle) and early ages at maturity resulting into smaller mature body sizes. These species are at risk of genetic erosion due to indiscriminate crossbreeding, stock thefts and diseases. There are also smaller population of exotic breeds and their crosses, which are mainly on large/commercial farms. The Malawi Zebu (MZ) cattle are the only indigenous bovine animal that has been domesticated. This accounts for more that 90% of all cattle found in Malawi. Recent trends in milk and beef production are favouring the importation of exotic breeds to be mixed with indigenous Malawi Zebu but this may lead to loss in indigenous gene pool. There has been crossbreeding of Holstein/Friesian bulls with indigenous Malawi Zebu cows to improve milk production and Brahman/Sussex/Africander/Charolais bulls with Malawi Zebu cows to improve beef production. The programme discontinued but there has been a lot of interbreeding and inbreeding within the populations and as a result Malawi zebu cattle do still have exotic blood in them in various proportions. The programme resulted in improved birth weight, weaning and mature weights. However, current records from Mbawa Research Station reveal that the birth weights of Malawi Zebu bull calves have declined from 27kg in 1988 to 15kg in 1997 whilst that of heifer calves has declined from 26kg to 14kg over the same period. This declining trend probably indicates that there is a lot of inbreeding within the herd. New foundation herd of bulls and cows from different agro- ecological zones should be established to improve the genetic diversity.

There are five breed types of domesticated and introduced birds (*Gallus domesticus*), viz: Indian River and Cobb-Cobb for meat; Hy-line for eggs and red in colour; Black Australorp as dual purpose for meat and eggs; Black Australorp and local crosses for dual purpose; and the Local as dual purpose. The Dwarf Local is less abundant, the frizzle Local is extremely less abundant, the Naked neck local is moderately abundant, the Spotted Local is highly abundant, the Helmeted Local is less abundant and the Long-legged is extremely less abundant (almost extinct). Despite the fact the local chicken is threatened recent figures from the Ministry of Agriculture and Food Security show a general increase in the population of local chickens (i.e. from about 10 million chickens in 2005 to 15 million chickens in 2008).

Among the domesticated small livestock, goats (*Capra hircus*) are the perhaps the most popular. There are four main genotypes in Malawi. These are the Boer goat (introduced from South Africa, is extremely less abundant); the Boer crosses, the Saanen (introduced for milk production) is extremely less abundant and so is very rare. The local goats are abundant and therefore of less conservation concern.

Sheep (*Ovis aries*), is 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 breed is extremely less abundant.

Conservation status of domesticated livestock is summarised in Table 8 below. Goat and sheep are abundant and therefore of less conservation concern. Some types of chickens are threatened and their populations have reduced drastically. Malawi Zebu is considered vulnerable since through indiscriminate crossing and inbreeding its genetic diversity has reduced drastically.

Table 8. Conservation status of domesticated livestock

Species	**Introduced Breeds**	**Indigenous Breeds**	**Conservation Status of the Indigenous Breeds**
Large Herbivores			
Cattle			
Dairy	Friesian/Holstein		
Beef	Brahman, Hereford, Simmental	Malawi Zebu	Vulnerable
Small Ruminants			
Goats (*Capra hircus*)	Boar, boar crosses and saanen	Indigenous local goat	LC (least concern)
Sheep (*Ovis aries*)	Dorper	Malawi Fat Tailed	LC (least concern)
Domesticated chickens (*Gallus domesticus*)	Indian river, Black australorp	Indigenous varieties include draft, frizzle, the naked neck, the spotted, the helmeted and long-legged types.	Among the local types the frizzle and long-legged types are extremely rare and feared locally extinct.
Pigs	Large white	Indigenous black pigs. Maintained on farm.	LC (least concern)

1.4 Threats to biodiversity

Threats to biodiversity refer to activities that have potential to contribute to reduction in biodiversity. In general terms major threats affecting Malawi's biodiversity may be placed into five broad groups; loss and fragmentation of natural habitats, over harvesting or over exploitation of natural resources, invasive species, pollution and climate change. Most of the

threats are as a result of human activities and are interlinked. For example, the NBSAP highlights deforestation as the major environmental problem in Malawi but deforestation has contributed to habitat loss and degradation of both terrestrial and aquatic biodiversity.

1.4.1 Loss and fragmentation of natural habitats

Alternative land uses for urban development, agricultural expansion, infrastructure development and mining have contributed to reduction or degradation of important habitats and ecosystems. A good example is the conversion of Kalwe Forest Reserve for the construction of the new Nkhata Bay District Hospital. Kalwe Forest Reserve is among the remaining rain forests in Malawi. Another example is the proposed Sugar factory to be constructed within an ecologically sensitive wetland (Lufuwu Dambo) in lakeshore district of Central Malawi, Salima. Lufuwu wetland is an important habitat for migratory birds and also supports the livelihoods of surrounding communities in terms of fishing and agricultural.

The current agricultural practice is also contributing to loss and fragmentation of natural habitats. The agricultural sector is dominated by subsistence farming with average land holding ranging from 0.5 and 1.5 Ha and is characterised by continuous cultivation on the same land, encroachment into marginal lands and protected areas.

High population and density are considered the greatest cause of habitat fragmentation since more land is cleared for settlement and is in search for fertile land to increase food production. This has directly contributed to reduction in forest cover from 44% to in 1970s to 28% in the 1990s. Thus as long as population growth rate remains high, pressure on land for settlement, agriculture and resource use will remain high and this will continue to exert pressure on the remaining habitats.

Total forest cover is estimated to be declining at 1.0 to 2.8% annually due to deforestation for agricultural expansion, charcoal production etc. This imply that forest have undergone significant degradation of ecological structure, function or composition as a result of human interventions. With the current deforestation rate it is highly likely that by 2020 most forest reserves will be critically endangered (i.e. will have undergone severe degradations of ecological structure, function and composition as a result of human interventions).

1.4.2 Over-harvesting or over exploitation of natural resources

Malawi is one of the poorest countries in the world being listed 163 out of 174 in the United Nations Development Annual Report for the year 2009. The poverty situation in Malawi is critical considering that 52% of the 13 million people live below the poverty line whilst 22% live in dire poverty. This is an improvement from in the 1990s when 62% of the populations lived below the poverty line. Despite this improvement however, about 90% of the population are forced by their low economic base to depend on natural resources endowment for energy (fuelwood), food, construction material, medicine, and fodder. This means that Malawians are forced by this low income base to trade-off long term sustainable resources for short term consumption of stocks since they depend entirely on the existing natural resource endowment for a living and other needs. This overdependence on natural resources has contributed to local extermination of some widely used natural resources. For example wild edible orchids which used to be widely distributed have been overharvested and their populations have been reduced to unsustainable levels.

A number of factors, e.g. inadequate enforcement of the policy, inadequate pricing policy contribute to over exploitation of natural resources in Malawi. For example, although fishing is regulated by the Fisheries Act, law enforcement when it comes to monitoring the closing season is not closely monitored such that fishing continues even during the closed season. In adequate enforcement of the Forestry Policy has also encouraged overharvesting of medicinal plants such as *Jetroliza bukobensis* and *Mondia whytei* which are highly demanded in neighbouring countries. Current pricing policies don't considered biodiversity as economic goods and this has resulted in poor pricing of biological resources, leading to overharvesting of resources. For example, Malawi timber has for the past decades been the cheapest in the region and this promoted uncontrolled and unsustainable harvesting of timber in Chikangawa pine plantation for export to neighbouring countries and beyond. Mulanje cedar although considered of high economic value in also inadequately priced.

Most Malawi animals have been hunted for meat, for their skins, for their horns and tasks as such populations of such animals as impala antelope, sable antelope, elephants, wild dogs, rhinos has reduced greatly. For example populations of Zebra have reduced from 00 to 00 in Nyika National Park. Population of Nyala antelope in Lengwe National Park reduced from 2527 in 1998 to 781 in 2007, whilst populations of buffalos redcued from 4144 to 666 within the same period. The population of zebras in Nyika National park was estimated to be 476 in 2005 but this reduced to 300 in 2008.

1.4.3 Invasive alien species

Invasive alien invasive species are organisms that are intentionally or accidentally introduced and threaten indigenous biodiversity through consuming and preying on them, competing with them, or through hybridising with them.

Approximately 30 invasive alien species have been recorded in Malawi, of these 28 were reported in the NBSAP. Two invasive alien species have been recorded since publication of the NBSAP, these include black wattle and eucalyptus bug (origin of Australia). Thus bringing the total number of known invasive alien species to 30 (comprising 17 plant IAS, 10 invertebrate IAS and 3 potential fish IAS).

Studies have shown that alien invasive species such as Central American mesquite (*Prosopis juliflora*) due to it allopathic educed growth has overgrown and replace indigenous vegetation in same parts of Lake Chilwa wetland (Swang'oma area). Similarly, the massive mats of water hyacinth have potential to change water chemistry, impede penetration of light and displace indigenous flora and aquatic life including fish.

Cypress aphids were first reported in Malawi in 1986. By 1990 it was estimated that cypress aphids killed exotic conifer trees worth over 40 million US dollars. Cypress aphids have also been reported in Mulanje cedar but the extent of damage caused by cypress aphids on Mulanje cedar is not known. Using biological control agent (wasps), damage caused by cypress aphids on conifers in Malawi has reduced significantly.

Invasive alien fish species recorded in Malawi such as the common carp and nile tilapia have potential for overtaking the indigenous biodiversity through hybridizing with their relatives found in Malawi's aquatic ecosystems. To protect Malawi's unique fresh water fish, use of these species within the Lake Malawi basin is prohibited by law.

1.4.4 Pollution

Pollution is considered to be one of the factors that threaten biodiversity. The existing data indicate that bush fires, dust gases and car exhaust fumes are major sources of atmospheric pollution in Malawi. Effluents from major factories and domestic and commercial sewages which are often discharged knowingly or unknowingly into the river systems are major pollutants of the aquatic ecosystems. Through filtration and leaching agricultural chemicals, fertilizers and herbicides are also discharged into the river systems. Although it is recognised that high nutrient content caused by fertilizer leaching into aquatic ecosystems makes the aquatic ecosystems become anaerobic, the extent to which this has affected species survival in aquatic ecosystems is not known.

1.4.5 Climate change

It is projected that Malawi will experience an increase in temperature within the range of 1-3^{o}C. It is further projected that this will reduce water levels in all major lakes of Malawi and thereby threatening fish production. For example, fish breeding sites in Lake Chilwa were affected during the 2001 draught and as a result *Oreochromis shiranus* were restocked with Lake Malawi genotypes. The increase in temperature may also change species composition of some plants and animals in favour of species better adapted to drier environmental conditions. From the initial communication it may be generalised that due to climate change drier areas such as Chikwawa and Nsanje will be drier and experience extreme rainfall shortages, reduction in forest cover and food shortage. Changes in rainfall and temperature patterns may lead to extinction of less resilient organisms of economic importance such as soil micro organisms and pollinators. Additionally, with increase in temperature some sensitive species will shift in their distribution range.

1.5 Implication of biodiversity loss

Malawi's economy and human society is entirely dependent and based on the biological diversity and services provided by the ecosystems. Extrapolated from the contribution of biodiversity components to the national economy (the Gross Domestic Product) it can be stated that the biodiversity of Malawi is instrumental in providing sources of livelihood needs in form of food and fibre, fuel wood, medicine and shelter. The economy also depends on the use of biodiversity as sources of raw materials for agro-industrial development and exports. The impact of biodiversity loss is here assessed based on the importance and contribution of biodiversity to major economic sectors of Malawi e.g. ecosystems, fisheries, forestry, agriculture, tourism and health. This section is based on the 2009 economic report and the 2010 Malawi Poverty and Environment Initiative economic report.

The economic value of ecosystems services (for nutrient recycling, provision of clean water and air, control micro environment and erosion) to the economy is difficult to estimate. These functions are important such that the value of ecosystem services to the Malawi may be more than the National Gross Domestic Product (GDP). For example, forests as sinks of carbon, a major green house gas, help Malawi mitigate the effects of climate change. Forests therefore help Malawi save millions of dollars that Malawi would spend to manage the effects of climate change.

The contribution of agrobiodiversity to the national economy may be more than the contribution of agricultural sector to the GDP since the Malawi economy is predominantly dependent on agriculture, which contributes about 40% of the Gross Domestic Product (GDP) and accounts for more than 90% of employment and 90% of merchandise export earnings. The agricultural sector benefits greatly from certain groups of biodiversity such as nitrogen fixing organisms, soil micro-organisms and pollinators. The use of nitrogen fixing plants is a direct response to the requirements for a lot of nitrogen by plants, given the low soil fertility levels in most parts of Malawi. This reduces the need for chemical fertilizers. Agriculture also benefits greatly from insects such as bees, flies, and butterflies, as well as bats and birds as pollinators. Wild relatives of crops and animals, when maintained, are sources of genetic material for breeding programmes for disease and pest resistance and yield improvement. It is therefore evident that the loss of agrobiodiversity has a detrimental effect on Malawi's economy.

The contribution of biodiversity to the health sector is two fold: as source of medicine or raw material for medicine; and as a source of food and nutritional security. As source of medicine, more than half of the world's modern drugs are derived from biological resources. In Malawi it is estimated that about 80% of the rural population rely on traditional medicines for the treatment of diseases. In addition to supplementing the National Health Services, traditional medicine is a source of income to the Traditional Healers. It is estimated that more than 3,000 people earn their income through working as Traditional Healers with some practising and supplying herbal medicines to South Africa, Zambia and Zimbabwe markets. Biodiversity is also important as source of food (such as tubers, vegetables, wild fruit, mushrooms) and contribute to the nutritional security. Loss of biodiversity therefore means that demand on the national health care service will be high, and this may cost Malawi millions of dollars.

The fisheries sector contributes almost 2.8% towards the GDP. Additionally, the fisheries sector provides 50% of total animal protein in Malawi. It is also estimated that over 350,000 people along the major fishing areas are engaged in fisheries related economic activities. The fisheries sector provides employment opportunities to people in fishing, processing and marketing. Despite these values, the intensification of fishing has resulted in near disappearance of some species and the gradual dwindling of fish production. Thus loss of fish biodiversity will have a negative impact on the economy of Malawi and livelihoods of people that depend on fish for a living.

Majority of Malawians depend on natural resource endowment for a living as sources of fuelwood, poles and timber, bamboo, crafts, thatching grass, medicines, spices, flowers, cosmetics, edible fruits, tubers, vegetables, mushrooms, fodder, and extractives (dyes, oils, gums, latex, resins). Grass is used extensively for thatching, especially in rural areas, while in the lakeshore region there is a flourishing handicraft industry based on the indigenous species. Wood fuel (firewood and charcoal) remains the dominant source of energy accounting for approximately 90% of the household and industrial energy requirement. At the household level wood is also used for construction, fence posts, sawn logs, furniture and joinery, sawn timber, boats and canoes, carvings, mortars and pestles, axe and hoe handles. This means that loss of biodiversity will have serious implications for the people who depend on them and any value cannot adequately convey the level of dependence on natural resources for the survival of the people.

Loss of forestry resources has devastating effects on the country's social and economic life. Social issues related to loss of forestry resources include:

- reduced sources of income for people who depend on plants, e.g. craftspersons. When preferred plant species are depleted, users who depend on them are deprived of their means of livelihood.
- reduced supply of the basic needs (food, fuelwood, medicines, timber, etc). Women, traditional healers, craftsmen and others have to travel long distances to fetch fuelwood, timber, and medicinal plants.
- loss of sacred and secret society sites. Some forested patches play an important role in the cultural life of the people and are considered sacred.
- flooding and siltation, creating ecological refugees and causing low levels of water in rivers for irrigation and hydro-electric power generation.

Wood fuel (Firewood and charcoal) remains the dominant source of energy accounting for approximately 90% of the household and industrial energy requirement. In 1996 demand for fuelwood was estimated at 15.45 million cubic metres and growing at 8% per annum. About 90% of this total demand is consumed by households and the rest is consumed by Industry. About 90% of urban energy consumption is from wood fuels. The Malawi BEST study estimates that woodfuel accounts for 4.3% on annual DGP. At the household level wood is also used for construction pole, fence posts, saw long, furniture and joinery, sawn timber, boats and canoes carvings, mortars and pestles, axe and hole handles. Harvesting of these products is selective with certain species preferred for certain products.

Tourism contributes approximately 4% to the GDP. Lake Malawi, with its wide range of endemic fish, is a major tourist attraction. This is followed by wildlife based tourism in national parks and Wildlife Reserves where large mammals such as elephant, buffalo, zebra are the major source of attraction. Through community participation, communities surrounding tourist areas earn income through IGAs and employment. Communities also benefit from sharing of benefits realised through CBNRM initiatives. Mechanisms of benefit sharing include retention of a proportion of the fees, licenses and concessions. The socio economic value of tourism cannot be estimated with certainty but it can be estimated based on its contribution to the economy is estimated to be not less than or equal the contribution of tourism to GDP.

1.6 Economic cost of unsustainable use of natural resources

Habitat loss and degradation, and loss of species have an impact on the economy of Malawi. For example eradication of invasive species which are wide spread in Malawi requires billion of dollars. Currently poor land use practices lead to siltation of water bodies and degradation of rivers. This leads to scarcity of water for irrigation and domestic use and as a result the government spends billion of dollars to provide water for irrigation and domestic use. Degradation of Shire River leads to clogging of electricity supply which leads to massive power cuts costing Malawi billion of dollars in maintenance and business failure. It is evident therefore that Malawi pays a high price for unsustainable use of natural resources. The

Malawi Poverty and Environment Initiative economic study estimated the cost of unsustainable use to be equivalent to giving up 5.3% of GDP each year (Table 9). Taking into consideration the MGDS aims for *total* annual GDP growth of 6%, MPEI Economic study report hypothesized that Malawi would have been richer by MK 27.1 billion (US$195 million) each year in 2007 prices if soil, forest, fishery and wildlife resources were used sustainably. Over time the costs of unsustainable resource use would accumulate such that over a decade the value of unsustainable natural resource use would amount to more than MK86 billion (US$615 million) in 2007 prices.

Table 9. Economic costs of unsustainable natural resource use

NR sector & source of cost – base case	*Annual cost (2007 prices)*			*Discounted cost of damage over 10 years*	
	MK Million	*US$ Million*	*% of GDP*	*MK Million*	*% of GDP*
Soils:	**8,988**	**65**	**1.9%**	**40,665**	**8.2%**
On-site impact on agriculture	7,540	54	1.6%	30,915	6.3%
Off-site impact on hydropower	1,433	10	0.3%	9,688	1.9%
Off-site drinking water treatment	15	0	0.0%	62	0.0%
Forests:	**12,983**	**93**	**2.4%**	**31,795**	**11.0%**
Unsustainable roundwood (excl fuelwood)	3,100	22	0.4%	12,710	2.4%
Unsustainable fuelwood	6,089	44	1.2%	2,495	4.8%
Flood prevention (indicative only)	232	2	0.2%	1,987	0.8%
Indoor air pollution	3267	23	0.7%	13,394	2.7%
Outdoor air pollution - WB 2002	**327**	**2**	**0.2%**	**2,417**	**0.5%**
Fisheries:	**3,906**	**28**	**0.8%**	**7,666**	**1.5%**
Unsustainable use (lower bound)	3,906	28	0.8%	7,666	1.5%
Wildlife:	**665**	**5**	**0.1%**	**2,730**	**0.5%**
Poaching loss (indicative only)	665	5	0.1%	2,730	0.5%
Total	**26,573**	**191**	**5.3%**	**84,064**	**21.4%**

Source: Malawi Poverty and Initiative economic Report (May 2010).

Chapter Two

Current Status of Malawi's Biodiversity Strategy and Action Plan

2.1 Introduction

The NBSAP for Malawi was published in 2006 after a comprehensive and broad based interactive participatory process involving all key stakeholders in biodiversity conservation and sustainable use. Implementation of some priority activities identified in the NBSAP started even before official publication of the NBSAP. This means that progress reported in this chapter is not only limited to the four years the NBSAP has been in operation but it also includes practical lessons learned before publication of the NBSAP. Problems Malawi has encountered in the implementation of the NBSAP and measure put in place to speed up implementation have also been highlighted. Whilst highlighting these achievements the link between NBSAP and how it relates to the implementation of CBD articles is also highlighted giving emphasis on how the NBSAP has contributed to the implementation of certain aspects as requested in COP8 decisions.

2.2 Brief description of the National Biodiversity Strategy and Action Plan for Malawi

The NBSAP was based on studies of the status and trends of biodiversity components. The studies focuses on such biodiversity issues as ecosystems, terrestrial biodiversity, aquatic biodiversity, agrobiodiversity, biotechnology, biodiversity policies and legislation, community participation, invasive alien species and incentive measures. The goal of the NBSAP is to conserve, protect and manage by the year 2020 all forms of life for all people with full participation of all stakeholders and to use the biodiversity sustainably and where benefits accrue to share them fairly and equitably. The strategy established four goals as follows:

- Actively protect, conserve and maintain protected areas, mountains and species within them,
- Enhance and improve biodiversity knowledge base through research and capacity building,
- Enhance sustainable use of biodiversity including agricultural biodiversity,
- Enhance community understanding and appreciation of biodiversity.

The NBSAP identified 192 actions. Of these 22 were priorities to be implemented first on the premise that Malawi lacks capacity and resources to implement all actions at once (Table 9). The actions were grouped into eleven thematic groups: terrestrial biodiversity; aquatic biodiversity; sustainable use of genetic resource; indigenous knowledge, access and benefit sharing; biotechnology; biodiversity policies and legislation; community participation; information, knowledge and capacity; incentive measures; invasive species and Malawi's role in global biodiversity conservation. Within each thematic area, the NBSAP identified a set of desirable outcomes and key strategic objectives. For each strategic objective a set of strategies and actions were identified. The thematic areas were selected in such away that they respond or contribute to the implementation of CBD articles and programme of works (Table 10).

The time frame for implementing these activities was estimated to be 2020. This time frame was chosen to coincide with the timeframe for Malawi's Vision 2020, which is the overall

policy framework for medium term socio economic development. In addition, this timeframe was considered long enough to allow Malawi to implement complex strategies, allow for revision of the NBSAP, and also implement the 2010 biodiversity target and the Millennium Development Goals. Thus the NBSAP set out a comprehensive long term strategy for the conservation and sustainable use of biodiversity components in Malawi.

2.3 Progress on incorporation of CBD targets and indicators into the NBSAP

Malawi's NBSAP provides adequate information regarding the status of biodiversity, where Malawi wants to be in terms of biodiversity conservation and sustainable use and how to achieve the intended results. The NBSAP however, does not provide indicators for measuring success. The desirable outcomes for each thematic area may however be considered indicators but most are not SMART (specific, measurable, achievable, realistic and time bound).

In keeping with Malawi's commitment to Article 10 of the Convention, Malawi is currently developing Guidelines for sustainable use of biodiversity. The aim of the guidelines is to promote the conservation and sustainable use of biodiversity in Malawi. They include indicators as tools for measuring success. The activities identified in the Biodiversity guidelines are not directly related to those identified in the NBSAP and as such the indicators identified in the Guidelines cannot be used to measure progress in the implementation of the NBSAP. Similarly the indicators cannot be used to assess the extent to which Malawi has implemented the 2010 targets. Since the guidelines are yet to be finalised, consideration should be given on data collections and calculations of certain indicators related to NBSAP and 2010 targets such as number of invasive species, extent of habitant loss for each ecosystem and ensure that the same indicators are also applicable to the NBSAP and 2010 targets.

The NBSAP prioritised 22 Priority actions based on their contribution towards achieving national and global biodiversity goals and targets. In keeping with Decision VII/30 of CoP VII, which urged and invited Parties and Government to develop national targets and indicators and incorporate them into national programmes including NBSAP, actions that were perceived to contribute to the implementation of the Global 2010 targets were prioritised. The NBSAP further associated each Priority Action with targets (which were eiher similar to the 2010 targets or were modified to suite the local conditions). An indication of the extent to which the Priority Actions have been achieved is highlighted in Table 10 below.

Table 10. Priority actions and targets as prioritised in the NBSAP

Priority actions and associated targets in NBSAP	Progress
Priority Action 1: Formulate a policy framework that would promote conservation of species, habitats and ecosystems that are important but not represented within the existing protected area networks or are vulnerable, fragile or are at risk of irreversible loss or decline of biodiversity.	• Malawi has initiated a process to revise the Environmental Management Act to incorporate biodiversity concerns. • Biotechnology and Biosafety Policy was approved in 2008. • A process to develop an Agrobiodiversity

Targets: Biodiversity hotspots including lakes and wetlands, mountains and terrestrial habitats and ecosystems outside the protected areas network are identified, characterized and protected by 2010 (*2010 BD Target 1.1*).	policy has been initiated. • Plant Breeders Rights Act awaits parliamentary approval.
Priority Action 2: Develop and implement programmes for sustainable conservation of important ecosystems of biodiversity importance including miombo ecosystems, mountain ecosystems, wetlands and biosphere reserves. Targets: Areas of particular importance to biodiversity such as Miombo ecoregions, Afromontane ecoregions of forest ecosystems and wetlands diversity effectively conserved by 2010 (*2010 BD Target 1.2)*.	• An integrated watershed management programme being implemented in Lake Chilwa Basin. • Malawi and Zambia are developing a collaborative project to manage and conserve the biodiversity of Nyika Transfrontier Conservation Area.
Priority Action 3: Encourage and support the protection, maintenance and restoration of areas of particular importance for the conservation of selected indigenous species. Targets: Restore, maintain or reduce the decline of population of species of 50 threatened species by 2010 (*2010 BD Target 2.1*).	• The MMCT established an Endowment Trust to support long term management and conservation of Mulanje Mountain Forest Reserve, an area of high biological diversity. The endowment has initiated work to restore the distributional range of mulanje cedar on the reserve through re afforestation programme.
Priority Action 4: Promote enforcement and compliance to policy, legislation and international conventions. Targets: Policy, legislation and other international instruments ratified and promulgated by 2008.	• Biosafety Protocol which Malawi signed in 2005 was ratified in 2008. Prior to ratification Malawi had enacted a Biosafety Act in 2002. • Biotechnology and Biosafety Act was approved in 2008.
Priority Action 5: Promote 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. Targets: Rates of loss and degradation of natural habitats decreased by 2010 (*2010 BD target 5.1*).	• Community Participation in Nyika-Vwaza has improved good working relationship such that communities around Nyika and Vwaza participate in fence maintenance, boundary clearing and some have surrendered muzzle loading guns. This has also reduced the rate of encroachment into the park such that no records of encroachments have been reported for the past 10 years.

Priority Action 6: Develop and enact regulations for access to and equitable sharing of benefit arising from the use of genetic resources. Targets: Benefits arising from commercial and other utilisation of genetic resources are equally shared with stakeholders by 2010 (*2010 BD Target 10.2*).	• The Environmental Management Bill when approved by parliament will have guidelines for Access and Benefit sharing. • The National Parks and Wildlife Act of 1992 was amended in 2004 to take into account issues of collaborative management. The Act promotes 50-50 sharing of benefits and responsibilities by each party.
Priority Action 7: Collect and maintain genetic resources in gene banks, botanic gardens, national parks, herbaria, museums and zoos, and promote re-introduction, in-situ and ex-situ conservation of priority, rare, or endangered taxa. Targets: Databases of genetic resources are created and published by 2009.	• About 3000 accessions of plants have been collected and stored at the NPGRC. • Sorghum, finger millet and bambara nuts have been reintroduced in selected areas. • About 950 endangered, rare or endemic plants have been collected through the Millennium Seed Bank Project and are stored an Millennium Seed bank in London with duplicates in NPGRC.
Priority Action 8: Collect all agrobiodiversity, 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. Targets: Agrobiodiversity, genetic diversity of fish and other valuable species conserved (*2010 BD Target 3.1*).	As above
Priority Action 9: Develop or strengthen existing regulations and institutional framework on conservation and sustainable use of rare and endangered taxa including international trade on endangered species. Targets: Illegal trade on endangered species reduced by 2010 (*2010 BD Target 4.3*).	• Guidelines for Access and Benefit Sharing developed. • Environmental Management Bill will facilitate formulation of Environmental Protection Authority which will be responsible for coordinating environmental activities in Malawi.
Priority Action 10: Develop methodologies to monitor, prevent and arrest the spread of invasive species in shared ecosystems, including early detection and coordinated management efforts at the community, national and regional levels.	• The Forestry Research Institute of Malawi (FRIM) has an ongoing programme to prevent spread of alien invasive species in forestry. • FRIM also coordinating an African network on invasive alien species and through this collaboration FRIM have identified potential invasive alien species in

Targets: Pathways for major potential alien invasive species controlled by 2010, management plans in place for major alien invasive species that threaten major ecosystems of Malawi by 2008 (*2010 BD Target 6.1, 6.2*).	eucalyptus. • Mulanje Mountain Conservation Trust has a management plan for managing invasive alien species on Mulanje Mountain Forest Reserve.
Priority Action 11: Implement the Biosafety Act and develop and implement a broad based biotechnology policy. Targets: Sectoral plans for the implementation of the Biosafety Act are developed and implemented by 2010; relevant departments and institutions have identified and trained staff in handling, monitoring and identification of GMOs.	• In 2007, Malawi developed Biosafety Regulations to guide management of Genetically Modified Organisms. • Three Standing Operating Procedures documents have been developed: Confined Field Trial Guidelines, Trial Manager's and Inspector's Handbook. These were developed in preparation for the first Confined Field Trial in cotton which when approved will be conducted at Bunda College.
Priority Action 12: Assess and identify available incentive measures important for biodiversity conservation, sustainable use as well as benefit sharing and promote the adoption of best practices. Targets: Biological resources that support sustainable livelihoods, food security and health care identified and maintained by 2010 (*2010 BD Target 8.2*).	• Plans are underway to identify incentive measure important for biodiversity conservation. • Department of National Parks and wildlife is implementing an incentive measures programme in Nyika Vwaza area which comprises Resources use Programme and Revenue Sharing.
Priority Action 13: Promote the involvement of the local communities, local leaders, the private sector and NGOs in decision-making regarding the management of biological diversity and ecosystems through community based natural resources management communities. Targets: Guidelines and regulation for establishing and managing village natural resource management areas are developed and implemented; community natural resource management areas identified and managed by 2010.	• Guidelines for CBNRM within the forestry sector lead to the identification and signing of six community clubs within the Mulanje Mountain Forest Reserve. • The Department of National Parks is in the process of developing guidelines for community participation within national parks and under these guidelines all community clubs will be under a single umbrella.
Priority Action 14: Promote joint management of biodiversity and ecosystems along national boundaries for the management of shared	• Malawi and Zambia in 2002 signed a Memorandum of Understanding for the management of transfrontier conservations

biological resources. Targets: Cross border management committees are established along shared natural resources; guidelines for cross border management of natural resources developed and implemented by 2008.	areas in Nyika and Kasungu national parks.
Priority Action15: Promote mechanisms for wise use of development assistance. Targets: New and additional financial resources are transferred to Malawi; regulations and code of conduct for use of development aid are developed and implemented by 2008 (*2010 BD Target 11.1*).	• Ministry of Finance in 200? Developed and approved a Development cooperation manual which also includes code of conduct regarding use of development aid. This has been basis for creation of Sector Wide Approaches in Agriculture and Education. There is potential for SWAP in environment focusing on the implementation of climate change programmes.
Priority Action 16: Promote the participation of different government agencies and collaboration with international organisations in programmes and activities to fulfil Malawi's obligations to the CBD and related treaties and protocols. Targets: Guidelines, procedures and mechanisms for technology transfer are developed and implemented by 2010 (*2010 BD Target 11.2*).	No progress
Priority action 17: Provide strategic direction and guidance to review and harmonize relevant policies and legislation and ensure that policy and legislation are in line with the Convention on Biological Diversity and other international conventions. Targets: Sectoral policies are revised to incorporate biodiversity issues by 2008.	• Environmental Management Act is being revised. Relevant sectoral policies and legislation will have to be revised to conform to the revised Act giving emphasis on strengthening law enforcement.
Priority action 18: Establish alternative financing mechanisms that will minimize resource expenditure and encourage close collaboration between sectors. Targets: Biodiversity Trust funds are established	• Apart from the existing Trust Funds, MMCT, MEET and EF, no new trust funds have been established for the past five years. • There is an opportunity to establish a Trust Fund for the long term management of the Nyika Transfrontier Project, under the

and fully operational; guidelines for establishing biodiversity working groups are developed and implemented by 2008.	proposed World Bank\Norway support
Priority action 19: Promote enforcement and compliance to policy, legislation and international convention through the creation and empowerment of an independent Environmental Protection Agency. Targets: Environmental Protection Agency is established and operational by 2007.	• The Environmental Management Bill provides for establishment of an independent Environmental Management Authority. This will be responsible for overall management of environmental activities in Malawi.
Priority action 20: Develop human, institutional and national capacities to identify, monitor and manage biodiversity through training for target groups in relevant courses including taxonomy, natural resources management, biodiversity assessment and ethnobiology. Targets: Diplomas, certificates, BSc ands degrees in Biodiversity management are established and fully functional in universities and other natural resource management training institutions by 2010; relevant posts (e.g. taxonomists, ecologists, geneticists) and training opportunities are identified and implemented by 2010.	• University of Malawi has been offering a master degree in environmental sciences and more than 100 students from Forestry Department, Department of Environment Affairs, Fisheries Department have been trained since the programme started. • Universities of Malawi and Mzuzu are offering undergraduate course in natural resources management and this has improved human capacity in the environmental sector.
Priority action 21: Instil a biodiversity culture in the youth of Malawi and local communities by developing guidelines on environmental education and curricula for schools and establishment of in-service training programmes for teachers. Targets: Curricula and guidelines for primary and secondary schools are developed and fully implemented. Training needs and institutions for teachers are identified, prioritized and promoted; guidelines for community participation and education for environmental and natural resources management are developed and fully implemented by 2010.	No progress
Priority action 22: Establish and provide capacity for operationalizing the national CHM and	• Guidelines for cooperation and participation of institutions in the CHM are

strengthen and implement the existing CHM institutional structure, and develop national biodiversity databases. Targets: Policy guidelines on biodiversity information management are developed and/or reviewed; regulations and guidelines on biodiversity information standards and on access and benefit sharing of biodiversity information developed by 2010.	developed. • Relevant staff has been trained in the operation and management of the CHM. • CHM for Malawi has been developed published.

2.4 Contribution of NBSAP to the implementation of CBD articles and national programmes

The Malawi NBSAP was developed after a thorough assessment of biodiversity components. Choice of components to be studies was made based on their contribution to the implementation of CBD Articles. The relationship between the thematic areas and article of the CBD as envisaged during the preparation of the NBSAP is provided in Table 10. This section highlights contributions the NBSAP has made towards the implementation of CBD articles and objectives.

A preliminary assessment of the extent to which the Malawi NBSAP has contributed to the achievements of the CBD articles and objectives was done in 2008. Results were presented at a workshop organised by the EAD and it is clear from the results that substantial progress has been made toward the realisation of some CBD articles. The biggest problem in Malawi has been the lack of policy guidance on biodiversity conservation, lack of plan of action for the implementation of the NBSAP and weak coordination mechanism and lack of monitoring and evaluation system. To improve the situation, Malawi is currently revising the Environmental Management Act (an overarching legal framework for the management of environment in Malawi). The revised act when passed by Parliament will have comprehensive guidelines and legal framework for conservation and sustainable use of biodiversity. The lack of a coordination unit in biodiversity and environment in general will be addressed by the proposed Environmental Protection Authority. These achievements are in line with the requirements of Article 6 of the Convention which requires parties to come up with enabling legislations for the conservation of biodiversity.

In keeping with the requirements of Article 15 on suitable use of agrobiodiversity and decision V\5 of CoP5 regarding the work programme on Agricultural Biodiversity Malawi is in the process of developing an agrobiodiversity policy. Among other things the policy will provide for mechanisms for protection of indigenous knowledge and benefit sharing that may arise from using the materials collected from farmers. Issues of Access and Benefit sharing are important for Malawi and in line with provisions of Article 8 of the Convention, Malawi developed guidelines for access to genetic resources and has also included measures to regulate access to genetic resources in the revised Environmental Management Act.

In keeping with Article 14 of the Convention regarding impact assessment and minimising adverse effects on biodiversity, Malawi in 1997 developed comprehensive guidelines for EIAs.

In line with this provision EIAs are carried out for all programmes (e.g. road maintenance rehabilitation Programme, irrigation, education, health programmes, and hydroelectric scheme). EIAs have played an important role in shaping developmental projects with potential impacts on the environment and well being of the people. The case of Kayelekela Uranium mine in the northern region of Malawi clearly shows that the EIAs provided guidelines on how the effects of effluents from the mine on terrestrial and aquatic ecosystems and biodiversity would be mitigate.

Issues of biotechnology are partially regulated by the Biosafety Act of 2003, which was developed in response to the Cartagena Protocol. In line with the Biosafety Act regulations and guidelines for management of GMOs have been developed. Malawi also developed a comprehensive National Biotechnology Policy and Biosafety Policy which was approved by parliament in 2008. Regulations on management of Genetically Modified Organisms were developed in 2007. These achievements are a testimony that Malawi has made significant progress in the implementation of the requirements of Article 19 (on handling of biotechnology and distribution of its benefits).

Table 11. Relationship between thematic areas and CBD Article

Thematic area	Targeted CBD article
Terrestrial biodiversity	Article 7. Identification and monitoring. Article 8. In situ conservation
Aquatic biodiversity	Article 7. Identification and monitoring. Article 8. In situ conservation.
Sustainable use of biological resources	Article 8. In situ conservation Article 9. ex situ conservation Article 10. Sustainable use of components of biological diversity
Traditional knowledge, access and benefit sharing	Article 15. Access to genetic resources. Article 8j. Indigenous knowledge systems
Biotechnology	Article 19. Handling of biotechnology and distribution of its benefits
Invasive species	Article 7. Identification and monitoring. Article 8. In situ conservation Article 9. ex situ conservation Article 10. Sustainable use of components of biological diversity
Biodiversity policies and legislation	Article 6. General measures for conservation and sustainable use
Community participation and	Article 13. Public education and awareness

awareness	Article 11. Incentive measures
Information, knowledge and capacity	Article 17. Exchange of information Article 16. Access and transfer of technology.
Incentive measures	Article 11. Incentive measure
Malawi's role in Global Biodiversity conservation	Article 22. Relationship with other international conventions. Technical and scientific cooperation. Article 5. Cooperation

2.5 Progress on implementation of the NBSAP

Although the NBSAP was published in 2006, it has not been widely disseminated and publicised in Malawi. As a result the NBSAP has not been followed up by key stakeholders and its implementation has been uncoordinated. In order to ensure and facilitate a coordinated approach to the implementation of the NBSAP, a workshop was arranged in April 2009 to document achievements made by key stakeholders, identify challenges associated with the implementation and map a way forward in order to speed up implementation.

The implementation structure provided in the NBSAP does not articulate clearly an action plan, mechanisms and structures for reporting and monitoring. The reporting structure would facilitate monitoring of the extent to which key stakeholders contribute to the implementation of key actions of the NBSAP. Thus the lack of the reporting structure, coupled with inadequate coordination and follow up by key stakeholders constrained the EAD to follow up the extent of NBSAP implementation. It must also be recognised that the NBSAP has been in operation for four years and as such the timeframe for reporting is too short to warrant detailed reporting on all 192 actions individually. Progress made towards the implementation of the 22 Priority Actions has been provided in section 2.3. This section therefore will highlight major achievements for each thematic area focusing on progress made towards achieving desirable outcomes that the NBSAP envisioned to achieve for each thematic area by the year 2020.

2.5.1 Terrestrial biodiversity

The NBSAP identified the following seven desirable outcomes in relation to conservation and sustainable use of terrestrial biodiversity. It was envisaged that when fully implemented terrestrial ecosystems and species within them will be conserved sustainably leading to increase in number and distributional range of ecosystems and species. However, activities that have so far been implemented are yet to contribute to the realisation of these outcomes.

Desirable outcomes by 2020	Progress
• Significant progress made in the conservation of species, habitats and ecosystems important for terrestrial biodiversity leading to increase in area	• Limited work on restoration of degraded ecosystems is being implemented by the Forestry Department in collaboration with NGOs. For example the MMCT planted 150

under protection (such as forests and grasslands) and restoration of degraded areas.
 	
• Significant number of private landowners are managing and protecting species and habitats leading to a reduction in number of species requiring in situ and ex situ conservation.
	Ha of Mulanje cedar bringing the total area under cedar to 850 Ha. The Forestry Department is implementing a restoration programme of degraded forest reserves such that Thyolo, Ndilande and Soche forest reserves.
	• Through the translocation programme Majete Wildlife Reserve has been restoked with a wide range of mammals and this has resulted in an increase in elephants from zero in 2003 to 215 currently and the number of black rhinos from zero to 7 currently.
	• Fisheries Department developed a strategy to restore Chambo (Tilapia) and this has contributed in an increased in chambo catched.
	• Through Public Private Partnership with DNPW, African Parks is managing Majete Wildlife Reserve and as a result mammals that were once extinct have been restored (Box 1).
	• Malawi has made significant progress towards improving biodiversity knowledge base through the following activities.
	  • Database of botanical collection. This has facilitated preparation of national checklist of plants and preparation of inventories and packaging of biodiversity information in a format most suitable to users.
	  • Capacity building. Appropriate staff has been trained in collection and management of biological collections (plants, fish, birds, mammals and insects).
	  • Collaborative research on propagation and management of medicinal plants.

• An understanding of the extent of Malawi's terrestrial biodiversity through inventories and systematic research has been achieved.	• Through the Millennium Seed bank Project around 950 species classified as endangered, threatened, economically wild plants have been conserved *ex situ* at the National Plant Genetic Resources Centre (NPGRC) with duplicates in the Millennium Seed Bank at Kew Garden, London UK.
• Programmes and mechanisms to prevent establishment of pests including prevention of introductions, control and eradication of alien invasive species identified and implemented, resulting in less frequencies of pests and reduced impact of invasive species on terrestrial ecosystems.	• FRIM has an invasive alien species management programme for forestry species. Through the programme populations of invasive cypress alphids has reduced significantly. • MoAFS has been implementing an invasive alien species programme of cassava mealybug and larger grain borer. This has reduced the populations of mealybug and thereby protecting the cassava germplasma.
• A clear understanding of threats to biodiversity and ecosystems has been achieved and avoided or mitigated. Malawi's Red Data Lists have been revised and contribute to better decision-making on species recovery programmes and ex situ conservation.	• Threats to biodiversity have been studied. • If species assess during the Millenium Seed band project are approved, the list of species on the national red data list will increase.
• Clear government guidelines and strategies on the conservation of mountain biodiversity and ecosystems facilitate community participation leading to gazetting more mountains as protected areas.	No progress
• A significant increase in the number of protected areas will lead to increased protection of a representative range of ecosystems and species and provision of legal status to some important ecosystems that are currently under customary and private land tenure	• Forest Reserves have increased from 85 in 1998 to 88 currently. This will increase to 91 when the proposed three forest reserves are approved. This will lead to an increase in protection of a representative ranges of ecosystems and species. • Danish Hunters Association is in

systems.	collaboration with lake Chilwa communities protecting bird sanctuaries in lake Chilwa wetland. Plans are underway to make lake Chilwa a community protected area. This will facilitate protection and sustainable use of birds in the wetland.

2.5.2 Aquatic biodiversity,

Progressing in achievement the following desirable outputs as set out in the NBSAP has been little. It was envisaged however that actions related to conservation of aquatic biodiversity will lead to improved understanding and conservation of aquatic ecosystems and species within them.

Desirable outcome by 2020	Progress
• Inventories of all aquatic ecosystems and species available, guidelines to promote research especially in the areas of ecology and taxonomy, and threats to biodiversity developed.	• An inventory of aquatic species, covering fish, amphibians, plants, invertebrates etc of lake Malawi basin was collected during the Lake Malawi biodiversity project. This is yet to be updated.
• Increased public knowledge about the importance of aquatic ecosystems and their current threats has been achieved through public awareness and education campaigns.	• Through public awareness campaigns by the Department of Fisheries messasges on importance of aquatic ecosystems are disseminated to stakeholders.
• Policies and legislation related to aquatic biodiversity and ecosystems are harmonised and strengthened and are supporting conservation and management of aquatic biodiversity.	• National Water Policy promotes a holistic and an integrated approach in water resources management and is harmonised with the Forestry Policy, Fisheries Policy, Energy Policy, Hydro power, Eco-Toursism and recreation policies. The policy provides for regular pollution control inspections on waste disposal facilities especially in tourist infrastructure adjacent to water bodies. In relation to forestry management, the policy promotes participation in integrated planning, development and management of the water resources

	catchment areas with the forestry department.
• Management plans for various types of aquatic ecosystems based on holistic and integrated approach put in place and instituted in a co-management arrangement. This will lead to an increase in number of aquatic protected areas and increase in protection of a representative range of aquatic ecosystems and species.	• Total LandCare is implementing an integrated watershed management project within Lake Malawi catchment. Project activities such as conservation agriculture, reforestation, agroforestry will lead to reduced soil erosion and thereby decrease the amount of sediment load into the lake. • There is an opportunity for improved ecosystem functioning of aquatic ecosystems of the Shire River Basin through the proposed Shire River Basin Watershed Management Project being developed by the World Bank. The project will target restoration of heavily degraded areas. • Lake Chilwa Basin Climate Change Project aims to build the resilience of communities and natural resources to adapt to effect of climate change and also reduce environmental degradation.

2.5.3 Sustainable use of genetic resource

The NBSAP set out an ambitious agenda in order to achieve sustainable use of genetic resources by 2020. Without follow up and an elaborate implementation action plan it is not surprising that little progress has been made towards achieving the following desirable outcomes.

Desirable outcomes	Progress
• Guidelines and procedures for conservation and sustainable use of forest, fish, and wildlife biological diversity are in place and are resulting in the improvement in ecological functioning of forests and aquatic ecosystems.	• Draft guidelines for sustainable use of biodiversity have been developed and waits approval of the National Biodiversity Steering Committee.
• Mechanisms for stakeholder participation in collection, characterisation, research and storage of biological resources, including	• The NPGRC disseminates information through: participation in agricultural shows, field days and the website. Under the Global Plan of Action for Plant Genetic Resources,

programmes for public awareness and education on the role and importance of pollinators, soil flora and fauna in maintaining the agricultural diversity are contributing substantially to maintenance of domesticated and indigenous species important for agricultural production and food security.	the Centre has established a National Information Sharing Mechanism (NISM). This is a partnership among stakeholders that contribute to the conservation and sustainable use of Plant Genetic Resources for Food and Agriculture (PGRFA) in Malawi. The aim of NISM is to foster exchange of information and in line with this the centre has website to promote information sharing www.pgrfa.org/gpa/mwi/welcome.htmx.
• Integrated policy and institutional framework are encouraging and facilitating a coordinated approach to conservation and sustainable use of biological diversity.	• Malawi has initiated a process to develop and put in place an agrobiodiversity policy to guide sustainable use of biological resources. The policy has provisions for access and benefit sharing, mitigation and adaptations to climate change etc and when in place will promote a coordinated approach to conservation of agrobiodiversity in Malawi.
• Guidelines and procedures to enhance, protect and encourage customary use of biological resources in keeping with traditional practices that are compatible with sustainable use of biological resources are in place.	• Malawi developed a Plant breeder's bill which includes farmer's rights. The bill awaits approval of parliament.
• Guidelines and mechanisms to promote and facilitate on-farm management, utilisation and conservation of biological diversity are developed and are encouraging conservation of biodiversity on customary land.	• Malawi has for the past 20 years been implementing an *ex situ* and *in situ* programme for the conservation of agricultural biodiversity through the National Plant Genetic Resource Centre (NPGRC). Currently the centre has collected and characterised over 3000 accession of indigenous crops. In addition, the centre has a programme to reintroduce lost crop varieties such as millet, yams, Livingston potato, groundnuts, bambara nuts and local varieties of maize in drought prone areas with full participation of communities. Furthermore the centre has an on-going conservation programme of indigenous crops species and has so far reintroduced finger millet in Mzimba, sorghum in Nsanje and chikwawa and bambara nuts in Lilongwe.
• Mechanisms and guidelines to enhance	• The Poverty and Environment Initiative (with

research, human and institutional capacities are promoting investigations into the relationships between sustainable use and conservation of biological resources, and subsequently leading to realisation of the full potential of Malawi's biological diversity in socio economic development.	support from UNEP) commissioned a study to evaluate the economic importance of natural resources. The study focused on the contribution of forests, soils, fish, wildlife to the economy. It has been established that forests contributes about 6.1 % to the GDP, fisheries contributes about 4% and wildlife contributes about 2.7% to the GDP. These results will be used by policy makers to make sound decisions on resource allocation to conserve Malawi's natural resources.

2.5.4 Indigenous knowledge, access and benefit sharing

Little progress has been made towards achieving desirable outcomes for the above thematic area for 2020. Despite this the following may be considered as major achievements.

Desirable outcomes by 2020	Progress
• Guidelines for the enhancement of preservation and maintenance of indigenous knowledge and the innovations and practices of indigenous and local communities are promoting sustainable use of biological resources and equitable sharing of benefits arising for the use of biological resources.	• No progress
• Policy guidelines and legislation that have provisions to facilitate the implementation of Article 15 of the CBD and integrate the Bonn Guidelines on access to genetic resources and fair and equitable sharing of the benefits arising out of the use of genetic resources are promoting access to genetic resources, utilisation and bioprospecting in accordance with international conventions and national regulations.	• Malawi is at the moment reviewing the Environmental Management Act. The bill which awaits parliamentary enactment has a comprehensive coverage of Access and Benefit Sharing procedure and guidelines.
• Guidelines and procedures on public awareness on access and benefit sharing and on utilisation of indigenous knowledge are empowering local communities and are enabling them to have bargaining power to negotiate fair and equitable terms of access and benefit sharing both at national and international levels.	• The National Parks and Wildlife Act (amended 2004) has clear guidelines on sharing of benefits with communities that leave within the park boundaries. This also applies to the Forestry Department which has clear guidelines on benefit sharing.

• Biological resources, products and processes other than plants and animals are protected by patents and plant varieties are protected by some form of IPRs.	• The relevant IPR legislation in Malawi is the Patents Act. This deals with Industrial inventions and was not designed with specific attention to biological resources. As currently defined most of the indigenous technologies which are passed from generation to generation may not be recognised. In order to correct the situation work is under way to integrate the African Model Legislation for the Protection of the Rights of Local Communities, Farmers and Breeders. • MoAFS drafted Plant Variety Bill which should also integrate relevant sections of the African Model Legislation.
• Guidelines and procedures to ensure equitable and fair distribution of benefits to Malawi stakeholders are in place.	• When approve the revisd EMA will include regulations to facilitate equitable sharing of benefits. • DNPW through its Access and benefit sharing programmes (which comprises, Resource use Programme, revenue sharing) has clear guidelines on sharing benefits with surrounding communities.

2.5.5 Biotechnology

Biotechnology is relatively new in Malawi and there are neither commercialized GM crops nor confined field trials. Malawi however has made some notable advances by putting in place policy and legal framework for the promotion and safe use of biotechnology and its products. When assess against desirable outcomes set out in the NBSAP it may be stated that Malawi has made significant progress in achieving outcomes related to biotechnology. Issues of biotechnology are partially regulated by the Biosafety Act, which was developed in response to the Cartagena Protocol.

Desirable outcomes by 2020	Progress
• A definitive biotechnology policy governing the development and handling of biotechnology in Malawi is developed and implemented.	• Malawi in 2008 developed and adopted a National Biotechnology and Biosafety policy.

• The Cartagena Protocol on Biosafety and the Biosafety Act of 2002 are enforced fully for the creation of an enabling environment for the environmentally sound application of biotechnology.	• In 2007, Malawi developed Biosafety Regulations to guide management of Genetically Modified Organisms. • There are three Standing Operating Procedures documents in place to guide biosafety issues namely Confined Field Trial Guidelines, Trial Manager's and Inspector's Handbook. These might first be used when the first Confined Field Trial in Bt cotton to be conducted will be conducted at Bunda College is approved.
• Guidelines are available to guide public awareness programmes on biotechnology and its products and biosafety issues surrounding the technology.	• No Progress
• Human and infrastructure capacity is developed in the field of biotechnology.	• More than 20 people from various departments have attended short courses on handling of GMOs aimed at assisting Malawi build capacity in GMOs. • The University of Malawi through the MBERU has trained students at post graduate level in the area of molecular biology. • Staff from the University, MoAFS, Forestry Department, Fisheries Department have obtained higher degrees in molecular biology and biotechnology.

2.5.6 Invasive species

When compared against the desirable outcomes, it would appear that Malawi has not made a significant progress towards the implementation of CBD requirements on Invasive Alien Species. However a number of activities are being implemented that focus on eradication and preventions of IAS some of which are summarised in the table below.

Desirable outcomes by 2020	Progress
• Education, training and public awareness programmes have been developed and are operational and have made the Malawi public more	• Issues of IAS are among environmental issues tought in schools. In addition, the public is informed about the dangers of IAS through the print and electronic media although

aware about the biology, impacts (economic, social and environmental) and ecology of invasive species including risks posed by them	these have focused on water hyancith, larger grain borer and invasive fish species, e.g. the common carp.
• Standardised procedures and guidelines for identification, risk assessment, socioeconomic impact assessment, reporting systems, prevention, control and eradication methodologies of invasive species are in place and are contributing to the reduction in number of invasive species and or establishment of new alien invasive species as well as minimizing the spatial distribution and frequency of introductions of invasive species.	• No progress regarding development of standardised procedures and guidelines for IAS management have been developed. Despite this a number of activities are bening implemented that are contributed to eradication on IAS by the Forestry Department, Department of Fisheries, MMCT and Electricity Commission of Malawi.
• Significant progress is made in the development of mechanisms for transboundary cooperation, multilateral cooperation and coordination of national programmes including establishment or strengthening of a coordinating unit to coordinate invasive species programmes.	No progress
• In line with CBD guiding principles for the prevention, introduction and mitigation of impacts of alien species, enabling policies and legislation including institutions are developed and are guiding national management and surveillance of invasive species programmes and research; invasive species considerations are integrated into sectoral policies and programs.	• The NEP provides for the control of IAS. The revised sectoral policies (Forestry Policy, Wildlife policy, Fisheries Policy) also provide for control and eradication of IAS. • The Plant Protection Act prohibit introduction of alien species and has provisions for assessment of introduced species through quarantine.
• Research guidelines are in place and are promoting coordinated research and community participation in invasive species research.	No progress

The Department of Fisheries continues to implement a water hyacinth *Eichhornia crassipes* control programmes using a combination of techniques ranging from mechanical removal and

biological control methods. Biological control methods were used the long-term suppression of the water hyacinth using natural enemies.

Ministry of Agriculture and Food Security has an IAS management programme that focused on the control of invasive alien cassava mealybug (*Phenacoccus manihoti*) with a diverse range of parasitoids and predators and control of the neotropical cassava green mite (*Mononychellus tanajoa*) with a diverse range of predatory mites most of which were indigenous. MoAFS has also a comprehensive programme for the control and eradication of the invasive larger grain borer.

The Forestry Department has a number of IAS activities which include:

a. **Biological control of cypress aphids-** During the 1990s, FRIM introduced *Pauesia juniperorum* a biological control agent against cypress aphids (*Cinara cupressivora*). Of late, the major activities of the project have been to monitor the impact and performance of the biological control agent in various parts of the country. The most recent studies investigated the performance of the aphids and their biological control agents on host trees. It has been observed that *P. juniperorum* is capable of reducing the population of cypress aphids by up to about 30%.

b. **Eradication of Pines and Himalayan raspberry on Mulanje-** since 2005, MMCT and the Department of Forestry has been carrying out activities to eradicate forest invasive plant species on Mulanje Mountain Forest Reserve. To date, more than 650 hectares have been cleared of invasive species (pine) by manual removal.

c. **Networking**

   FRIM has taken a leading role in the establishment and management of an Africa-wide network on forest invasive species. The network aims to share knowledge and experiences on forest invasive species in the region. Through the network, potential threats e.g. *Sinex noctilio* pest of pine trees in South Africa and Zimbabwe and *Leptocybe inrasa* pest on eucalyptus have been identified. The eucalyptus bug has already been reported in Malawi.

Malawi also has an opportunity to eradicate bracken fern (*Pteridium aquilanium*) from Nyika Plateau under the proposed Nyika TFCA project. Bracken fern has displaced a number plant species of Nyika Plateau.

Despite the above achievekents, implementation of IAS programmes is challenged by a number of factors such as:

i) Uncoordinated programs, with no specific line authority mandated to coordinate IAS activities,

ii) Weak border control and quarantine activities, mainly due to inadequate human and infrastructure capacity,

iii) Limited resources such that invasive species control is restricted to priority areas,

iv) Uncertainty about the environmental, social and economic risk and long-term of forestry invasive species,

v) Insufficient public education and awareness on invasive species and their impacts,

vi) Inadequate platform for collaborative and coordinated actions on invasive species both nationally and cross-border,

vii) Ineffective and outdated legislation and regulatory/policy frameworks for addressing invasive species and their impacts,

viii) Insufficient information, research on control, eradication, prevention and management of invasive species.

2.5.7 Biodiversity policies and legislation

In Malawi, biodiversity conservation is not government by a single legislation but by all sectoral policies and legislations dealing with various components of biodiversity such as the Forestry Policy, Fisheries Policy, National Parks and Wildlife Policy. These sectoral policies and legislations were revised to conform to requirements of NEP and EMA. However, the NBSAP considers EMA as an inadequate act when it comes to conservation of biodiversity since it lacks provisions for access and benefit sharing, mandate for endangered species, designation of critical habitats and ecosystems. These may be some of the reasons that might have triggered revision of the Environmental Management Act which started before publication of the NBSAP.

Desirable outcome by 2020	Progress
• Roles of government, NGOs and the private sector in biodiversity conservation and sustainable use have been identified, defined and prioritised.	• The roles of government, NGOs and the private sectors in biodiversity conservation are clearly defined in NEP, NBSAP and the Local Government Policy.
• Biodiversity objectives as defined in the NEP and relevant sections of international conventions and treaties have been reviewed and incorporated into all sectoral policies and legislation.	• Malawi incorporated biodiversity objectives into sectoral policies during the policy reform which was undertaken in order to align the sectoral policies with requirement of NERP and CBD.
• Government has mandated a technical department under an independent Environmental Protection Authority to implement and enforce biodiversity policies and legislation.	• Malawi in 2006 initiated a process to revise the Environment Management Act. The revised Act has provisions for establishment of an independent Environmental Protection Authority. This will be responsible for e an overall coordination of environmental management in Malawi including law enforcement.
• Significant political will has been created leading to a significant improved	• An addendum on MGDS on environment was approved and climate change

government leadership in fulfilling international conventions and treaties.	together with environment has been included in the MDGS as one of the priority areas. This has enabled Malawi to allocate more resources through the national budget to climate change activities.
• Increased public awareness of various biodiversity-related policies and legislation.	
• Significant progress is made to identify and harmonise conflicting and non-complementing sectoral policies.	• The Policy review undertaken during the NBSAP process identified a number of policy deficiencies as follows: o The Forestry Act was developed without extensive consultation and without specific reference to EMA. It may be necessary to harmonize the two Acts, particularly with regard to provisions relating to declaration and revocation of Forest Reserves and environmental impact assessment. On this recognition, Malawi has initiated a process to revise the forestry policy and act. o There is also need to harmonize the Forestry Act with Land Act, the Electricity Act, the Local Government Act and the National Parks and Wildlife Act since their provisions affect, directly or otherwise, forestry issues. For example, the Local Government Act gives powers to local authorities to carry out reafforestation programmes and manage forests in their areas of jurisdiction. It appears that these powers may be exercised independent of and exclusive from the Department of Forestry. o The Fisheries Act does not provide for provision of incentives to aquaculture farmers to encourage them to engage in fish farming.

	o The Wilife Act of 1992 had no provision for buffer zones. There was need, therefore, to revise relevant sections of the Act to provide for creation of buffer zones for all national parks and to incorporate provisions for the involvement of communities in wildlife management. In this recognition, the Act was amended in 2004 to incorporate issues of collaborative management and benefit sharing.

2.5.8 Community participation and awareness

Malawi recognises that the environment is intrinsically connected to the social and economic fabrics of the rural communities, providing ecosystem services ranging from provision of food, nutrient recycling, regulation of abundant undesirable organisms, etc. Despite the many functions, and government programmes on environmental management, Malawi still experiences serious environmental degradation. This is due in part to the lack of understanding and appreciation by communities of the importance of biodiversity in sustaining life. This is the reason why sustainable conservation of biodiversity requires more than just financial investment; it also requires greater knowledge and understanding of the importance of the biodiversity by all stakeholders, particularly rural communities who are often the most affected by the impacts of environmental degradation. Community participation in natural resources management is provided for in the NEP. At the community level community participation is facilitated by the Local Government Policy which promotes community participation through local level committees such as Village Development Committees.

Desirable outcomes by 2020	Progress
• Communities participate in planning, management and implementation of biodiversity programmes and law enforcement through natural resources community associations.	• In line with NEP, sectoral policies have provisions for community participation. This has facilitated community participation in forestry, fisheries and national parks through Area Development Committees. For example, through community participation the Department of Forestry have signed 6 co-management agreements with communities around Mulanje Mountain Forest Reserve. The Fisheries Department has signed co-management arrangements with Chia

	Lagoon fishermen Association for the co-management of Chia lagoon. This has facilitated identification and conservation of fish sanctuaries in the lagoon.
• Primary, secondary and tertiary curricula revised and strengthened to incorporate issues of biodiversity conservation and sustainable use.	• Malawi in response to requirements of the NEP which seeks to promote sustainable social and economic development through enhanced public and political awareness, in 1996 published a National Environmental Education and Communication Strategy. The strategy continues to guide implementation of public awareness in biodiversity conservation and sustainable use and has facilitated inclusion of environmental concerns including climate change into the school curriculum at primary, secondary and tertiary levels. UNIMA and MZUNI now offer environmental and natural resources courses at undergraduate and post gradiuate levels.
• The public, especially the children, are more aware of the value of biodiversity through schools and community programmes.	• In response to the Environment Education and Communication Strategy and in close collaboration with the EAD, the Wildlife and Environmental Society of Malawi (WESM), continue to sensitive and instil environmental culture in the youth and the general public through wildlife clubs in schools, thematic publication, radio and TV programme, and education visits to areas of ecological importance.
• Local stakeholders including researchers, professionals and private resource managers have adequate information about biodiversity in their areas and that indigenous knowledge is incorporated into biodiversity management programmes.	• Malawi has just published its CHM which will improve availability, sharing and exchange of biodiversity information.
• The private sector actively participates in biodiversity conservation and sustainable use through provision of adequate financial resources at the local community level.	• Malawi Environmental Endowment Trust operates a small grants scheme for environmental activities. MEET has provided funding for the construction of an electric fence in Kasungu National Park, provided support for bee keeping activities in Mulanje Forest Reserve and has recently provided support for the biodiversity project of Zomba

	Malosa Forest Reserves. • African Parks Majete contributes significantly to conservation of biodiversity in Malawi. Through its conservation programme the vegetation of Majete has been restored and all the encroached areas have been recovered and revegetated. Almost all animals which were locally extinct have been reintroduced. • Mulanje Mountain Conservation Trust in collaboration with the Forestry Department has intensified law enforcement around Mulanje Mounatin Forest Reserve and this has resulted in reduced illegal cutting of Mulanje cedar.
• Guidelines and programmes for gender and HIV/AIDs mainstreaming in Biodiversity conservation are promoting participatory and appropriate research.	• No progress has been made in the developing guidelines and programme for gender and HIV/AIDS mainstreaming. However, a number of mainstreaming activities are being undertaken. HIV/AIDS mainstreaming has focused mainly on consumption of indigenous crops rich in nutrients and vitamins through home based care programmes.

2.5.9 Biodiversity Information and knowledge

Information on biodiversity is available in form of published literature, grey literature, data bases of botanical, museum and fish collections. This information however has never been consolidated, packaged and made available in a format most appropriate to the users. This has affected information sharing and exchange. It was therefore envisioned by the NBSAP that biodiversity information would improve if human and infrastructure capacities were developed.

Desirable outcomes by 2020	Progress
• Readily available biodiversity information in a format and language most appropriate to the end user.	• Establishment of National Information Sharing Mechanism through the FAO Biodiversity International programme has brought many stakeholders together to understand the importance of conserving plant genetic resources. The initiative has also assisted raise awareness on the status and importance of plant genetic

	resources locally, regionally and internationally through the website www.pgrfa.org/gpa/mwi/welcome.htmx. • Through the PROTA (Plant Resources of Tropical Africa) Project biodiversity information has been collected, complited and packaged in formats most appropriate to end users. The information is available on line (www.prota.org) and in print.
• Well maintained and regularly updated inventories of taxonomic groups to facilitate efficient monitoring and identification of biodiversity.	• Little progress has been made in updating national inventories of vatious biodiversity components.
• Made sufficient progress in filling the existing scientific information gaps in the following areas: species identification and classification, natural products research including medicinal plants, ecosystems management and systematics.	• Through the SOBONET project, Malawi collected information about distribution, conservation status and uses of plants of Malawi. • Through the Nyika Biodiversity Support Project funded by the Government of Norway, conservation status, distribution, uses and the extent of diversity of plants of Nyika National Park has been collected and databased. • Medicinal plants projects being undertaken by FRIM and the NHBG has collected new information and is facilitating conservation of rare medicinal plants through cultivations in medicinal gardens.
• Made noticeable progress in the collection, classification, identification and management of biological collections of different taxonomic groups.	• Approximately 100,000 plant specimens are housed at the National Herbarium in Zomba. • About 3000 accessions of plant genetic resources are housed at the NPGRC. • Fish specimens collected from Lake Malawi and other water bodies have been characterised classified and are housed at the Fisheries Research Unit in Monkey Bay. • The Museums of Malawi collects and

	keeps biological material of various biodiversity components ranging from birds, snakes, mammals etc. • The University of Malawi, Makoka Research Station, FRIM and Bunda College are maintaining a large collection insect of Malawi. Malawi had previously planned to create an insect museum based on these collections, but this was constrained by lack of funding.
• Guidelines and mechanisms for information sharing and exchange.	• The EAD is in the process of developing guidelines for information sharing and participation of institutions in the CHM. • With funding from UNEP Malawi has developed CHM for biodiversity conservation. Relevant staff has been trained in the operation and management of the CHM within Environmental Affaires Department.

2.5.10 Incentive measures

The proposals for design and implementation of incentive measures as annexed to decision VI/15 were taken into consideration during preparation of strategies and actions in the NBSAP thematic area for incentive measures. However, although the NEP provides for mechanisms for economic incentives for sustainable management of the environment in Section 3.2, there are no true incentives in biodiversity conservation in Malawi. The only measures that provide some kind of incentives for biodiversity conservations are those related to benefit sharing in CBNRM. In Malawi, some kind of access and benefit sharing is provided for in the Forestry Policy, Fisheries Conservation and Management Policy, Wildlife Policy and National Parks and Wildlife Act (2004) as amended. The Wildlife Policy is significant as it promotes granting of use rights to communities who legitimately use the land on which wildlife occurs, recognises the importance of equitable distribution of benefits and revenues derived from sustainable use of wildlife resources. In line with this policy, DNPW is implementing the following programmes: Resource Use Programme, which allows harvesting selected wildlife resources by adjacent communities; wildlife related enterprises, and revenue sharing with adjacent communities. Resource Use Programmes are also practiced in Forestry and Fisheries.

Desirable outcomes by 2020	Progress
• Policies, laws and institutional frameworks are revised or developed to remove or minimize potential	• Malawi natural resources conservation was wholly state controlled which focused on policing. This encouraged illegal harvesting

perverse incentives	of resources such that black rhino and elephant populations were completely wiped out in Mwavi and Majete Wildlife reserves. Nyika National Park experienced a decline of animal population of 80%. To reverse the situation, there was a policy shift from policing to collaborative management and as a result the Forestry Policy, Fisheries Conservation and Wildlife Policy and the Wildlife Policy were revised to promote collaborative management.
• Guidelines and procedures for the application of ways and means to remove or mitigate policies and practices that generate perverse incentives are promoting community participation in biodiversity conservation and improving livelihoods of rural communities.	• The livelihoods of communities in Nyika-Vwaza area have improved through Resource Use Programmes. RUP provides immediate tangible benefits to communities and this has encouraged their participation in biodiversity conservation in PAs. Economic value for harvesting resources from PAs is valued at about US$200,000 per annum. • The National Parks and Wildlife Act provides for sharing of 50% of Park entry fees and 20% of concession fees with communities. The revenue sharing programme has been piloted in Nyika-Vwaza area and between 2004 and 2008 the Nyika-Vwaza Association has collectes US$7000 annually. The funds have been used to construct school blocks, teachers' houses, health centres and boreholes. These benefit sharing programmes have promoted community participation in construction of fences, clearing of boundaries and surrendering of muzzle loading guns in Nyika-Vwaza. • African Parks Majete is also implementing RUP and revenue sharing programme. This has contributed to significant reduction in poaching and encroachment into the reserve. • DNPW, based on lessons learned from Nyika-Vwaza will be implementing RUP and Revenue Sharing Programmes in Liwonde and Lake Malawi national parks.

	• Co-management arrangements in forestry have been a source of income to communities through sharing of revenues earned from confiscation of illegal forest products and IGAs such as bee keeping. • Communities involved in co-management forestry arrangements have potential to earn income through carbon points through the REDD initiatives. The Forestry Department with funding from USAID assessed carbon potential of Mkuwazi Forest Reserve and Thazima Forest in the northern region of Malawi. Estimated carbon stocks were 211,889±23,694 tC in the 1,767 ha of Mkuwazi Forest Reserve and 995,446±120,385 tC in the 35,910 ha of Thazima region of Nyika National Park. Based on these estimates, it was projected that Mkuwazi and Thazima would make about US$39,400 and US$141,888 per year over a period of 50 years respectively.
• Significant progress made in developing and or adopting tools and methodologies for valuation of biodiversity and biological resources	• No progress. However, recognising the role of incentive measures in promoting community participation in biodiversity conservation the EAD has initiated a process with funding from UNEP to conduct an assessment of incentive measures. It is envisioned that the assessment will feed into preparation of guidelines for incentive measures.
• Institutional framework is in place and is facilitating implementation and effective monitoring, enforcement and evaluation of incentive measures.	• Implementation of incentive measures follows a sectoral approach. In National Parks and Wildlife Natural Resources, Committees (e.g. Nyika-Vwaza Association, Upper Shire Association, Village Trusts in and around Lake Malawi National Park, and Lower Shire Association for Lengwe national Park) are the unit of production and these have to be legally registered in order to work with DNPW. The DNPW provides overall guidance and direction. A similar arrangement is applicable in Forestry and Fisheries.

2.5.11 Malawi's role in Global Biodiversity Conservation

Malawi has an international obligation to implement all articles and work programmes of the Convention. Malawi's commitment to global biological conservation dates back four decades ago when, after attaining independence, Malawi, in 1966, signed a number of conventions such as the Convention on Wetlands of International Importance Especially as Water Fowl Habitat (Ramsar Convention, 1971), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973) and the Convention on the Conservation of Migratory Species of Wild Animals. The signing and ratification of the 1992 Convention on Biological Diversity also confirms Malawi's continued commitment to contribute towards conservation and sustainable use of biological diversity. In conformity with some of the above conventions, Malawi has designated the following sites of internation biodiversity importance: Lake Chilwa (was designated a Ramsar Site in 1997; Nankumba Peninsula was declared the Lake Malawi National Park and further declared a World Heritage Site (UNESCO) and Mulanje Mountain was declared a Man and Biosphere Reserve (UNESCO) in 2000.

Desirable outcomes by 2020	Progress
• Malawi contributes to a global vision of implementing the biological resources management by participating in international fora, sharing information and expertise and fostering bilateral and multilateral cooperation in biodiversity conservation efforts.	• Malawi has made substantial contribution towards CBD decisions through: o Activily participates in CoPs and SABSTA meetings since 1992. o Chaired first SABSTA and also hosted an ecosystem approach conference in 1998 where principles of Ecosystem Approach were first discussed and recommended to CoP for further consideration. o Membership to CBD bureau. • The contributions that Malawi makes to CoP discussions are therefore not only important at the national level but also at the global level.
• Malawi continues to plays an important role in protecting biodiversity nationally regionally and globally.	• Through collaboration with the Millennium Seed Bank, approximately 950 accessions have been collected and are stored at NPGRC with duplicates at the Millennium Seed Bank in Kew, London. • Through a Memorandum of Understanding between Malawi and Zambia, biodiversity and ecosystems in

	Kasungu and Nyika National Parks are being managed jointly. • About 15% of the global total freshwater fish are found in Lake Malawi. Thus Malawi's effort to conserve Lake Malawi cichlids is of global conservation significance.
• Malawi makes significant progress to implement the CBD in harmony with relevant treaties and conventions related to biodiversity and natural resources.	• Biodiversity considerations have been integrated into the NAPA which demonstrates the link between climate change and biodiversity. • One of the cretaria for choosing Lake Chilwa wetland as a RAMSAR site was its importance as a breeding site for migratory birds. Thus by fulfilling requirements of the RAMSAR convention Malawi also implemented its obligation related to the Convention on Migratory Species of Wild Animals.

2.6 Constraints to the implementation of NBSAP and the way forward to improve implementation

2.6.1 Obstacles for the implementation of the NBSAP

Major achievements of the NBSAP implementation include the revision of the Environmental Management Act to incorporate biodiversity issues including the proposal to establish an independent Environmental Protection Authority; initiatives to put in place an Agrobiodiversity policy; enactment of the Biotechnology and Biosafety policy in 2008; development of Biosafety Regulations and Standing Operating Procedures documents to guide management and handling of Genetically Modified Organisms in Malawi. Despite these achievements however, implementation of the NBSAP encountered a number of challenges. The first problem is in relation with government commitment when it comes to funding biodiversity activities. Biodiversity funding through the national budget is inadequate when compared to the magnitude of environmental problems in Malawi. This inadequate funding creates a challenge to institutional responsible for biodiversity management because the funding provided is not adequate for effective implementation of their work programmes. Lack of funding forces government departments not to prioritise biodiversity conservations.

Although Malawi benefits from external funding, this has been irregular. In the 1990s support to biodiversity from both bilateral and multilateral donors was significant. During this period Malawi was a focal point for biodiversity conservation within the SADC region and was previlage to manage and implement regional biodiversity projects such as the Southern Africa Biodiversity Network (SABONET), SADC Biodiversity Support Programme, Lake Malawi Biodiversity Project, Mulanje Mountain Biodiversity Conservation Project. Currently the

number of true biodiversity project has dropped and the focus at the national, regional and international levels has shifted to climate change. To ensure sustainability, projects supported by development partners should benefit from the national budget.

Implementation of the NBSAP has also been affected by inadequate coordination. The Environmental Affaires Department has the overall responsibility for coordinating implementation of the NBSAP. However, currently there is no policy and legislative framework that provides institutional arrangement empowering the department for effective biodiversity coordination. This is provided in the draft Environmental Management Bill which has constituted Biodiversity Steering Committee as one of the main steering committees under the proposed Environmental Protection Agency. This means that the implementation of the NBSAP and biodiversity in general is through the National Biodiversity Steering Committee that is voluntary, ad hoc and often not prioritized because of financial constraints. The other problem with the current implementation arrangement is that although the EAD is the main institution to coordinate implementation of the NBSAP, there is no legal obligation to force institutions to implement provisions or to include the provisions of the NBSAP into their programmes. This means that the implementation of the NBSAP is haphazard, voluntary, ad hoc and often not prioritized. To improve the situation, the EAD should establish Coordinating unit and a Monitoring and Evaluation Unit for effective monitoring of biodiversity programmes. Emphasis should be on establishments of a participatory monitoring and evolution system.

An overall National Biodiversity policy should be developed to guide implementation of biodiversity conservation and sustainable use including agrobiodiversity. Implementation of specific areas such as agrobiosiversity, invasive alien species, incentive measures etc may be guided by strategies. This means that specific policies for these areas may not be necessary.

2.7 International and domestic funding dedicated to priority biodiversity activities

2.7.1 Government funding

The NBSAP is a product of a consultative process involving a wide range of stakeholders especially those concerned with the conservation and sustainable use of biological resources. Implementation of the NBSAP therefore is the responsibility all government institutions involved in conservation and sustainable use of biodiversity. The Malawi Constitution requires that all government departments are funded through the national budget. In line with the Constitution therefore funds are provided through the national budget to sectors responsible for the conservation and sustainable use of biodiversity such as the Forestry Department, Department of Fisheries, Department of National Parks and Wildlife, Museums of Malawi, Ministry of Agriculture and Food Security, the NHBG and the University of Malawi and Mzuzu University. Although the funding is not specific for biodiversity conservation, government funding has enabled Malawi maintain a network of protected areas (which are the main sectors connected with biodiversity conservation). In this regards, it may it be argued that the Malawi government is the primary source of funding for biodiversity conservation in Malawi. The government through the Local Government Funds also provide support to various

conservation activities especially those related to reforestation of degraded hills and river banks through the Public Works Programme.

2.7.2 Donor funds

Most biodiversity activities and programme are implemented with donor funding. This is important considering that government funding is often inadequate. Donor support is in three categories: government to government support through bilateral agreements (which channels funds through the Ministry of Finance); multilateral arrangements of which the GEF is the main source; and direct agreement between development partners and NGOs or the private sector.

Donors that have contributed to biodiversity conservation through bilateral agreements include the Royal Kingdom of Norway, the Japanese Government and the European Union. Within the past five years, Malawi has received funding in excess of ten million Dollars for biodiversity activities and projects from bilateral donors. The Royal Kingdom of Norway provided the sum of 15 million NOK (about 2.4 million US$) for the conservation and sustainable use of the biodiversity on Nyika Plateau. The European Union is the major donor of the forestry sector. With funding from the EU, the Forestry Department is implementing a sustainable forestry programme (Improved Forest Management for Sustainable Livelihoods Programme) in twelve districts of Malawi. The programme aims at improving the livelihoods of local communities through the provision of forest goods and services and the development of forest based enterprises. The programme has developed interventions that aim at contributing towards increased household income and food security such as tree planting and forest conservation and promotion of forest based income generating activities such as honey, mushroom and timber production and processing. The government of Japan through the "Hitoyama Initiative" has granted the Department of Forestry MK3 Billion (approximate 180 million US$) for the Forestry Preservation Programme. The programme will aim at enhancing protection of forest reserves and the conservation of biodiversity through capacity building.

The GEF continues to provide critical financial assistance to the biodiversity sector in Malawi. GEF funding is either channelled through the UNDP, UNEP or the World Bank. The GEF has funded biodiversity related activities and projects amounting to over US$12 million. Based on provisions of GEF's Resource Allocation Framework, Malawi's allocation under the previous cycle was approximately US$4,250,000 for biodiversity conservation. These funds were earmarked for three projects; Development of a National Clearing House Mechanism and Assessment of Capacity Building Needs; Sustainable Management of Nyika TFCA and Participatory Development and Management of Nkhotakota Wildlife Reserve. The previous RAF expired in June 2010 and approximately US$3,835,700 has been utilised, leaving a balance of US$414,300. The initial STAR (System for Transparent Allocation of Resources) envelope for GEF-5 for Malawi is estimated to be about 7.58 million US$ of this about 4.2 is initially allocated to biodiversity. The current STAR for Malawi is yet to be programmed.

Development partners have supported biodiversity activities with direct support to the private sector and NGOs. NGOs active in biodiversity conservation include Wildlife and Environmental Society of Malawi (WESM), Centre for Environmental Advocacy and Policy Research (CEPA),

and Mulanje Mountain Conservation Trust (MMCT). WESM is currently implemented a GTZ funded project on sustainable use of wild fruits whose main output is the establishment of a community owned indigenous fruits juice making company. With funding from the Development Fund of Norway, CEPA undertook a survey of the role of women in the conservation of traditional crops in Malawi. Based on the results of the survey, CEPA in collaboration with the Ministry of Agriculture and Food Security initiated a process to develop a national agrobiodiversity policy. Mulanje Mountain Conservation Trust is currently managing an endowment funds which is dedicated for the conservation and sustainable use of resources of Mulanje Mountain Forest Research. The endowment fund was capitalised with funding from the GEF. Currently MMCT has received additional funding from the Royal Kingdom of Norway, the EU and USAID for various biodiversity activities within Mulanje Mountain Forest Reserve. A list of selected past, on going and pipeline projects with external support are listed in Table 12.

Table 12. Summary of donor contribution to biodiversity conservation and sustainable use in Malawi

Donor	Project Title	Estimated Cost	Project status
Royal Norwegian Government	Nyika Biodiversity Cinservation support Programme	13 million Nok	Completed
	Mulanje Mountain Conservation Trust	25 million NOk	On going
	Nyika TFCA	25 million NOK	Pipeline
European Union	Improved Forest Management for Sustainable Livelihoods Programme	1.996 million Euro	On going
GEF	Nyika TFCA	About 3 million USD	Pipeline approved by GEF
	NBSAP and National Reports to the CBD (1^{st} to 4^{th} National Reports)	US$349,000	completed
	SADC Biodiversity Support Programme	US$270,000	Completed
	Lake Malawi Biodiversity Conservation Project	5 million US$	Completed
	Mulanje Mounatin Conservation Trust	5.3 million US$	Completed

	CHM enabling activity and establishments of CHM	US$11,000	On going
	Nkhotakota Game Reserve		Pipeline Approve by GEF
USAID	MOBI+LISE MMCT	3 million	On going
	NATURE Programme	9 million US$	Completed
	Kulera Biodiversity Project (with Total LandCare)	7 million	On going
	CAMPASS Project	12 million	completed
Japanese Government "Hitoyama Initiative"	Forestry Preservation Programme	MK3 Billion (approximate 180 million US$)	Approved

Biodiversity activities are also being supported through Public Private Partnerships (PPPs). Although PPPs in natural resources management are not supported by a national policy, successful PPP arrangements are being implemented in the wildlife sector. African Parks (Majete) entered into a PPP arrangement with Department of National Parks and Wildlife regarding the management of Majete Wildlife Reserve in 2003. Through the partnership, Majete Wildlife Reserve has restocked species that were once locally extinct (Box 1). It is evident from the case study the current PPP arrangement with African Parks Majete has contributed to conservation of such endangered species such as Black Rhinos and elephants.

There are prospects for PPPs to contribute to biodiversity conservation in Malawi. It is envisaged that the Nyika Transfrontier Project will be managed under a PPP arrangement between Nyika Foundation (a lead organisation to be entrusted with the management of the project) and DNPW and Zambia Wildlife Authority. Proposals are also under consideration by the Forestry Department to enter into a PPP arrangement with MMCT for the management of Mulanje Mountain Forest Reserve.

Box 1. Management of Majete Wildlife Reserve through Public Private Partnership arrangement

Majete Wildlife Reserve (MWR) has an area of 70,000 ha. It is situated in southern Malawi, Chikhwawa district. Majete was gazetted a wildlife reserve in 1960s and has been under the management of the DNPW until 2003 when African Parks signed a Public Private Partnership to manage the reserve under a concession for a period of 25 years. Due to inadequate funding and inadequate law enforcement most large mammal species e.g. elephants, black rhinoceros, lions, buffalos, eland, zebra, sable antelope were subjected to heavy poaching and were completely eliminated by the early 1993.

African Parks (Majete) Ltd (APM) became the first Private Company to be given a management concession of a Protected Area in Malawi. Under six years, significant achievements have been registered in the restocking programmes, infrastructural developments and socio-economic developments.

About 3000 animals and 11 species have been translocated from Liwonde/Lengwe National Parks, and others purchased from South Africa or Zambia. Majete now has three of the "Big five". There are 215 elephants, 7 black rhino and over 300 buffalos that have been re-introduced in Majete. Future plans include restocking Majete Wildlife Reserve with the predators such as lions, leopards and cheetahs by 2012.

Species	Elephant	Buffalo	Sable	Waterbuck	Warthog	Nyala	Impala	Zebra	Black rhino
Status in 2003	0	0	0	0	0	0	0	0	0
Status in 2010	215	306	255	295	158	58	428	177	7

2.7.3 Trusts funds

There are three trusts funds related to the conservation and sustainable use of biodiversity, Mulanje Mountain Conservation Trust, Malawi Environmental Endowment Trust and the Environmental Fund. The Mulanje Mountain Conservation Trust was established to ensure long term and sustainable management of the biodiversity of Mulanje Mountain Forest Reserve. The Trust was capitalised with funds from the GEF and has been successful in obtaining addition funding from USAID, Norway and the EU. MMCT therefore is a sustainable source of funding for conservation and sustainable use of the biodiversity of Mulanje Mountain Forest Reserve. MMCT's work on the mountain is in line with the work programme related to Mountain Biodiversity and Ecosystem Approach.

The Malawi Environmental Endowment Trust was established as a long term mechanism to finance environmental activities on recognition that funding for environmental activities was inadequate when compared to the extent of environmental problems. MEET has supported over 160 small grants valued at 4.5 million US$ since its establishment in 1999. The endowment was capitalized by a grant under the USAID\GoM cooperate agreement regarding

Natural Resources Management and Environmental Support Programme (NATURE). The cooperative agreement committed the GoM to allocate $4.41 million to capitalize the Endowment Fund. Between 2007 and 2008 the fund had dwindled to MK796 million (approximately US$5.1 million) from MK823 Million (about US$5.3 million) due to global economic crisis which affected global capital markets inclusive of Malawi Stock Exchange market.

Malawi in 2003 established the Environment Fund as an innovative, sustainable funding mechanism for central, district and local level community action in ENRM. The fund is to be capitalised with levies from electricity, mineral sales, petroleum sales, water sales etc. The fund is yet to be capitalised and has therefore not supported any projects. The fund is managed through the Environmental Affairs Department.

2.8 Effectiveness of the NBSAP; adequacy of the NBSAP to address threats to biodiversity

The NBSAP is a long term strategy to guide the conservation and sustainable use of biodiversity in Malawi. The time frame for the implementation of NBSAP was estimated to be 2020 to coincide with the timeframe for the Malawi vision 2020, and to enable Malawi to contribute to the achievement of the 2010 targets of reducing biodiversity loss by 50% as agreed by the global community and achieve by 2015 the Millennium Development Goals. It must be recognised that NBSAP has been in operation for about 20% of its intended timeframe. It is therefore premature to provide an objective assessment of the adequacy of the NBSAP in addressing the threats to biodiversity. However, considering that a critical analysis of threats to biodiversity and gaps in Malawi's knowledge on biodiversity was undertaken during development of the NBSAP, it may be stated that the NBSAP was designed to address all critical threats, except the new and emerging threats (e.g. climate change and pollution). Climate change and pollution were not perceived to be critical threats to biodiversity in Malawi and as a result no strategies and actions for biodiversity conservation and sustainable use in relation to managing the impacts of climate change and pollution were included in the NBSAP. A revised NBSAP should include strategies and actions for these threats. It must be recognized however that although the NBSAP in its present format appear to be adequate to address most critical threats to biodiversity, the NBSAP is underutilised as a tool to guide planning and implementation of biodiversity programme in Malawi.

2.9 Progress towards implementation of COP 8 decisions

2.9.1 National participation of indigenous and local communities

Decision VIII/5 paragraph 2 of COP 8 invites parties through their national reports to report on progress in achieving national participation of indigenous and local communities and associated capacity building. In doing so parties would be responding to the requirements of Article 8j of the Convention which requires parties to respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional life styles relevant for the conservation and sustainable use of biodiversity and promote their wider application with the approval and involvement of the holders of such

knowledge, innovation, and practices and to encourage sharing of the benefits arising from their utilisation.

Participation of local communities in Malawi is provided for in the Local Government Act of 2000 which has provisions for empowerment of local communities to actively participate in biodiversity conservation and sustainable use through local level development committees. In line with this policy and in line with the National Environmental Policy sectoral policies (i.e. the Forestry Policy, Fisheries Policy and National Parks Policy) now incorporates aspects of community participation. At the Assembly level natural resources management is facilitated through the District Executive Committee (DEC) through the District Environmental Sub-Committee (DESC). At the local level, community participation is facilitated through Area Development Committees.

Malawi has rich indigenous knowledge most of which is not recorded but is passed from generation to another through word of mouth. For example, Traditional Healers have practiced traditional healing from time immemorial but their practice has never been comprehensively documented. Most of the materials used by the Traditional Healers are becoming rare due to unsustainable use and this has forced some Traditional Healers to start conserving and sustainably using the medicinal plants through establishment of medicinal gardens. It must be pointed out however that Malawi has no specific programmes or policy framework or institution for management of the indigenous knowledge systems.

2.9.2 Protected areas

Decision 24 paragraph 4 of COP8 encourages parties to provide necessary support for developing countries to enable them to build capacity for protected areas. Malawi is classified as a Least Developed Country (LDC) and as such is not obliged under the decision to provide support to other parties. However, as a LDC Malawi has received support from various donors to promote sustainable management and capacity building in the conservation of protected areas.

The history of protected areas in Malawi dates back to 1912 when the first forestry research was gazetted. Currently Malawi has 88 Forestry Reserves, five National Parks and four wildlife reserves. Forestry reserves were originally designated as catchment areas and as such important ecosystems such as wetlands were not targeted. National parks and wildlife reserves on the other hand were established as conservation areas for large mammals. Management of protected areas is primarly funded by GoM through the national budget. Although the funding is inadequate, the fact that GoM continues to fund the Forestry Department and DNPW operations (law enforcement, research, salaries etc) is a demonstration that GoM is committed to the protection of Protected Areas.

2.9.3 Impact Assessments

Parties are urged through (Decision VIII/28, paragraph 5) to apply voluntary guidelines on biodiversity-inclusive Environmental Impact Assessment. This decision is a follow up to the implementation of Article 14 of the Convention regarding the importance of impact assessments.

Environmental Impact Assessments are mandatory for all development programmes as provided for in Environmental Management Act section 24. In line with this provision, Malawi in 1997 developed comprehensive guidelines for EIAs. EIA guidelines advocates for the Strategic Environmental Assessments (SEAs) for policies, programmes and plans. However, guidelines for conducting SEA are not provided.

The EIA guidelines are widely implemented in Malawi. For example based on the proposal to establish a Sugar Factory in Lufuwu wetlands (in Salima District southern Malawi) an Environmental Impact Assessment was conducted and provided specific recommendations for protection of breeding sites for migratory birds within the wetland. Based on the EIA, government approved only 6,000 ha for the sugar estate out of the 12,000 ha requested excluding the critical elements of the wetland. A comprehensive EIA was also conducted before mining of uranium at Kayelekela Uranium started. As a result a number of measures have been put in place to mitigate the effects of effluents on terrestrial and aquatic ecosystems and biodiversity. More information on the role of EIAs in biodiversity conservation is provided in section 3.7.

Chapter three

Sectoral and cross-sectoral integration or mainstreaming of biodiversity considerations

3.1 Introduction

Mainstreaming in this section refers to inclusion or integration of action related to biodiversity conservation and sustainable use into economic sectors whose core business is not biodiversity conservations such as agriculture, tourism, fisheries, forestry and mining. It also entails inclusions of biodiversity considerations into national policies and programmes. By integrating biodiversity considerations Malawi is fulfilling requirements of Article 6b which requires all parties to integrate as far as possible and appropriate the conservation and sustainable use of biological diversity into relevant sectoral and cross sectoral plans, programme and policies. The need to mainstream biodiversity considerations into sectoral and cross sectroral policies and programmes is a complex challenge for Malawi especially considering that the responsibility of managing and conserving biodiversity is fragmented along the departments and statutory corporations under the Ministry of Natural Resources, Energy and Environment; Ministry of Agriculture and Food Security; Ministry of Irrigation and Water, and Ministry of Lands, Housing and Urban Development; The National Herbarium and Botanic Gardens of Malawi; Universities of Malawi and Mzuzu. Despite this challenge, Malawi has made good progress towards mainstreaming biodiversity at all levels. This chapter describes the achievements made. This is done by describing cross-sectoral coordination measures which are in form of enabling policies and legal frameworks, implementation structure and cross cutting national plans and programmes. This chapter also examines efforts Malawi has made to facilitate mainstreaming of biodiversity considerations into the private sector and land use planning sector through enforcement of EIAs.

3.2 Overview of biodiversity policy and institutional framework

3.2.1 Relevant biodiversity policies and legislation

Malawi participated at the UNCED in Rio de Janeiro in June 1992. In response to the Rio agreements, Malawi in 1994 developed a National Environmental Action Plan (NEAP). The NEAP provides a framework for integrating environmental considerations into national economic and social development programmes and plans. Malawi's commitment to address its environmental problems was reflected in Section 13(d) of the Constitution which calls upon the State: "To manage the environment responsibly in order to-preserve the degradation of the environment; provide a healthy living and working environment for the people of Malawi; accord full recognition to the rights of future generations by means of environmental protection and the sustainable development of natural resources; and conserve and enhance the biological diversity of Malawi."

To implement the NEAP, Malawi in 1994-95 prepared the the Environmental Support Programme (ESP) whose overall objective was to integrate environmental concerns into the socio-economic development of Malawi. The ESP provided a planning framework for the

government's activities and interventions in environment but only a few of the identified intervations have been implemented.

To facilitate implementation of Malawi's environmental aspirations as enshrined in the Constitution, Malawi in 1996 adopted an overarching National Environmental Policy (the NEP). Legal instrument for the implementation of the principles of environmental and natural resource management as contained in the NEP are provided for in the Environmental Management Act. These documents are cross – cutting in nature and provide structure and legal frameworks for the development and/or revision of sectrol policies and legislation in environmental and natural resource management. The NEP was adopted in order to promote sustainable social and economic development through the sound management of the environment. The policy provides for the conservation of biodiversity in section 4.12 which seeks to conserve, manage and utilise sustainably the country's biological diversity (ecosystems, genetic resources and species) for the preservation of the National Heritage. EMA on the other hand was enacted to remove the lack of an overarching statute providing general environmental protection. Sectoral policies and legislations were required to be revised to be consistent with this Act. Thus as required by EMA, Malawi undertook a review and reform of environmental and natural resources management policies and legislation in 2004. The reviews were designed to address deficiencies and the over reliance on central government control over the use of natural resources and lack of community participation on natural resource management. The reform was also in response to the requirements of CBD article 6b. The NBSAP observed however that both NEP and EMA do not address biodiversity issues comprehensively and as a result included Strategy 7.1 which recommended development of a National Biodiversity Policy. Some policies and Acts that were revised in line with NEP and EMA are provided in Table 13.

Table 13. Example of sectoral policies that were revised and/or developed in line with the requirements of EMA and NEP

Policies, legislation and strategies	Objectives relevant to biodiversity conservation	Biodiversity mainstreaming
Agriculture policies (Agriculture and Livestock Policy 1994)	To improve production and promote wealth creation through agriculture	• Promotes conservation and sustainable use of agrobiodiversity through conservation of indigenous germ plasma on farm and in gene back.
Forestry Policy 1996	To integrate forestry management with environmental conservation Establish appropriate incentive that will promote community based conservation and sustainable use of forest resources as a means of	• The policy has provisions related to co-management and forest protection. • Promotes sustainable forest management based on the ecosystem approach.

	poverty reduction.	• Promote private sector involvement in forest management. • Provides for protection of invasive alien species
Irrigation Policy 1998	To Improve use of water through irrigation. Conserve aquatic biodiversity	• Promote EIAs in irrigation development
National Fisheries and Aquaculture Policy 2001	To improve fisheries management	• Promotes aquaculture as a measure to reduce pressure on natural fisheries. • Promote co management and protection of endangered species and sustainable use of fish resources • Provides for eradication of invasive alien species.
Land Resources Management policy 2000	To introduce proper land use planning and reduce biodiversity degradation To avoid sectrol land use conflicts and enhance sustainable socio-economic use for the conservation of biodiversity.	• Promote development of technologies that are ecologically sound for environmental fragile areas such as steep slopes, stream banks, watershed areas, swamps and also promote the management, conservation and utilization of natural resources in order to ensure sustainable land and ecosystem productivity.
National Wildlife Policy 2000	To promote co-management of wildlife Ensure the adequate protection of representative ecosystems and their biological diversity	• Provides for community participation and equitable sharing of benefits • Promotes protection of ecosystems and their biodiversity through adoption of sustainable land management practices.
Energy Policy 2002	To regulate and promote use of renewable energy sources	• Promotes the use of alternative energy sources as a means to reduce

		deforestation.
Water Resource Management Policy 1994, revised 2006	To reduce degradation of water resources and reduce pollution	• Promote ecosystems approach in water resources management. • Promotes EIAs in all major water developments including irrigation schemes and dams.
Biotechnology and Biosafety policy 2008	Promote biotechnology research and development which is morally and ethically responsive and sensitive to environmental protection and safety. Promote awareness, understanding and knowledge of biotechnology at all levels of society in Malawi	• Regulates the use of GMOs • Promote sustainable management of the environment. • Discover and improve natural products and improve production of indigenous plants and animals. • Promote conservation of local farmer's seeds.

3.2.2 Sectoral biodiversity coordination

Management of biodiversity in Malawi is not a responsibility of a single government department but is a responsibility of all departments with mandate for the management of various components if biodiversity. The Forestry Department, Department of Fisheries, Department of National Parks and Wildlife, the National herbarium and Botanic Gardens of Malawi, Environmental Affairs Department are the major government agencies whose core mandates include biodiversity conservation and sustainable use (Table 13). Specific biodiversity functions for these departments are prescribed in relevant sections of the Constitutions and further elaborated in sector specific policies and legislations. The Environmental Affairs Department has the overall responsibility for coordinating government departments and agencies that have specific responsibilities for the management of biodiversity. The Forestry Department is charged with management of forestry biodiversity both within and outside protected areas whilst the Department of National Parks and Wildlife is responsible for the conservation of ecosystems including biodiversity within them. The Department of Fisheries has a huge responsibility of managing the endemic and diverse fish of Malawi. Relevant government departments and agencies with mandate for biodiversity conservation and sustainable use are summarised in Table 14.

Table 14. Major government departments with environmental management responsibilities

Government department and or sectors	Functions related to conservation and sustainable use of biodiversity
Forestry Department	• *In situ* and *ex situ* conservation of forest resources. • Protection and management of Forest Reserves. • Management of forest plantations. • co-management of forest reserves. • Collection and management of biological materials (especially invertebrates) and data. • Ecological research and forestry inventories.
Environmental Affairs Department	• Coordination of environmental programmes and also the national focal point for all environmental conventions. • Following up of CBD issues at the national, regional and international levels. • Coordination of EIAs. • Outreach.
Department of Fisheries	• Conservation and sustainable use of fish biodiversity. • Eradication and control of invasive species. • Outreach. • Collection and management of biological collections and data. • Ecological research.
Ministry of Agriculture and Food Security	• Sustainable land management practices including promotion of reforestation, conservation agriculture, agroforestry. • In situ and ex situ conservation of agrobiodiversity.
Department of Energy	• Contributes to reduced deforestation through promotion of alternative energy sources.
Department of National Parks and Wildlife	• In situ conservation of fauna and flora. • Community participation and provision of incentives. • Protection of protected areas through law enforcement.
Ministry of Education, Science and Technology	• Integration of environmental conservation into the school curriculum • Outreach.
Museums of Malawi	• Management of biological collections and information

	(inventories and conservation status of biodiversity components). • Research and outreach.
National Herbarium and Botanic Gardens of Malawi	• Ex situ and in situ conservation of endangered plants, • Management of biological collections information and data.
Universities of Malawi and Mzuzu	• Environmental education • Research

3.2.3 Cross sectoral biodiversity coordination

In order to ensure proper cross sectoral coordination of environmental activities in Malawi a specific institutional mechanism was developed through the establishment of a Department of Research and Environmental Affairs (DREA) in 1991. DREA was mandated to co-ordinate issues pertaining to research and sustainable environmental management in Malawi through a multi-sectoral approach. DREA was later up-graded to the Ministry of Research and Environmental Affairs (MOREA) in 1994 but the ministry was abolished in 1997 and replaced by a new Ministry of Forestry, Fisheries and Environmental Affairs with the Environmental Affairs Department having the responsibility of co-ordinating all issues pertaining to sustainable environmental management. The Environmental Affairs Department is now within the Ministry of Natural Resources, Energy and Environment but its mandate has remained the same since its establishment.

The Environmental Affairs Department is also charged with harmonisation of national environmental policies and legislation and also coordinates environmental activities through a number of committees (intergovernmental structures relevant for coordination of biodiversity activities undertaken by various government departments) such as:

a) The Cabinet Committee on Agriculture and Natural Resources (CCANR). This is the highest level policy and decision making body responsible for environmental policy issues and informs Parliament on the state of the environment.
b) The Parliamentary Committee on Agriculture and Natural Resources (PCANR) lobbies parliament on all matters to do with the environment.
c) National Council for Environment (NCE) is a policy advisory institution which operates through working groups and national steering committees, advises both the CCANR and PCANR on environmental issues.
d) The Technical Committee on Environment (TCE) is responsible for examining scientific issues and makes recommendations for action.
e) The National Biodiversity Steering Committee follows up and monitors implementation of biodiversity issues.
f) National Biosafety Regulatory Committee.

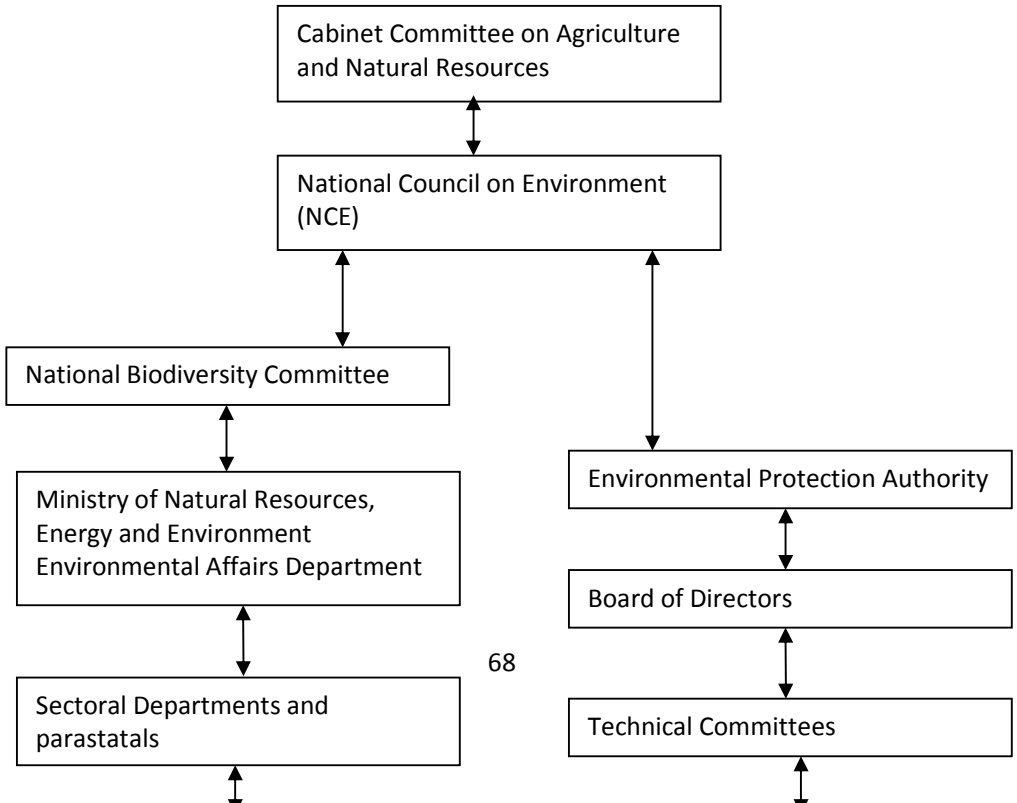
The current implementation structure will change if the Environmental Management Bill is approved by Parliament. It is envisaged that a National Environmental Protection Authority will have the mandate to coordinate and monitor all activities concerning protection and management of the environment and the conservation and sustainable utilisation of natural

resources, including regulation of access to genetic resources, policy formulation, law enforcement and environmental mainstreaming. The relationship between the current and proposed implementation structures is provided in the Figure 4. The Authority will be guided by of Board Directors and the following technical committees:

a) Technical Committee on Environmental Impact Assessments.
b) Technical Committee on Standard Reviews and Enforcement.
c) Technical Committee on Community Based Natural Resources Management.
d) Technical Committee on Biodiversity Conservation.
e) Technical Committee on Pollution Control.
f) Technical Committee on Soil and Water Conservation.
g) Technical Committee on Hazardous Wastes, Chemical and other Toxic substances.
h) Technical Committee on Environmental Information and Public Awareness.

Implementation of biodiversity activities at the district level is guided by the Local Government Act of 1998. The Act unifies government and local authorities and facilitates community participation in the formulation, planning and implementation of development and environmental programmes through District Councils. District levels committees facilitate integration of biodiversity into Assembly plans and programmes. In this regard, District Environmental Subcommittee (DESC) coordinates and ensures that environmental concerns are mainstreamed into all district programmes. In line with the Decentralisation Policy the EAD has established environmental offices at each district. District Environmental Officers are members of DESC and hence facilitate mainstreaming of biodiversity issues into assembly plans. The revised EMA proposes the establishment of District Environmental and Natural Resources Management Committee at the district level to promote a coordinated approach in the integration of environmental considerations at the district level.

Figure 4: Current (left) and proposed (right) institutional framework for environmental protection in Malawi



Malawi is required by EMA to prepare NEAPs and State of Environment Reports (SOERs) every four years. Malawi published it first SOER in 1996 with support from Danish Development Agency (DANIDA). The second edition was prepared in 2002 and the third edition is under preparation. Similarly the first NEAP was published in 1994 and the second edition was published in 2002. Although these documents are not regularly updated as provided for in EMA, they provide national perspective on the management of natural resources. District Assemblies are also required by the EMA to prepare District Environmental Action Plans and District State of Environment Reports which should be reviewed regularly. Despite this provision, DESPs and DSOERs were prepared for a limited number of districts and preference was given to lake shore districts to limit the impact of lake shore holiday resorts on the aquatic ecosystems.

Government departments that have a focus on natural resource management are also required by the law to prepare environmental management plans which should be consistent with the NEAP. The purpose of the environmental management plans is to facilitate interdepartmental mainstreaming of biodiversity issues. This also applies to environmental NGOs. For example, in line with EMA, the Wildlife and Environmental Society of Malawi (WESM) developed an environmental and communication strategy to guide implementation of environmental education. In addition, environmental NGOs are also members of major environmental committees at the central and assembly levels as required by NEP and the Decentralisation Policy. By participation in these committees, NGOs play a crucial role in influencing mainstreaming of biodiversity conservation into national programmes and policies. Coordination of NGO environmental activities is the responsibility of Coordinating Union for Rehabilitation of the Environment (CURE) but WESM is the leading NGO when it comes to the implementation of NRM activities.

3.3 Cross cutting national programmes and strategies

Malawi as part of the global community has committed itself to a number of international protocols and conventions and is obliged through these forums to integrate international protocols and conventions into national programmes and policies. For example, Malawi is required by Article 6b of the Convention on Biological Diversity to integrate as far as possible the three objectives of the Convention into national programmes and policies. In response to its international obligation, Malawi has included biodiversity considerations into cross cutting national plans, strategies, programmes and policies such as the National Adaptation Programme of Action (NAPA), National Strategy for Sustainable Development (NSSD), Malawi Growth and Development Strategy (MGDS), the Millennium Development Goals (MDGs).

3.3.1 National Strategy for Sustainable Development for Malawi

Malawi published its NSSD in 2004. The purpose of the strategy is to set out an agenda for providing the basis for Malawi's sustainable development in the thematic areas of water, energy, health, agriculture and biodiversity to ensure sustainable livelihoods and poverty reduction.

The goal for the strategy is to manage the environment responsibly, prevent degradation, provide a healthy life for all, protect the rights of future generations and conserve and

enhance biological diversity. Within the context of sustainable development, the NSSD proposed strategies and actions that would contribute to sustainable environmental management and attainment of CBD goals. For example, the NSSD strongly recommends inclusion of EIAs in the planning and construction of roads, airports and railways so as to minimise adverse environmental effects of road construction and ensure that the infrastructures are environmentally friendly.

Theme three of the NSSD is devoted to the protection and management of natural resources base and therefore includes strategies for sustainable management of biodiversity (which is broken down into forestry, fisheries, and wildlife resources). The NSSD therefore provides for strategies to enable inclusion of CBD objectives into national and regional policies and programmes. The NSSD also has strategies to reverse biodiversity loss through monitoring trends in biodiversity, establishment of protected areas of biodiversity significance and restoration of biodiversity in degraded areas. Recognizing the adverse effects of invasive alien species on biodiversity, the NSSD included strategic actions to facilitate control and prevention of invasive alien species. The NSSD also recognizes that meaningful biodiversity conservation is not possible without sustainable funding. Thus strategies to promote innovation and sustainable funding mechanisms for biodiversity conservation and wise use were proposed. It is evident from the forgoing that the NSSD has demonstrated Malawi's efforts to integrated biodiversity related issues into national plans and programmes. An assessment of the extent to which the NSSD has been achieved has never been conducted. However, if implemented in line with provisions of the NSSD, these strategies and actions will contribute to the realization of the CBD goals and objectives.

3.3.2 Malawi Growth and Development Strategy

Malawi in 2006 published the Malawi Growth and Development Strategy (MGDS) as a medium term strategy for worth creation and economic growth. The strategy sets out a national vision, areas of strategic interventions or priority areas and the approach for achieving the vision. The MGDS provides basis for resource mobilisation and also include indicators for measuring success and identifies the following nine key priority areas that should be implemented in order to achieve economic growth and wealth creation.

a) Agriculture and food security,
b) Greenbelt irrigation and water development,
c) Education, science and technology,
d) Transport infrastructure and Nsanje world inland port,
e) Climate change, natural resources and environmental management,
f) Integrated rural development,
g) Public health, sanitation, HIV and AIDS management,
h) Youth development and empowerment,
i) Energy, mining and industrial development.

In addition to these key priority areas the MGDS also described other focus areas which are grouped into five themes; sustainable economic growth, social protection, social development, infrastructure development, and improving governance. Of relevance to

biodiversity conservation and sustainable use is sub theme related to the conservation of natural resources base. This recognises that sustainable use of natural resources contribute to the achievement of many of the goals of the MGDS. If implemented in line with the MGDS it is expected that proposed interventions in the forestry sector will lead to reduced environmental degradation whilst interventions in the fisheries sector will assist Malawi maintain fish biodiversity. It is expected further that interventions in the environmental sector will lead to environmental protection and sustainable use and conservation of the natural resources endowment and interventions related to the wildlife sector will facilitate the sector achieve its long term goal of conserving and managing protected areas and wildlife.

Progress in achieving MGDS goals and objectives is reviewed annually based on a set of indications. Recent reviews have indicated that progress towards achievement of natural resources management is slow. The review has recorded increased deforestation and increased sediment loads in aquatic ecosystems. This means that the MGDS will not achieve its goal of reducing environmental degradation by 2011. However, through partnership with South African Parks, Malawi has reintroduced rhinos and its population has increased to 15 since the programme started. Threatened animals such as elephants have been relocated from areas with high animal human conflicts (such as Phililongwe Forest Reserve) to more secure and well protected wildlife reserves (Majete Wildlife Reserve). This is a clear demonstration that the MGDS has achieved one of its goal of increasing populations and conservations of wild animals.

Although the MGDS includes issues related to biodiversity conservation, integration of biodiversity matters into agriculture and food security, transport infrastructure and development, social development etc was not emphasised. Thus interventions in these areas may be implemented without taking into consideration the impact the interventions may have on biodiversity conservation and sustainable use. Consideration should be given for inclusion of biodiversity matters into all priority areas in the next phase of MGDS.

3.3.3 Malawi National Adaptation Programmes of Action

In 2008 Malawi launched the National Adaptation Programme of Action (NAPA). The purpose of NAPA was to develop strategies that would enable Malawi address urgent and immediate climate adaptation needs caused by climate change and extreme weather events. The NAPA identified five key adaptation priorities needs as follows:

a) Improving community resilience to climate change through development of sustainable rural livelihoods.
b) Restoring forests in upper, middle and lower Shire valley catchments to reduce siltation and the associated water flow problems.
c) Improving agricultural production under erratic rains and changing climatic conditions,
d) Improving Malawi's preparedness to cope with draughts and floods
e) Improving climate monitoring to enhance Malawi's early warning capacity and decision making and sustainable utilisation of Lake Malawi and lake shore area resources.

The NAPA focus areas are environmental related and focus on using natural resources sustainably in order to build the resilience of the communities to adapt to effects of climate

change. This is a clear indication that the NAPA incorporates biodiversity related matters as prominent factors that need to be included in the national adaption programme. Although the NAPA was not developed with a clear focus on mainstreaming biodiversity it is clear that these measures will support biodiversity and contribute to the achievement of the CBD goals.

3.3.4 Agricultural Sector Wide Approach (ASWAp)

Malawi is in the process of developing an Agricultural Sector Wide Approach Programme. The goal of ASWAp is to achieve food security. This will be achieved through the following four priority areas:

a) Improved food security and nutrition,
b) Commercial agriculture and agro-processing and market development,
c) Sustainable agriculture land and water management and.
d) Agricultural research and extension services.

ASWAp recognises that agriculture expansion over the past 30 years has lead to the replacement of natural flora with introduced ones and decimation of ecologically important wildlife and micro organisms. In order to reduce the loss of biodiversity associated with agriculture, the ASWAp proposes to intensify conservation agriculture, protection of catchment areas and other fragile areas such as wetland and river banks.

A key programme within the ASWAp is the intensification of irrigation through the Greenbelt Initiative (GBI). The purpose of GBI is to increase production though irrigations. The programme proposes to increase the area under irrigation to one million hectares. Recognising the impact GBI may have on the environment, a number of measures to mitigate the impact of GBI on the environment have been proposed. All interventions to do with irrigation will be supported by EIAs. In addition, GBI will contribute to afforestation of degraded areas and also manage the impact of chemical fertilizers on the environment by promoting agroforestry, use of manures and conservation agriculture.

Although the focus of ASWAp is on improved food production, the programme does not fully recognise the value of agrobiodiversity since strategies related to the conservations of agrobiodiversity have not been included. The ASWAp should therefore take into consideration the benefits that agrobiodiversity may bring to the agricultural sector. An aspect of the conservation of indigenous crops and their wild relatives including conservations of pollinators and other soil micro organisms of importance to agriculture should be considered.

3.3.5 The Millennium Development Goals (MDGs)

As a signatory to the Millennium Development Goals, Malawi is obliged to contribute to the global attainment of the eight goals. Malawi is implementing the MDGs through medium term strategies such as the Malawi Growth and Development Strategy. The MDGs priority areas are fully aligned with MGDS. The MGDS is therefore recognised as an important framework for implementing the MDGs. Of relevance to biodiversity conservation is goal number 7 of the MDGs (ensuring environmental sustainability). Indicators for the environmental sustainability

were described as proportion of land area covered by forests, percentage of area protected to maintain biodiversity, energy usage and carbon dioxide emission. Based on the Malawi MDGs review for 2008, it would appear Malawi is making significant progress in maintaining the area under forest cover. The proportion of Malawi under protected area network is about 15% which is already more than the MDGs target of 10% by 2020. However, proportion of land area covered by forest declined from 41.4 percent in 1990 to 36.2 percent in 2005. If this trend continues, Malawi is unlikely to remain with land area covered by forest by 2020. Government and private sector forestry programmes which focus on reforestation, afforestation, promotion of natural regeneration, forest protection should be intensified to contain this problem.

3.4 Linkages with other UN Conventions

Malawi is signatory to a number of biodiversity related conventions such as the CITES, Convention of Migratory Species, Ramsar, the World Heritage Convention, Convention of Climate Change, and the Convention on Desertification. Activities of these conventions overlap considerably and as such establishment of linkages between these instruments is crucial. This section describes the linkages between these conventions at policy and programme levels.

3.4.1 Climate change

Malawi signed the climate change convention in 1992. In line with the requirements of the Convention, Malawi demonstrated its commitment to the Convention by including in the National Environmental Policy and the Environmental Management Act issues of climate change. Climate change has also been mainstreamed into biodiversity related policies (e.g. Forestry Policy, Fisheries Policy, National Parks and Wildlife Policy). The Forestry policy recognises the role of forest in carbon capture and storage and therefore emphasises on reforestation programmes. By promoting conservation agriculture, agroforestry and small scale irrigation technologies the agriculture sector contributes to the implementation of some requirements of climate change especially those related to limiting greenhouse gas emissions. Population of Nyala (restricted to Lengwe National Park) has been reported to be declining mostly due to climate change (erratic rainfall patterns) and poaching. As conservation measure DNPW has increased the distributional range of Nyala antelopes by reintroducing them in Majete Wildlife Reserve and Kuti Ranch in Salima.

Malawi is in the process of developing a climate change response programme which will guide implementation of climate change activities in Malawi including those outlined in the NAPA. Meanwhile, the NAPA which was launched in 2008 provides guidelines for the implementation of climate change activities. The NAPA therefore identified potential adaptation option to climate changes in agriculture, forestry, fisheries, energy, wildlife, water etc. For example, option for adapting to Climate Change in agriculture include changes in land use and limiting greenhouse gas emissions through adoption of conservation agriculture technologies, whilst options for adaptation to climate change in fisheries included building a capacity for fish gene banks to maintain genetic diversity of the fish population.

In addition to mainstreaming climate change issues into biodiversity related policies, Malawi is also implementing climate change interventions. In 2007 Malawi launched a Tree Planting and Management for Carbon Sequestration and other Ecosystem Services Programme. Approximately 148 farmers with at least 2 hectares of land are participating in the prrogramme and are paid for each hactere per year over a period of five years. Although the programme has some design problems (in that no baseline data was collected at the start of the project and as such without base line data any carbon gains cannot be verified) the programme has contributed to an increase in area under forest cover.

The Forestry Department with funding from MEET and CAMPASS II Project undertook a pilot study on forest conservation in protected Areas (in Nyika National Park and Mkuwazi Forest Reserve). The aim was to reverse the trends of degradation, preserve biodiversity, conserve ecosystems and provide opportunities for livelihoods development through community management using various interventions. The project provided a methodology for determining the carbon benefits from the conservation of forests in protected areas and also includes methods for quantifying carbon stocks and determining the likely rates and areas at risk of deforestation in the absence of project activities. Estimated carbon stocks were 211,889±23,694 tC in the 1,767 ha of Mkuwazi Forest Reserve and 995,446±120,385 tC in the 35,910 ha of Thazima region of Nyika National Park. Based on these estimated it was projected that Mkuwazi and Thazima would make about US$39,400 and US$141,888 per year over a period of 50 years respectively. The interventions, activities and systems of carbon crediting and making payments for carbon benefits through Reduced Emissions from forest Degradation and Deforestation can be replicated for most protected areas in Malawi. Thus through this project, the Forestry Department demonstrated a strong linkage between forest conservation and climate change.

The private sector has potential to implement interventions that promote climate change and biodiversity. For example Total LandCare (TLC), is currently implementing an integrated land management programme within Lake Malawi basin (covering the areas between Chia lagoon and Nkhatabay). Programme activities such as Conservation Agriculture, agroforestry and community forestry promote carbon capture and storage. Thus as the project builds the resilience of communities to adapt to climate change, the biodiversity related interventions demonstrate the strong linkage between biodiversity and climate change.

3.4.2 Migratory species

Malawi became party to the Convention on Migratory Species in 1975 and also signed the Ramsar Convention in 1996. In line with the Ramsar Convention a strategy which focuses on wetland management and conservation was launched. In keeping with the Convention obligations, Lake Chilwa wetland was declared a Ramsar site. Lake Chilwa has been identified as an important bird area. With support from Danish Hunter Association (DHA) communities are being involved in the identification and protection of breeding sites for migrating birds. The breeding sites will be designated bird sanctuaries and there are also plans to turn part of the wetland into a community conservation area. Thus as Malawi promotes sustainable management of wetlands, Malawi's obligations on Convention on Migrating species are being met.

Another programme related to the protection of migrating species is the Transfrontier Conservation Areas (TFCA) project. In 2004 Malawi and Zambia signed a Mmemorandum of Understanding to manage Nyika and Kasungu National Parks as Transfrontier Conservation Areas. Through this arrangement endangered species such as lions, elephants and wild dogs are protected as they migrate between the two countries. These initiatives therefore demonstrate a strong linkage between the conservation and sustainable use of wetlands, biodiversity and migratory species.

3.4.4 Desertification

Malawi became party to the United Nations Convention to Combat Desertification (UNCCD) in 1996. To facilitate implementation of the Convention a National Action Pland (NAPs) was developed and adopted in 2000. NAPs addresses five core areas related to desertification; food security, water management and development, renewable energy, forest resource management and environmental management. These areas are also prioritised in the NAPA and the NBSAP. Thus demonstrating strong linkages between desertification, climate change and biological diversity conventions.

3.5 Incentive measures

Malawi has an obligation as required by Article 11 of the Convention to adopt in as far as possible and appropriate, economically and socially sound measures that act as incentives for the conservation and sustainable use of components of biological diversity. Malawi has made some progress towards adopting measures to promote incentives in biodiversity conservation and sustainable use. Incentive measures for natural resources management is strongly supported by the NEP 2004 part 3.2 (Economic Incentives for Sustainable Environmental Management). In keeping with this provision sectoral policies especially the National Forestry Policy, Fisheries and Aquaculture Policy and the National Parks and Wildlife policy promote incentives through Community Based Natural Resources Management programme. For example, through collaborative management of forest reserves, attempts have been made to give back to communities some stake in forest conservation and use through co-management activities. These have been sources of income to the communities through sharing of revenues earned from confiscation of illegal forest produce and income generating activities (IGAs) in form of non forest based activities such as bee keeping, mushroom farming and ecotourism.

The Department of National Parks and Wildlife started a system of incentive measures as a means to promote collaborative management in National Parks when the Government in 1996 approved resource use and revenue sharing with communities who legitimately use the land on which wildlife occurs. Currently, DNPW is implementing the following programmes: Resource Use Programme (RUP), which allows harvesting selected wildlife resources by adjacent communities; wildlife related enterprises; and revenue sharing with adjacent communities. Socio economic benefits of the programme are provided in section 2.4.10.

Natural Resources Management Policies (e.g. the Wildlife Policy) have some provisions that promote provision of incentives for communities to participate in biodiversity conservation. Apart from these policies, the concept of incentive measures has not been integrated into other institutions and policies whose core business is not biodiversity conservation. For

example lack of legislation on intellectual property rights mean that genetic resources and indigenous knowledge are exchanged freely and as such the potential resulting commercial and technological benefits do not trickle down to the local communities. Another problem is that Malawi's biodiversity is inadequately valued due to poor pricing of biological resources. In recognisition of these inadequacies Malawi has initiated a process to review and document incentive measures in Malawi and the results will be used to develop guidelines and procedures for incentive measures for biodiversity conservation and sustainable use.

3.6 The Ecosystem Approach

Principles of Ecosystem Approach (sometimes also referred to as the Malawi Principles for Ecosystems Approach) were endorsed by the CoP in 2000 based on recommendations from the workshop on Ecosystem Approach held in Malawi in January 1998. The CBD defines Ecosystem Approach as a strategy for integrating management of land, water and other living resources that promotes conservation and sustainable use in equitable way. Thus the Convention regards the Ecosystem Approach as the primary framework for action under the Convention since its implementation shall assist parties to reach a balance of the three objectives of the Convention. The Ecosystem Approach recognises humans as an integral component of ecosystems and therefore promotes interdisciplinary and holistic environmental approach in natural resources management and active involvements of stakeholders in defining sustainable alternatives.

Malawi has made significant progress in integrating some principles of Ecosystem Approach into national policies and programmes. For example, principles of the Ecosystem Approach especially those associated with involvement of all relevant sectors in the society, decentralisation of natural resources management to the lowest point possible, recognition of ecosystems in an economic context etc, are integrated into the National Environmental Policy (2004) and sectoral policies dealing with biodiversity conservation (Forestry Policy, National Parks and Wildlife Policy, Fisheries and Aquaculture Policy). The NBSAP strategies and its actions recognise the importance of interdisciplinary and holistic approach in maintaining natural diversity and productivity of landscapes whilst sustaining human needs. In this connection the NBSAP emphasized the use of the Ecosystem Approach in the management of protected areas and therefore responded by providing a specific Guiding Principle "e"; which recognises that conservation of biodiversity both within and outside protected areas including mountains is best done following the Ecosystem Approach. Furthermore, recognising that the Ecosystem Approach is integral to the protected areas management, the NBSAP also provided strategy 3.2.1; that will facilitate development of appropriate guidelines, methodologies, procedures and technologies that fully utilises the concepts of Ecosystem Approach in protected areas.

Despite the lack of a national Ecosystem Approach framework, some environmental programmes are designed and implemented taking into consideration provisions of ecosystems and their functioning. Both the government and the private sector have initiated programme that embrace the principles of Ecosystem Approach. The most well known

projects with strong Ecosystem Approach focus include the Mulanje Mountain Reserve Biodiversity Conservation Project and Management for Adaptation to Climate Change (MACC) Programme. The MACC project is a 5 year program to improve the capacity of rural communities to adapt to the growing threat of climate change. Over 50,000 households are targeted, of which a minimum of 35-40% are women, across 5 districts in the central watersheds of Lake Malawi. Climate change interventions being implemented include:

- **Reforestation** efforts that combine tree planting and natural regeneration with the promotion of fuel efficient stoves to reduce wood use and related impacts of deforestation.
- **Sustainable Land and Water Management** with key focus on Conservation Agriculture and agroforestry.
- **Farm diversification** to reduce the impacts of climate change by promoting a) high yielding, drought and disease resistant crops, and b) small livestock adapted to the local environment.
- **Low-cost irrigation systems** using treadle pumps, drip kits, and water harvesting.
- **Rural-based Enterprises** focusing on bee keeping, fish farming, eco tourism and mushroom farming.
- **Carbon Markets:** A feasibility assessment has identified Conservation Agriculture and village wooldlots as having potential for carbon revenues based on REDD Plus (Reduced Emission from Forest Deforestation and Forest Degradation) requirements.

The project is being implemented by Total LandCare (TLC) a non-profit, non government organization registered in Malawi, Mozambique, Zambia and Tanzania with funding from the Norwegian Government.

3.7 Integrating biodiversity considerations into Environmental Impact Assessment and Strategic Environmental Assessment

The Environmental Management Act is the primary mechanism or instrument at the national level for ensuring that environmental considerations are integrated in national plans and decision making across all sectors. To guide integration of environmental considerations in national development EMA requires that all projects shall not be implemented unless an environmental impact assessment is carried out. It also a requirement that environmental audits shall be carried out for purposes of enforcing provisions of the EMA and that all developers shall take reasonable measures for mitigating any undesirable effects on environment arising from the implementation of a project which could not be foreseen in the process of conducting EIAs. In line with EMA, Malawi in 1997 published guidelines for Environmental Impact Assessments. EIA guidelines give a list of projects for which EIA is mandatory. These include; a) agriculture/aquaculture projects e.g. irrigation schemes, fish ponds, introduction of exotic fish; b) water resources development, e.g. ground water utilisation projects, dams; c) infrastructure projects e.g. roads, hospitals, sewerage works; d) energy generation; e) mining and quarrying projects; f) Forestry projects e.g. logging operations, conversion of forests to another land use; g) tourism development projects e.g. construction of lodges. In general biodiversity considerations are integrated in EIAs by making

sure that the following issues are taken into consideration in making environmental impact assessments:

a) That the project should not cause damage to biodiversity (wildlife, plants and habitats)
b) That the project promotes sustainable use of natural resources,
c) That the project promotes ecosystem maintenance – i.e. the project will not affect any environmentally sensitive areas e.g. wetlands, areas containing rare and endangered species.

It is evident from Table 15 that Malawi has made good progress in using the EIA guidelines as a tool to integrate biodiversity considerations into land use planning and decision making. For example, based on EIA result, the National Environmental Council rejected an application for Central African cattle Ranch to open a cattle ranch in Dzalanyama Forest Reserve on the basis that the activity would disturb the ecological balance of the forest reserve. The proposal to develop 5 Ha of land within Lilongwe City into a recreation centre and modern park was also rejected is the main catchment for a dam.

Table 15. Effectiveness of EIAs in mainstreaming biodiversity considerations into planning and decision making

Project name	Brief project description	Recommendations
Area 10 Housing and Recreation Project	Development of a recreation centre and modern park within a catchment area of a dam in the City of Lilongwe	The project was rejected because the proposed site is the main catchment area for Area 10 dam.
Central African Cattle Ranch	Establishment of a 12000 Ha ranch within Dzalanyaama Forest Reserve. The reserve was gazetted in 1946.	The cattle ranch was rejected in order to maintain ecological balance in the forest reserve.
Lusangazi Solid Waste Disposal Site	Construction of solid waste disposal site in an area of 12 Ha in Lusangazi Forest Reserve.	The landfill in Lusangazi Forest Reserve was rejected to provent environmental degradation in the forest.
Lufuwu Sugar Estate	12000 Ha was earmarked for sugar estate within an ecologically important wetland.	The estate was granted 6,000 ha out of the 12,000 ha excluding the critical elements of the wetland.
New Tourist Lodge within Majete Wildlife Reserve	Proposal by African Parks Majete to construct a lodge on one Ha of land within the wildlife reserve.	The Resort Project in Majete was approved on condition that there should be selective cutting down of trees and that heavy machinery is not used to prevent disturbance of

		animals.
New Nkhatabay District Hospital	Kalwe FR is about 207 and the hospital will cover 50 Ha	The project was approved on condition that rare species will be relocated and that construction should not be on ecologically sensitive site.
Kayelekela Uranium Mine	Keyeleke Uranium mine is in Northen region of Malawi and covers and area of 157 km^2.	The project was approved on condition that all degraded areas will be revegetated, seed bank of all rare and endemic plants will be established and that the whole area will be revegetated on closure of the mine.

Land use practices for urban development, agricultural expansion, infrastructure development and mining have contributed to the current environmental degradation. To ensure a balance between development and sustainable environmental management, integration of environmental considerations into land use plans and decisions making is crucial. To achieve the balance, efforts have been made to integrate environmental considerations into tools guiding land use planning and decision making. Land use planning is the responsibility of the Department of Physical Planning in the Ministry of Lands, Housing and Urban Development. Land use planning is governed by a number of legislations such as Town and Country Planning Act, the Land Act, Mines and Minerals Act, Public Roads Act, Industrial Development Act etc. The National Planning and Development Plan (NPDP) of 1987, was the first major steps towards guiding land use planning but environmental considerations were not adequately taken into consideration. This gap is now covered by the National Land Resources Management Policy (2000) which promotes integration of environmental concerns into land use planning and decision making by promoting the development of technologies that are economically viable, ecologically sound and socio culturally acceptable especially in environmentally fragile areas such as step slopes, stream banks, watershed areas, swamps and dambos; and by promoting the management, conservation and sustainable utilisation of natural resources.

At the local level, local authorities are urged to use the Local Government Act as a planning tool. The Local Government Act promotes incorporation of community concerns into developmental programmes, hence the most important entry point to ensuring proper integration of biodiversity considerations into programme and plans is at the district level. As pointed out earlier, the NEP provides for preparation and publication of NEAPs and SOERs at the national and district levels. These have been most important tools to guide planners and decision makers integrate environmental considerations into land use planning and decision making at the local level.

Chapter Four

Conclusions: Progress towards the 2010 Targets and Implementation of the Strategic Plan

4.1 Progress towards the 2010 Biodiversity Target

Parties under Decision VI/26 adopted a Strategic Plan of Action for the Convention on Biological Diversity in which parties committed themselves to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth. In decision VII/30, Parties adopted a framework to facilitate the assessment of progress towards achieving the 2010 Biodiversity Target and integration into thematic programmes of works. In order to facilitate monitoring of achievements of the 2010 goals and sub targets, the CoP identified targets and Parties and governments were urged and invited to develop national and regional targets and indicators and incorporate them into national plans and programmes including NBSAP. As pointed out in section 2.3, the NBSAP prioritised 22 action based on their contribution to achieving national and global biodiversity goals and targets including the 2010 targets. Each priority action was associated with target. Of the 22 targets about eleven were modified from the 2010 targets. The extent to which the 22 priority actions and targets have been achieved has been highlighted in section 2.3. However, recognising that COP considers NBSAPs as important tools in achieving the 20110 Biodiversity targets, progress made towards the implementation of the NBSAP will be used to demonstrate the progress Malawi has made towards achieving the 2010 targets.

Table 16. Progress towards 2010 Biodiversity Targets

Goals and targets	Relevant indicators	Progress
Protect the components of biodiversity		
Goal 1. Promote the conservation of the biological diversity of ecosystems, habitats and biomes		
Target 1.1: At least 10% of each of the world's ecological regions effectively conserved.	• Coverage of protected areas • Trends in extent of selected biomes, ecosystems and habitats • Trends in abundance and distribution of selected species	• Malawi has a total area of 11.85 million hectares of which 1,869,974 ha was estimated in 1993 to be under Protected Areas Network. Recent information from Forestry Department shows that the number of Forest Reserves has increased to 88 from about 70 in 1990. Although the number of PAs has increased the areas under PA cover appear to have

Goals and targets	Relevant indicators	Progress
		reduced to 1,109,331 Ha. This means that about 9.3% of Malawi's total area is under Protected Areas. • Progress has been made in rehabilitating degraded ecosystems. Ndirende and Thyolo Forest Reserves have been restored through forestry rehabilitation programme. • Although there are still challenges in increasing the abundance of threatened species progress has been made towards improving distribution and abundance of selected species. For example the Nyala antelope which used to be restricted to Lengwe National Park has now been reintroduced in Majete Wildlife Reserve and Kuti Ranch in Salima. Large mammals such as zebras, elephants have also been reintroduced in Majete Wildlife Reserve.
Target 1.2: Areas of particular importance to biodiversity protected	• Trends in extent of selected biomes, ecosystems and habitats • Trends in abundance and distribution of selected species • Coverage of protected areas	• Malawi's Protected Area Network includes areas of high biological diversity e.g. Nyika Plateau, Mulanje Forest Reserve, Lake Malawi. PAs are the only place where a wide range of biodiversity are represented and protected. • Ecosystems and biodiversity continue to be threatened by human activities and they are on the decline. Area under protected areas is reported to be declining at 1.0 to 2.8 % annually. The current list of protected areas include forest reserves that have either been completely destroyed due to deforestation or development (e.g. Kalwe Forest Reserve, Thyolo), or heavily degraded due to charcoal

Goals and targets	Relevant indicators	Progress
		production and cultivation e.g. Zomba-Malosa Forest Reserves. This means the area under Protected Areas may be less than the official figure. Despite this, all vegetation types are represented in the Protected Areas Network. • The Fisheries Department has identified Lake Malombe, the eastern arm of lake Malawi and interconnection between lake Malawi and Malombe as areas of particular importance for *Tilapia* species. The department has designated these fish sanctuaries.
Goal 2. Promote the conservation of species diversity		
Target 2.1: Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups.	• Trends in abundance and distribution of selected species • Change in status of threatened species	• Chambo (*Tilapia*) Restoration Strategic Plan has facilitated development of fish sanctuaries in lakes Malawi and Malombe. Despite this chambo is less abundant in Lake Malombe and southern part of Lake Malawi but more abundant in Mozambican waters. • Conservation efforts in Wildlife sector have improved the conservation status of species that were threatened by unsustainable use. For example: o Elephant population has increased from 340 in 2002 to 460 in 2007 in Vwaza Wildlife Reserve, from zero to 300 in 2009 in Majete Wildlife Reserve. o Rhino population has increased from zero to 15 in 2009. o Nyala antelope has increased from 0 to 58 in 2009 in Majete Widlife Reserve. • Area under Mulanje Cedar reduced to

Goals and targets	Relevant indicators	Progress
		850 Ha due to illegal harvest, bush fires and invasive species. MMCT has replanted cedar on 100 Ha, thus increasing the area to about 950 Ha.
Target 2.2: Status of threatened species improved.	• Change in status of threatened species • Trends in abundance and distribution of selected species • Coverage of protected areas	• An assessment of conservation status of biodiversity components is an on going activity in national parks. The results have been used to relocate animals from one park to another. • Chambo catches declined in the past decade. Conservation strategies that combine aquaculture and restoration programmes has improved catches from 3,280 tonnes in 2007 to 3,586 tonnes in 2008.
Goal 3. Promote the conservation of genetic diversity		
Target 3.1: Genetic diversity of crops, livestock, and of harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained.	• Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socio-economic importance • *Biodiversity used in food and medicine (indicator under development)* • Trends in abundance and distribution of selected species	• About 300 accessions of indigenous crops, collected, stored and characterized by NPGRC. • Medicinal plants conserved *ex situ* in medicinal gardens managed by Traditional Healers Associations. • FRIM in collaboration with the Millennium Seed Bank has collected about 950 accessions of seeds of indigenous, rare, threatened and economically important species for long term storage at Millennium Seed Bank, London with duplicates at NPGRC. • Limited number of local breeds of cattle (Malawi zebu), chickens, goats, pigs and ducks are maintained at Bunda College of Agriculture.
Promote sustainable use		
Goal 4. Promote sustainable use and consumption.		

<table>
<tr><th>Goals and targets</th><th>Relevant indicators</th><th>Progress</th></tr>
<tr><td>Target 4.1: Biodiversity-based products derived from sources that are sustainably managed, and production areas managed consistent with the conservation of biodiversity.</td><td>Area of forest, agricultural and aquaculture ecosystems under sustainable management
Proportion of products derived from sustainable sources (indicator under development)
Trends in abundance and distribution of selected species
Marine trophic index
Nitrogen deposition
Water quality in aquatic ecosystems</td><td>In the absence of monitoring programme this is difficult to assess. But the PPP arrangement in Majete Wildlife Reserve is facilitating sustainable management of the reserve leading to sustainable use of resources from the reserve.
Nyika-Vwaza Association through an agreement with DNPW is allowed to harvest resources from the park on sustainable basis. The Resource Use Programme is an incentive for communities to participate in the management and sustainable use of resources (e.g. honey) in the park.
Lake Malawi has high levels of nutrients from agricultural activities. These have changed water quality and have affected fish abundance such that some fish are more abundant in the Mozambique side of the lake.</td></tr>
<tr><td>Target 4.2. Unsustainable consumption, of biological resources, or that impacts upon biodiversity, reduced.</td><td>Ecological footprint and related concepts</td><td>Between 1980 and 200 Malawi experienced an annual decline of about 9,000 tonnes of Chambo fish production due to over fishing. Recent figures show an increase in fish catches from 10,000 tonnes in 1991 to above 13,000 tonnes in 2007.
Population trends in Nyika National Park show a general decline. The decline of Roan Antelope and Zebra is of much concern as the two are key species for tourist attraction in the park.
<table>
<tr><th>Species</th><th>2008</th><th>2005</th><th>Trend (%)</th></tr>
<tr><td>Roan</td><td>611</td><td>827</td><td>-26</td></tr>
<tr><td>Eland</td><td>1198</td><td>952</td><td>+26</td></tr>
<tr><td>Zebra</td><td>300</td><td>476</td><td>-37</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Goals and targets</th><th>Relevant indicators</th><th>Progress</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>K/Springer</td><td>44</td><td>62</td><td>-29</td></tr>
<tr><td>Common duiker</td><td>171</td><td>187</td><td>-9</td></tr>
<tr><td>Bushbuck</td><td>93</td><td>138</td><td>-33</td></tr>
<tr><td>Bush pig</td><td>41</td><td>38</td><td>+8</td></tr>
<tr><td>Warthog</td><td>192</td><td>175</td><td>+10</td></tr>
</table>
Data Source: DNPW

A general decline has also been observed in Vwaza wildlife Reserve with zebra as the most affected. Elephants are the only animals that increased between 1985 and 2007.

<table>
<tr><th>Animal species</th><th>2007</th><th>2002</th><th>1985</th></tr>
<tr><td>Elephants</td><td>460</td><td>342</td><td>250</td></tr>
<tr><td>Buffaloes</td><td>34</td><td>140</td><td>900</td></tr>
<tr><td>Kudu</td><td>135</td><td>222</td><td>500</td></tr>
<tr><td>Hartebeest</td><td>30</td><td>201</td><td>700</td></tr>
<tr><td>Roan</td><td>206</td><td>140</td><td>700</td></tr>
<tr><td>Zebra</td><td>4</td><td>16</td><td>250</td></tr>
<tr><td>Warthog</td><td>223</td><td>201</td><td>1500</td></tr>
<tr><td>Reedbuck</td><td>30</td><td>152</td><td>300</td></tr>
<tr><td>Bushbuck</td><td>139</td><td>71</td><td>700</td></tr>
<tr><td>Grysbok</td><td>59</td><td>55</td><td>1000</td></tr>
<tr><td>Common duiker</td><td>131</td><td>140</td><td>1000</td></tr>
</table>
Data Source: DNPW
</td></tr>
<tr><td>Target 4.3: No species of wild flora or fauna endangered by international trade.</td><td>Change in status of threatened species</td><td>Recent increases in elephant populations indicate that there has been significant reduction on elephant poaching (which is triggered by international trade).
Rhinos were extinct in Malawi due to international trade, these have been reintroduced and population is estimated to be 15 rhinos.
Status of threatened species has remained the same, but there is potential for medicinal plants such as Mondia whitei, aloes becoming increasing rare due to international trade.</td></tr>
</table>

Goals and targets	Relevant indicators	Progress
Address threats to biodiversity		
Goal 5. Pressures from habitat loss, land use change and degradation, and unsustainable water use, reduced.		
Target 5.1. Rate of loss and degradation of natural habitats decreased.	• Trends in extent of selected biomes, ecosystems and habitats • Trends in abundance and distribution of selected species • Marine trophic index	• High population growth rate has resulted in increased pressure on land for agricultural and settlements. Information from MoAFS shows that area under crop cultivation in 2008/09 was 3 million Ha. This is an increase from 2.47 million hectares from 1999/2000. This has contributed to a significant reduction in area under wetlands and forests. • Area under PAs was estimated to be 1,869,975 Ha in 1998. Data from Forestry Department shows that there are 88 Forest Reserves, 5 national parks and 4 wildlife reserves occupy about 2,018,198 Ha. This represents 8% increase. Despite this increase there has been massive encroachment into forest reserves and some forest reserves have been degazetted to pave way for settlements and development. • Fisheries in Malawi are on the decline due to overfishing and pollution and as a result about 102 fish species are listed as endangered. There are no records of local extinction of fish species but work conducted in Lake Chilwa show that *Labeo mesops* and *cylindricus* have not been reported in riverine catches on the Malawi side for the past 20 years. Labeos are a major composition (by biomass) of Lake Chilwa influent rivers.
Goal 6. Control threats from invasive alien species		

Goals and targets	Relevant indicators	Progress
Target 6.1. Pathways for major potential alien invasive species controlled.	• Trends in invasive alien species	• Biological control of the invasive cassava mealybug (*Phenacoccus manihoti*) with diverse range of parasitoids and predators has resulted in significant reduction of the cassava mealybug. • Cypress aphids (Cinara spp.) were first reported in Malawi in 1986 and by 1990 it was estimated that cypress aphids killed exotic conifer trees worth over 40 million US dollars. Due to biological control programme using wasps, populations of cypress aphids has reduced significantly. • New invasive alien invertebrates, *Lectocybe inrasa* a pest on eucalyptus has been reported to be widespread in Malawi. • Black wattle, a native of Australia has also been recorded in Malawi but still need to be studied. • Backen fern is becoming a serious invasive species in Nyika National Park and Mulanje Mountain Forest Reserve. Blacken fern will be eradicated on Mulanje Mounatin under the Mulanje Mountain Biodiversity conservation Project. There is an opportunity that bracken fern will be eradicated on Nyika National Park under the proposed Nyika Transfrontier Conservation area Project. • Use of Invasive alien fish species, carp and nile tilapia within the Lake Malawi basin is prohibited by law. Thus reducing the potential of these hybridizing with Lake Malawi endemic fish.
Target 6. 2. Management plans in place for major alien species	• Trends in invasive alien	• Invasive alien species management programme is uncoordinated and as a

Goals and targets	Relevant indicators	Progress
that threaten ecosystems, habitats or species.	species	result potential sources of invasive species are very often not subjected to rigorous study and assessments. • There is no national management plan for control and prevention of invasive species but sectors involved in eradication of invasive species incorporate aspects if IAS in their management plans. For example Mulanje Mounain Conservation Trust has Management plans for the management of invasive alien species (pines, Himalayan raspbury) on Mulanje Mountain Forest Reserve. The fisheries Department has a management plan for the control of water hyacinth, whilst the Forestry Research Institute of Malawi has been implementing a management plan for the control of cyperus aphids and other forest invasive alien species since 1990. • Plans are underway to develop a national strategy and action plan for invasive species.
Goal 7. Address challenges to biodiversity from climate change, and pollution		
Target 7.1. Maintain and enhance resilience of the components of biodiversity to adapt to climate change.	• Connectivity/fragmentation of ecosystems	• The NAPA has been adopted and identified adaptation needs in agriculture, forestry, fisheries, wildlife etc. It also includes adaptation options for improving community resilience to climate change through development of sustainable livelihoods. • Continus corridaor between Nyika national Park and Vwaza, between Liwonde National park and Namizimu forest Reserve provide an opportunity for animals to migrate freely and hence building their resilience to migrate to better areas

Goals and targets	Relevant indicators	Progress
		in times of droughts or floods.
Target 7.2. Reduce pollution and its impacts on biodiversity.	• Nitrogen deposition • Water quality in aquatic ecosystems	• 1996-98 data from Lake Malawi catchment shows that the rivers supplied 0.26 to 0.40 g P $m^{-2}y^{-1}$ and 2.0 to 4.5 g N $m^{-2}y^{-1}$ to the surface of Lake Malawi. These figures were three times (for Phosphorus) and six times (for nitrogen) higher than previously estimated. Considering that nitrate release is characteristic of catchments losing vegetation cover it may be argued that current levels of nitrogen deposits in aquatic ecosystems are much higher than the 1996-98 figures. • Evidence of poor water quality in Lake Malawi may be extrapolated from the phytoplankton flora (based on 1996-98 study) of Lake Malawi which revealed that *Planktolyngbya tallingi* replaced the previously dominant *Planktolyngbya nyassensis*. The presence of *P. tallingi* indicates nutrient availability and poor light condition. A nitrogen fixing blue-green algae which is often a climax species in highly eutrophic situation and has a toxic form was also reported. • Deforestation is major source of pollutants into the aquatic ecosystems. Despite measure and programme put in place to reduce the rate of deforestation, vegetation cover is being lost at an alarming rate.
Maintain goods and services from biodiversity to support human well-being		
Goal 8. Maintain capacity of ecosystems to deliver goods and services and support livelihoods		
Target 8.1. Capacity of ecosystems to deliver goods	• *Biodiversity used in food and medicine (indicator*	• About 90% of Malawians depend on natural resources endowment for a living in form of wild food and

Goals and targets	Relevant indicators	Progress
and services maintained.	*under development)* • Water quality in aquatic ecosystems • Marine trophic index • Incidence of Human-induced ecosystem failure	traditional medicines. The right of Malawian to continue deriving these goods from biodiversity is promoted through the existing laws and policies. As long as the ecosystems will be managed in line with the laws and policies the capacity of ecosystems to deliver goods and services will be maintained. • Sediment and nutrient loads due to human activities (cultivation, deforestation) have affected aquatic ecosystems. For example in Lake Chilwa *Labeo mesops* and *L. cylindricus* have not been reported in riverine catche on Lake Malawi rivers for the past 20 years, but these are abundant in Mozambican rivers. Deforestation has also change the ecosystems of most miombo forests and this has resulted in reduced mushroom population.
Target 8.2. Biological resources that support sustainable livelihoods, local food security and health care, especially of poor people maintained.	• Health and well-being of communities who depend directly on local ecosystem goods and services • *Biodiversity used in food and medicine*	• Significant progress has been made to document wild plants used for food and medicine in collaboration with communities and traditional healers with a view to come up with strategies for sustainable harvesting and propagation on medicinal plants. In order to promote a harmonised working relationship between conventional medical practice and traditional healers, a code of ethics for traditional health practitioners, traditional medicine policy and a draft Traditional Health Practitioners Bill have been prepared, all in consultation with and collaboration between the Traditional Healers' Associations and Ministry of Health. The draft policy seeks to promote research into traditional medicine

Goals and targets	Relevant indicators	Progress
		and also provides for conservation of biodiversity and preservation of indigenous knowledge. These initiatives will facilitate mainstreaming of traditional medicine into the national health care system. • Erosion of genetic diversity within domesticated crops is widespread and is due to preference to improved varieties. Programmes to characterise protect and multiply the remaining varieties, breeds and strains are on going within the Forestry Department and Ministry of Agriculture and Food Security (through the National Plant genetic Resources Centre). • Current agrobiodiversity programmes do not include conservation of pollinators and soil flora and fauna upon which the agricultural diversity is dependent.
Protect traditional knowledge, innovations and practices		
Goal 9 Maintain socio-cultural diversity of indigenous and local communities		
Target 9.1. Protect traditional knowledge, innovations and practices.	• Status and trends of linguistic diversity and numbers of speakers of indigenous languages • *Additional indicators to be developed*	• A draft Traditional Medicine policy has been developed and when approved this will promote protection of indigenous knowledge related to traditional healing. • The relevant IPR legislation in Malawi is the Patents Act. This deals with Industrial inventions and was not designed to cater for issues such as community, farmers and breeders rights or indeed with specific attention to biological resources. As currently defined most of the indigenous technologies which are passed from generation to generation may not be recognised. In order to correct the situation work is under

Goals and targets	Relevant indicators	Progress
		way to integrate the African Model Legislation for the Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources (the Model Legislation) into the Plant Variety Bill being drafted by the Ministry of Agriculture and Food Security. • Malawi has over 30 local languages. The major languages are being promoted and developed through deliberate government policy such as encouragement of radio and TV programmes in various languages. Languages and various traditional foods and practices are being promoted through tribal associations such as the Chewa Heritage Association, The Mulahko wa Alohmwe Association, Ngoni Heritage Association etc.
Target 9.2. Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit-sharing.	*Indicator to be developed*	• The rights of communities living close to Protected Areas are respected and promoted through collaborative management. The Wildlife Policy has provisions that permit communities living close to national parks to have access to natural resources. In addition to this the policy provides for sharing of revenue with communities. The resource use programme is also being practices in Forest Reserves and Fisheries. • Malawi is making progress to improve the current IPR regulations. The situation will improved when the Traditional Healers Bill which also promote issues of IPR, and the Plant Breeders Bill, which has provisions for protection of indigenous knowledge, and sharing of benefits arising from

Goals and targets	Relevant indicators	Progress
		the use of farmers' innovations are approved by parliament.
Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources		
Goal 10. Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources		
Target 10.1. All access to genetic resources is in line with the Convention on Biological Diversity and its relevant provisions.	*Indicator to be developed*	• Access to genetic resources is guided by Procedures and Guidelines for Access and Collection of Genetic Resources in Malawi (Revised 2002) and Procedures and Guidelines for the Conduct of Research in Malawi (Revised 2002). Comprehensive ABS regulations are included in the revised EMA.
Target 10.2. Benefits arising from the commercial and other utilization of genetic resources shared in a fair and equitable way with the countries providing such resources in line with the Convention on Biological Diversity and its relevant provisions	*Indicator to be developed*	• Provisions on ABS contained in the proposed Environmental Management Bill and the Manual on Access and benefit Sharing will promote utilization of genetic resources and equitable sharing of benefit in line with relevant provisions of the CBD.
Ensure provision of adequate resources		
Goal 11: Parties have improved financial, human, scientific, technical and technological capacity to implement the Convention		
Target 11.1. New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with Article 20.	• Official development assistance provided in support of the Convention	• Financial support has been received from the GEF (for MMCT, Lake Malawi Biodiversity Project, Nyika TFCA etc), from USAID, Norway (Nyika Biodiversity Project, MMCT, Nyika TFCA). However this is still inadequate when compared to the high number of rare and endemic species (especially fish) in Malawi.
Target 11.2. Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under	*Indicator to be developed*	• Technologies relevant to biodiversity conservation and sustainable use have been transferred to Malawi. For example fish cage farming has improved availability of chambo in

Goals and targets	Relevant indicators	Progress
the Convention, in accordance with its Article 20, paragraph 4.		Lake Malawi. Technologies in capture and translocation of elephants have improved distribution and protection of elephants and have reduced the elephant human conflicts experienced in Phirilongwe Forest Reserve.

4.3 Progress towards goals and objectives of the Strategic Plan

Strategic goals and objectives	*Possible indicators*	Progress
Goal 1: The Convention is fulfilling its leadership role in international biodiversity issues.		
1.1 The Convention is setting the global biodiversity agenda.	CBD provisions, COP decisions and 2010 target reflected in work plans of major international forums	Malawi believes the Convention is leading on setting the global biodiversity agenda as demonstrated at the World Summit on Sustainable Development in 2002 in south Africa. This is also demonstrated by arranging a meeting to discuss the next course of action in implementing 2010 actions at the next 66 UN gathering.
1.2 The Convention is promoting cooperation between all relevant international instruments and processes to enhance policy coherence.		Malawi is of the opinion that the Convention has clear guidelines and measures that promote cooperation between all relevant instruments such as the UNCCD, UNFCCC, RAMSAR, CITES, Convention on Migratory species etc.
1.3 Other international processes are actively supporting implementation of the Convention, in a manner consistent with their respective frameworks.		
1.4 The Cartagena Protocol on Biosafety is widely implemented.		Malawi ratified the Cartagena Protocol and has made significant progress in implementing provisions of the Protocol. In line with the Protocol Malawi has put in place Biosafety Act, Regulations and guidelines for managing GMOs, National Biosafety Committee. In addition, Malawi in 2008 approved National Biotechnology and Biosafety Policy. Progress has also been made towards strengthening Malawi capacity in handling of GMOs through training.
1.5 Biodiversity concerns are being integrated into relevant	*Possible indicator to be developed:*	SADC objectives strongly support sustainable utilisation of natural

Strategic goals and objectives	*Possible indicators*	Progress
sectoral or cross-sectoral plans, programmes and policies at the regional and global levels.	*Number of regional/global plans, programmes and policies which specifically address the integration of biodiversity concerns into relevant sectoral or cross-sectoral plans, programmes and policies* *Application of planning tools such as strategic environmental assessment to assess the degree to which biodiversity concerns are being integrated* *Biodiversity integrated into the criteria of multilateral donors and regional development banks*	resources and effective protection of the environment. To achieve this, a number of biodiversity related regional instruments have been developed. These include Protocols on Forestry, Tourism, shared waters, Wildlife Conservation, and Law enforcement, the Environment and protocol on the development of tourism. NEPAD which Malawi belongs to also integrates biodiversity considerations through its two priority areas of Agriculture and Food Security and Environment, climate change and tourism.
1.6 Parties are collaborating at the regional and subregional levels to implement the Convention.	*Possible indicator to be developed:* *Number of Parties that are part of (sub-) regional biodiversity-related agreements*	Malawi as a member of the SADC region collaborates with other SADC member states through a number of projects such as the SADC and USAID collaborative project to improve the management of selected shared river basins and protect biodiversity in the Southern Africa region. The overall goal of the Agreement is to promote integrated management of shared water resources in a manner that contributes to poverty alleviation, equity and protection of biodiversity. The SDAC Regional Rhino Conservation Project is another example. Through this project Rhinos which were extinct in Malawi have been reintroduced in Liwonde National Park and Majete Wildlife Reserve. Malawi is also collaborating with Zambia on the conservation of shared Protected Areas. In this regard, Malawi signed an MoU with Zambia to

Strategic goals and objectives	*Possible indicators*	Progress
		manage the Kasunga TFCA and Nyika TCFA.
Goal 2: Parties have improved financial, human, scientific, technical, and technological capacity to implement the Convention.		
2.1 All Parties have adequate capacity for implementation of priority actions in national biodiversity strategy and action plans.		Malawi lacks human, infrastructure and institutional capacity to implement the NBSAP. In this recognition the NBSAP responded by prioritising three actions that would lead to strengthened infrastructure and human capacity (**Priority action 21:** Develop human, institutional and national capacities to identify, monitor and manage biodiversity through training for target groups in relevant courses including taxonomy, natural resources management, biodiversity assessment and ethnobiology; **Priority action 22:** Instil a biodiversity culture in the youth of Malawi and local communities by developing guidelines on environmental education and curricula for schools and establishment of in-service training programmes for teachers; and **Priority action 23:** Establish and provide capacity for operationalizing the national CHM and strengthen and implement the existing CHM institutional structure, and develop national biodiversity databases). Capacity constraints were also highlighted in the National Capacity Self Assessment. Funding from the national budget is inadequate and often enough for salaries only. There is therefore need for additional resources to support or enhance efficiency of the existing human capacity and speed up implementation of the NBSAP.
2.2 Developing country	Official development	Funding from the national budget is

Strategic goals and objectives	*Possible indicators*	Progress
Parties, in particular the least developed and the small island developing States amongst them, and other Parties with economies in transition, have sufficient resources available to implement the three objectives of the Convention.	assistance provided in support of the Convention (OECD-DAC Statistics Committee)	inadequate. However most biodiversity activities are funded by a combination of multilateral and bilateral donors such as the GEF, Norway, USAID, JICA, the EU etc.
2.3 Developing country Parties, in particular the least developed and the small island developing States amongst them, and other Parties with economies in transition, have increased resources and technology transfer available to implement the Cartagena Protocol on Biosafety.		Malawi has received funding from UNEP/GEF and other agencies to implement the Cartagena Protocol on Biosafety and for capacity building. These funding has supported training of relevant personnel in risk assessment, risk management, modern biotechnology etc. Malawi still lacks technology and equipement to handle genetically modified Organisms.
2.4 All Parties have adequate capacity to implement the Cartagena Protocol on Biosafety.		Limited capacity is available but resources are inadequate to implement the Cartagena Protocol effectively.
2.5 Technical and scientific cooperation is making a significant contribution to building capacity.	*Indicator to be developed consistent with VII/30*	This has not been assessed.
Goal 3: National biodiversity strategies and action plans and the integration of biodiversity concerns into relevant sectors serve as an effective framework for the implementation of the objectives of the Convention.		
3.1 Every Party has effective national strategies, plans and programmes in place to provide a national framework for implementing the three objectives of the Convention and to set clear national priorities.	Number of Parties with national biodiversity strategies	Malawi published its NBSAP in 2006 which was formulated in such a way that it directly contributes to all articles of the Convention. In addition the the NBSAP, Malawi has relevant strategies and programmes that contributes to the implementation of the Convention such as *ex situ* and in situ conservation of plant genetic resources (through the NPGRC) and

Strategic goals and objectives	*Possible indicators*	Progress
		the Protected Areas Network.
3.2 Every Party to the Cartagena Protocol on Biosafety has a regulatory framework in place and functioning to implement the Protocol.		Malawi in 2002 developed and adopted a Biosafety Act. In 2008, Malawi adopted a Biotechnology and Biosafety Policy. In line with the act, Malawi put in place committees and regulations for handling GMOs. These instruments are facilitating implementation of the Biosafety Protocol.
3.3 Biodiversity concerns are being integrated into relevant national sectoral and cross-sectoral plans, programmes and policies.	*To be developed* *Percentage of Parties with relevant national sectoral and cross-sectoral plans, programmes and policies in which biodiversity concerns are integrated*	Sectoral policies and legislation (Forestry, Fisheries, and National Parks) were revised in line with EMA and NEP. It has been demosntrated in Chapter 3 that biodiversity concerns have been mainstreamed into NSSD, MDGs, MGDS, NAPA.
3.4 The priorities in national biodiversity strategies and action plans are being actively implemented, as a means to achieve national implementation of the Convention, and as a significant contribution towards the global biodiversity agenda.	*To be developed* *Number of national biodiversity strategies and action plans that are being actively implemented*	NBSAP Priority Actions are directly linked to CBD articles and were designed to contribute to the implementation of the 2010 targets. These are therefore contributing significantly towards the biodiversity global agenda.
Goal 4: There is a better understanding of the importance of biodiversity and of the Convention, and this has led to broader engagement across society in implementation.		
4.1 All Parties are implementing a communication, education, and public awareness strategy and promoting public participation in support of the Convention.	*Possible indicator to be developed:* *Number of Parties implementing a communication, education and public awareness strategy and promoting public participation* *Percentage of public awareness*	National Environmental Education and Communication strategy was adopted in 1996. Guided by the strategy school curriculum has been revised to incorporate environmental education. For example, both UNIMA and MZUNI are offering degrees in environment and natural resources management. Guided by the same strategy NGOs especially WESM and MMCT are implementing environmental

Strategic goals and objectives	*Possible indicators*	Progress
	programmes/projects about the importance of biodiversity *Percentage of Parties with biodiversity on their public school curricula*	education programme but targeting the youth and the rural communities. Public appreciation of the importance of the Convention and the value of biodiversity in maintaining life is also being promoted through public awareness campaigns through the print and electronic media.
4.2 Every Party to the Cartagena Protocol on Biosafety is promoting and facilitating public awareness, education and participation in support of the Protocol.		Limited awareness, education and participation programme are available for the Cartagena Protocol on Biosafety.
4.3 Indigenous and local communities are effectively involved in implementation and in the processes of the Convention, at national, regional and international levels.	*To be developed by the Ad Hoc Open-ended Working Group on Article 8(j)*	NEP strongly promotes community participation in natural resources management. This is also supported by the relevant sectoral policies such as the Forestry, Fisheries and Wildlife which have provisions for collaborative management with communities living within the vicinity of PAs.
4.4 Key actors and stakeholders, including the private sector, are engaged in partnership to implement the Convention and are integrating biodiversity concerns into their relevant sectoral and cross-sectoral plans, programmes and policies.	*To be developed* *Indicator targeting private sector engagement,* *e.g. Voluntary type 2 partnerships in support of the implementation of the Convention*	The private sector has actively participated biodiversity conservation related activities such as ecotourism and reforestation programmes. For example through the concession agreement with the Forestry Department on harvesting of pine on Viphya Plateau, Reply is required to replace the trees they harvest. The Public Private Partnerships contribution to achievement of CBD objectives is substantial. For example through PPP arrangement African Parks (Majete) has managed to reintroduced threatened mammals in Matege Wildlife Reserve. Similarly MMCT has increased areas under Mulanje cedar on Mulanje Mountain.

Strategic goals and objectives	*Possible indicators*	Progress
		There is also potential to improve biodiversity on Nyika through partnership arrangement with Nyika Foundation.

4.3 Conclusions

4.3.1 Impact of CBD implementation in improving conservation and sustainable use of biodiversity

Based on results presented in previous chapters it is evident that implementation of the CBD has had positive impact on the conservation and sustainable use of biological diversity in Malawi. For example, although Malawi had some conservation programmes prior to the Convention there are a number of positive gains that came about after Malawi became party to the CBD. Among the positive gains are issues related to biosafety and technology transfer, access and benefit sharing, protection of the indigenous knowledge, and incorporation of environmental issues into the school curriculum. The benefits need to be strengthened and the following achievements have provided solid background for Malawi to achieve better results in future.

a) Malawi in response to Decision 10 of the CoP is in the process of developing guidelines for sustainable use of biodiversity. By developing the guidelines Malawi will be contributing to the realisations of NBSAP Priority Action 5 regarding development of guidelines.
b) Restoration of degraded ecosystems (e.g. Ndilande Forest Reserve) by the Forestry Department, reintroduction of threatened mammal species (elephants, rhinos etc) in Majete Wildlife Reserve, and restoration of chambo (Tilapia) in Lake Malawi. Although the restoration programmes are not guided by national programmes and strategies, this is the starting point for achieving NBSAP target in respect of Priority Action 2 (develop and effectively manage restoration programmes and initiatives to restore threatened species).
c) Initiation of a process to revise the Environmental management Act is a major achievement. When adopted, the revised EMA will provide for establishment of an independent institution (Environmental Protection Authority) that will oversee implementation of NRM programmes in Malawi. This will promote a coordinated approach towards biodiversity conservation and sustainable use in Malawi. The process to revise EMA also contributes to achieving NBSAP targets related to Priority Actions 18 to 20 (see Box 1 for NBSAP Priority Actions and Targets).
d) Significant progress with the implementation of the Cartagena Protocol as attested by adoption of the Biosafety Policy in 2002, adoption and approval by parliament of the Biotechnology and Biosafety Policy in 2008, setting up of national biosafety committees to monitors and facilitate implementation of the Biosafety Protocol. This also means that Malawi has initiated work to implement requirements of Article 19 of the Convention regarding handling of biotechnology and distribution of its benefits. In addition, this also shows that Malawi has made significant progress towards NBSAP target related to Priority 11 (regarding implementation of the Biosafety Act).

e) Considerable progress has been made in mainstreaming biodiversity considerations into national plans and programmes. As pointed out in section 3, MGDS (a medium term strategy for wealth creation and growth) integrates biodiversity concerns by promoting sustainable conservation of natural resources base.

Despite these achievements, Malawi has encountered a number of challenges in the implementation of the NBSAP. The following are some of the challenges:

- There is lack of framework for monitoring and evaluating biodiversity programs. In addition the targets and measurable indicators do not permit systematic follow up of progress of implementations. This is also made worse by the lack of baseline data on biodiversity components.
- There is inadequate flow of information on biodiversity programmes because the CHM is not fully functional. In addition there is lack of research on biodiversity which means that information is often outdated and inadequate.
- Biodiversity has a low profile in the national agenda and as a result there is less funding from the national budget and from the international community for biodiversity conservation and sustainable use.
- There is weak coordination of biodiversity programs in Malawi. The EAD as an institution designated to coordinate implementation the NBSAP has not put in place mechanisms to facilitate implementation.
- The regulatory framework for biodiversity is weak.

4.3.2 Lessons learned regarding implementation of the Convention

Little progress has been made on sensitising the private sector on the importance of biodiversity conservation. With the exception of projects that have undergone EIAs most private sector activities especially tobacco estates have not integrated biodiversity concerns into their activities.

Malawi has also learned that biodiversity reporting is more meaningful when compared to baseline data. In order to ensure that Malawi is making progress, achievements reported in this report will be regarded as baseline for comparison in the fifth National Report. Not only is the lack on indicators problematic when reporting, lack of follow up on CoP decisions means that projects being implemented by various organisations are not responding to CoP decisions and specific NBSAP actions. This makes preparation of national biodiversity reports difficults because information is not readily available.

Success has been made in sensitizing local communities on the importance of biodiversity. This has promoted participation of local communities in biodiversity conservation and sustainable use. Success has also been made in mainstreaming biodiversity considerations into national programmes and plans. With the exception of these, integration of biodiversity considerations into the private sector especially commercial farmers has been minimal. This is an area that requires special attension.

4.3.3 Future Priorities and Capacity building needs

a) Future priorities

Although, Malawi has put in place conducive legislation, policies, strategies and programmes to facilitate biodiversity conservation and sustainable use, biodiversity conservation is still problematic. There are a number of priority issues that must be implemented first if Malawi is to make strides in biodiversity conservation. In this recognition, Malawi through the National Capacity Self Assessment (NCSA) process identified national biodiversity priority issues. The biodiversity issues were ascertained taking into consideration the strategic approach established with NBSAP. It is envisaged that implementation of the priority issues will improve environmental, and natural resources management, through capacity building at systemic, institutional and individual levels in accordance with the challenges of the CBD. The NCSA identified and prioritised the following issues. Priorities were ranked according to scale of problem, level of concern and ability to address the issue.

Table 17. Assessment of priority issues in order of their importance to Malawi (adapted from draft NSCA on Biological Diversity).

No	Issue	Scale of Problem	Level of Concern	Inability to adequately address	Priority ranking
1.	Inadequate appropriate measures for *in situ* and *ex situ* conservation of biodiversity	6	3	3	12
2.	Increasing numbers of threatened species and populations	6	3	3	12
3	Increasing spread of invasive species	6	3	3	12
4	Inadequate capacity to conduct research in biodiversity	6	3	3	12
5	Inadequate capacity to deal with issues relating to biotechnology such as safe use, monitoring, evaluation and research	6	3	3	12
6	Inadequate capacity to identify, monitor, evaluate and manage biodiversity	6	3	3	12
7	Inadequate sustainable funding for biodiversity related activities/projects/programmes	6	3	3	12
8	Inadequate legislation to deal with issues relating to access to biological resources and fair and equitable sharing of benefits arising from the use of the biological resources	1	3	3	7

9	Poor exchange of information and knowledge on biological diversity	1	3	3	7
10	Inadequate integration of biological diversity issues within the national priority development programmes	1	3	3	7
11	Inadequate enforcement of legislation on implementation of programmes and projects leading to adverse impacts on biodiversity	1	3	3	7
12	Poor community participation in the conservation and sustainable utilisation of biological diversity	1	3	3	7
13	Low capacity to access and absorb financial resources provided via the financial mechanism of the Convention	1	3	3	7
14	Inadequate innovation to translate research results into tools for managing biodiversity	1	3	3	7
15	Weak linkage between research results and policy formulation	1	3	3	7
16	Unsustainable implementation of programmes	1	3	2	6

Scale of problem; 3= Global, 2 = Trans-boundary, 1 = National
Level of concern: 3 = high, 2 = medium, 1 = low
Inability to adequately address issue; 3 = low, 2 = medium, 1 = high

b) Capacity building needs

The NCSA on Biological Diversity undertaken in 2006 provided a comprehensive analysis of capacity needs to address the above priority issues. The following systemic, institutional and individual capacity needs are based on the NCSA.

i) Systemic capacity

- There are a number of national policies/strategies and legislation relating to biodiversity. However, the legal and policy frameworks are over burdens with overlaps, gaps and inconsistencies. The sectoral policies and legislation need to be harmonised to minimise overlaps and conflicts. In addition, there is need to develop appropriate instruments (e.g. regulations, guidelines and contractual agreements) to fully operationise the existing sectoral policies and legislation.
- Most institutions have clearly defined mandates related to biodiversity conservation and sustainable use. However, role and responsibilities of overlapping institutions require further clarification and formalisation.
- In adequate government funding continue to be the major obstacle affecting effective implementation of biodiversity programmes in Malawi. This is despite Malawi facilitating establishment of three Trust Funds to finance natural resources management. There is need therefore to review the current funding strategies.

- Public Private Partnerships have potential to contribute towards improved biodiversity conservation and sustainable use. This should be strengthened through creation of enabling policy frameworks for PPPs.
- Information on status and trends of biodiversity is scattered, inadequate and outdated. This affects sound decision making regarding what to conserve. A national programme to fill information gaps should be developed.

ii) Institutional capacity

- While only a few of the institutions are solely dedicated to biodiversity work, most of the scientific and academic institutions are in one way or another involved in biodiversity conservation. Internal instruments of these institutions should be reviewed to be consistent with EMA.
- The responsibility of the institutions, their activity, co-ordination and accountability in the field of biodiversity is low and therefore need further improvement.
- The scientific and academic institutions do not have adequate financial resources for biodiversity conservation. These institutions should develop strategies for identifying alternative source of funding.
- The human resources available in research institutions are fairly qualified but inadequate. To improve the situation Malawi should develop a strategy to increase the pool of scientists. This should be based on needs assessment.
- Availability of information services e.g. libraries and Internet service are inadequate. This should be strengthened through operationisation of the Clearing House Mechanism.
- There is low appreciation of biodiversity among policy makers. To improve the situation a strategy for raising the appreciation of the CBD among relevant government institutions and saff should be developed and implemented

iii) Individual level:

- Current educational level and knowledge on biodiversity related issues are sufficient in few research and academic institutions. There is need therefore to strengthen the understanding of biodiversity in most of the institutions, particularly at the District Assembly and community level.
- The exchange and access to information is inadequate among the professional scientists in various research institutions.
- Individual motivation to promote excellence in biodiversity issues is low due to poor incentives and motivation.
- Communication skills among the individuals involved directly involved in biodiversity conservation is adequate.
- There is appropriate deployment of human resources in research and academic institutions but it is poor in most other institutions.

Appendix I - Information concerning reporting Party and preparation of national report

A. Reporting Party

Contracting Party	Malawi
NATIONAL FOCAL POINT	
Full name of the institution	Environmental Affairs Department, Ministry of Natural Resources, Energy and Environment
Name and title of contact officer	Dr. Yanira Ntupanyama, Director
Mailing address	Lingazi House, P. Bag 394, Lilongwe 3
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CONTACT OFFICER FOR NATIONAL REPORT (IF DIFFERENT FROM ABOVE)	
Full name of the institution	Environmental Affairs Department, Ministry of Natural Resources, Energy and Environment
Name and title of contact officer	Mr. M.K.M Mwanyongo, Assistant Director of Environmental Affairs
Mailing address	Lingazi House, P. Bag 394, Lilongwe 3
Telephone	+265 1 771 111
Fax	+265 1 773 379
E-mail	mwanyongom@malawi.gov.mw
SUBMISSION	
Signature of officer responsible for submitting national report	
Date of submission	

B. Process of preparation of national report

This report is prepared based on information from the literature and stakeholder consultations as follows:

Literature Search.

The purpose of literature search was to obtain an overview of past and present activities on biodiversity conservation and sustainable use. The results were used to prepare a preliminary report from which information gaps were identified. In addition to this the report provided basis for determining methodologies for data collection and sources of the missing information. The following publications were consulted.

- Malawi Growth and Development Strategy.
- National Biodiversity Strategy and Action Plan,
- Malawi National Strategy for Sustainable Development,
- Policies and Acts related to biodiversity conservation such as the National Environmental Policy, National Forestry Policy, National Forestry Programme, National Fisheries and Aquaculture Policy, Natioal parks and Wildlife Policy, Land Resources Policy, Malawi Report on Policy, Environmental Management Act.
- National Environmental Action Plan
- Malawi State of Environment Reports,
- National Biodiversity Reports (First, second and third national reports),
- Malawi Economic Reports

Stakeholder consultations

Malawi is encouraged under decision VII/25 of CDB to ensure wide stakeholder involvement, as well as that of indigenous and local communities, in the preparation of national reports, or in related processes that will inform national-report preparation, to ensure a more accurate and comprehensive reflection of the views and priorities of national stakeholders. In order to achieve this, key stakeholders form the universities (University of Malawi and Mzuzu), Government Institutions (Environmental Affairs Deptartment; Forestry Department, Department of National Parks and Wildlife; National Herbarium and Botanic Gardens of Malawi; Fisheries Department; FRIM; NRPGC; and Department of Agricultural Research), NGOs (e.g. Wildlife and Environment Society of Malawi, Malawi Environment Endowment Trust, Mulanje Mountain Conservation Trust, and Molecular Biology and Ecological Research Unit, MBERU) and the private sector were consulted.The objective of the consultations was to collect additional information and also to verify and or update information from literature. Information from stakeholders and the literature was used to prepare a draft report.

National consultative Workshop

The draft report was discussed at a stakeholder's workshop organized by Environmental Affaires Department. The workshop was attended by members of the National Biodiversity Steering Committee and representative of key biodiversity institutions (NHBG, UNIMA, MZUNI, MMCT, FOrestry Department, Department of Fisheries etc). The workshop was convened in order to:

a) brief the participants on the progress being made in the peparation of the fourth country report and obtain endorsement of the National Biodiversity Steering Committee to submit the draft report to UNEP,

b) brief participants on the extent to which Malawi has implemented the NBSAP and obstacles encountered in the process,

c) present the fourth report and solicit their comments, contributions and endorsement,
d) discuss the mechanisms to be put in place to speed up NBSAP implementation.

Appendix II - Further sources of information

- **www.countryStar.org/MWI (CountrSTAT Malawi - Draft site).**
- **http://www.chmmw.org (Malawi Clearing House Mechanism).**
- **Malawi Pover and Environment Initiative Economic Report, May 2010 (Yoran et. Al. 2010).**
- **FAOSTAT (2009), see www.faostat.fao.org.**
- http://ag.arizona.edu/oals/malawi/PLUS.html; MALAWI+ Public Lands Utilisation Study (PLUS). Final Report by Orr B., Eiswerth B., Finan T., and Mlembo L. (1998). University of Arizona Office of Arid Lands Studies and the Forestry Research Institute of Malawi.
- National Biodiversity Strategy and Action Plan (Environmental Affairs Department 2006).

Annex III - Targets of the Global Strategy for Plant Conservation

Decision VI/9 of CoP 6 invites Parties and Governments to develop national and/or regional targets, and, as appropriate, to incorporate the targets for the Global Strategy for Plant Conservation into relevant plans programmes and initiatives, including national biodiversity strategies and action plans. This decision has not been adequately followed up in Malawi such that Malawi has no national strategy for plant conservation. The targets were not also incorporated into the NBSAP. Despite this, most NBSAP strategies and actions were designed to contribute towards the implementation of the Global Strategy for Plant Conservation. It must be pointed out however that most targets most were also implemented through the SABONET project which phased out in 2005.

Malawi has not designated a focal point for the implementation of the strategy. This means that there is no institution to follow up implementation. Despite this, activities undertaken by the NHBG, FRIM, MoAFS etc have contributed to the implementation of various targets of the strategy.

Progress	Challenges	Priorities
Target 1: A widely accessible working list of known plant species, as a step towards a complete world flora		
Malawi has no national checklist but the following are a valuable sources of information for the preparation of a national checklist of plants. – Pteridophyta collected in Malawi, with a preliminary checklist of the Orders Psilotales and Lycopodiales (Berrie 1981) – A First Checklist of the Herbaceous Flora of Malawi (Binns 1968) – An annotated checklist of the macrophytes of the Shire River, Malawi, with reference to potential aquatic weeds (Blackmore et al 1989).	• Inadequate human and infrastructure capacities to compile and check the nomenclature of the names, • inadequate up to date taxonomic literature • inadequate funding.	• Revising the existing checklists, • Finalising the electronic data base and linking it with GIS to facilitate preparation of national checklists of plants. • Finalising and publishing the national checklist of plants of Malawi.

– Systematic list of Nyika botanical collections (Brummitt 1973) – Plants of the Nyika Plateau (Burrow and Willis 2005). – IUCN Red Data List for Southern African Plants – A checklist of indigenous agricultural crops and germplasm (National Plant Genetic Resource Centre) An electronic database of the herbarium collections at the National Herbarium and Botanic Gardens has potential for being used to develop an up to date checklist of plants of Malawi. This together with information from the literature including Flora Zambesiaca has been used to prepare a draft national checklist.		
Target 2: A preliminary assessment of the conservation status of all known plant species, at national, regional and international levels		
• With support from SABONET a preliminary assessment of conservation status of some plants of Malawi was conducted and the resulted were part of the IUCN Southern Africa Red Data List. The results show that approximately 261 species are considered threatened, vulnerable, rare or endangered. • Malawi has been participating in the Millennium Seed Bank Project and through this project a total of 950 plat species were	• Limited human capacity to undertake conservation status of plan species using recommended IUCN methodologies. • Inadequate financial resources	• capacity building for Red Data List assessment. • production and maintenance of Red Data List for Malawi through the existing channels.

targeted. In order to facilitate decision making full conservation assessment of 63 species determined as having either the highest extinction threat, or as being data deficient, were treated to a fuller conservation assessment based on IUCN Red List categories and criteria.		
Target 3: Development of models with protocols for plant conservation and sustainable use, based on research and practical experience		
• Malawi is in the process of developing guidelines for sustainable use of biodiversity. • The Millennium Seed Bank project, which Malawi is a partner produces threatened species dossier that contains information on plant populations in the wild, germination protocols, propagation methods and recommendations for *ex situ* and *in situ* conservation. • MMCT has an Ecological Monitoring Programme where biodiversity parameters such as species diversity, conservation status, human activities are monitored in permanent ecological plots. Results of the study will be used to develop models for plant conservation and sustainable use in the reserve.	• Inadequate research capacity • poor institutional collaboration	• Building capacity in the development of methodologies and protocols for conservation and sustainable use of plants. • Making available information about plants electronically and on the Clearing House Mechanism.
Target 4: At least 10 per cent of each of the world's ecological regions effectively conserved		

• About 12% of Malawi's total land areas under Protected Areas network which is more than the global target. The percentage may increase if the proposed three forestry reserves are approved. • Almost all the ecoregions found in Malawi (WWF ecoregions and IUCN Afromontane Ecoregions of Forest Biodiversity (e.g. Mulanje Forest Reserve and Nyika National Park) are represented in the Protected Areas network.	• Low capacity to enforce the law and implement the relevant policies. • Encroachment into protected areas due to poverty, agricultural expansion and development.	• Implementation of the WWF Ecoregions to increase representation of conserved ecoregions. • Speed up approval of the three proposed Forest Reserves. • Assess conservation status of ecosystems. • Facilitate approval of Lake Chilwa wetland as a community conservation area.
Target 5: Protection of 50 per cent of the most important areas for plant diversity assured		
• Approximately 28% of the total land area of Malawi is under forest cover. Of these about 11% is national parks and wildlife reserves, 10% are gazetted forest reserves and the remaining 7% is natural woodlands on customary land. Currently there are about 88 gazetted forest reserves and 5 National Parks and 4 Wildlife reserves. The protected areas cover a wide range of habitats ranging from closed forests to wetlands and aquatic habitats e.g. Lake Malawi National Park. Protected areas such are Nyika National Park, Zomba and Mulanje mountains are considered areas of high plant biological	• Low capacity to enforce the law. • Inadequate policy harmonisation. • Land shortage which leads to encroachment into protected areas. • Approximately 240,000 Ha of forests occur on customary land and hence not protected by law.	• Develop guidelines for selection of PAs

diversity. • The primary reason for creating forest reserves is for catchment protection. In addition to this function, PAs play a role in biodiversity conservation, forestry protection, protection of water supply an erosion control. Currently it is estimated that about 14 forestry reserves are valued for biodiversity conservation and presence of rare and endemic species.		
Target 6: At least 30 per cent of production lands managed consistent with the conservation of plant diversity		
• Integrated watershed Projects being implemented within the Lake Malawi basin and Lake Chilwa basin aim at improving ecosystem function and sustainable natural resources management following the ecosystem approach and also aim at mainstreaming biodiversity into land use planning. • Community participation in natural resources management and in on farm conservation of plant genetic resources through the national gene bank is assisting small holder farmers manage lands in line with the conservation of plan diversity.	• limited human capacity and inadequate funding for such activities. • Lack of appropriate incentives the conservation of plant diversity	• Update or develop land use management plans for selected areas
Target 7: 60 per cent of the world's threatened species conserved in situ.		
• An assessment of the conservation status of	• A total of 241 plant species are included in	• Build human and infrastructure capacities,

plants of Malawi during the NBSAP observed that all the known threatened species are represented in Malawi's protected areas network but their populations are declining. This means that the following strategies provided in the National Forestry Programme to some extent provide mechanisms to ensure that threatened species continue to be conserved *in situ* in Protected Areas. o **NFP 4.2** - Optimize policy influence on forests and livelihoods o **NFP 4.3** - Build local forest governance through decentralization o **NFP 4.4** - Support Community based forest management o **NFP 4.6** - Strengthen forest extension o **NFP 4.9** - Manage forest reserves.	the Malawi Red Data List as being threatened. The lists does not include all Orchids and Aloes most of which are threatened. This means that the number of threatened species may be more than 241 species. • High poverty and population pressure means species will always be threatened – making conservation efforts difficult. • Inadequate plans to protect threatened species outside Pas	• Assess conservation status of major biodiversity components, • Update list of threatened species
Target 8: 60 per cent of threatened plant species in accessible *ex situ* collections, preferably in the country of origin, and 10 per cent of them included in recovery and restoration programmes		
• The total number of threatened species in Malawi is not known. Despite this, the following on going *ex situ* conservation programme have significantly contributed to the realisation of this target.	• A comprehensive list of threatened species and their distributional range is not known. • Inadequate human capacity.	Strengthen the capacity of the NPGRC and the national tree seed centre.

o Threatened Plants Programme initiated during the SABONET project has contributed to the collection and introduction in the botanic gardens of such species as Aloes (30 species), orchids (about 11 species), and rare medicinal plants. o The National Plant Genetic Resource Centre collects and stores on long term basis seeds for cultivated and wild relatives of cultivated crops. Currently the Centre has over 3000 accessions. o The National Tree Seed Centre, collects and stores on short term basis threatened and rare indigenous trees species. o Through the Millennium Seed Band about 950 accessions of rare and threatened plants have been collected and are being stored at Kew with duplicates at NPGRC.		
Target 9: 70 per cent of the genetic diversity of crops and other major socio-economically valuable plant species conserved, and associated indigenous and local knowledge maintained		
• The National Plant Genetic Centre, National Tree Seed Centre, Government Research Stations have the mandate to collect and conserve all crops including their wild relatives.	• Inadequate infrastructure and human capacity to collect and maintain the collections. • Inadequate financial resources. • Inadequate appreciation of the importance	• Build capacity for multiplication and reintroduction of threatened species into the wild.

• Approximately 50 crop species (almost all known crops grown in Malawi) are conserved on long term basis at the National Plant genetic Resource Centre. The sample size of each crop species is of enough quantity to allow reintroduction of crops. • The National Tree Seed centre maintains a viable collection of all threatened trees species of Malawi. This when combined with seed collection maintained by the NHBG, agricultural research stations means that more than 70 percent of crop species grown in Malawi are under conservation of some sort.	and value of ex situ conservation of crops.	
Target 10: Management plans in place for at least 100 major alien species that threaten plants, plant communities and associated habitats and ecosystems		
• Malawi has about 30 invasive species. At the moment no national management plan for control and prevention of invasive species is available. • Mulanje Mountain Conservation Trust has Management plans for the management of invasive alien species (pines, Himalayan raspberry) on Mulanje Mountain Forest Reserve. • The fisheries Department has a	• Due to limited resources control and management of invasive species is restricted to a few invasive species. In addition to this there is scientific uncertainty about the environmental, social and economic risk posed by a potentially invasive alien species and as a result, only those adequately studied are targeted. This has often resulted in delayed or postponement of eradication and	Development of management plans for major invasive alien species.

management plan for the control of water hyacinth using biological control agents. • Forestry Research Institute of Malawi has been implementing a management plan for the control of cyperus aphids since 1990. Biological control agents using wasps have reduced the populations of aphids and have reduced the number of conifer trees destroyed by the aphids significantly. • The Ministry of Agriculture and Food security has a management plan to control the larger grain borer. With a combination of chemical and better storage facilities, grain loss from the larger grain borer can be reduced significantly.	control of invasive species. • Management programmes are uncoordinated, and often emphasize on eradication than prevention of introductions. • Institutional framework and policies that would have facilitated control and reduce spread of potentially invasive species within Malawi and between its neighbours are unavailable. • Unavailability of a designated organisation to coordinate invasive species programmes means that sectoral activities, such as fisheries, agriculture, forestry, and horticulture are very often not subjected to rigorous study and assessments. • Lack of an effective overall coordinating institution on invasive species management.	
Target 11: No species of wild flora endangered by international trade		
• Malawi has various instruments that regulation international trade and these include the Investment Promotion Act, Malawi Bureau of Standards, Control of Goods Acts, The Customs and Excise Act, EMA, National Park and Wildlife Act, Forestry Act and the Fisheries Conservation	• Lack of harmonization between sectoral policies and laws which have provisions for international trade, • inadequate understanding of the mechanisms and instruments regulating international trade,	• Produced a comprehensive list of traded plants.

and Management Act. • Current projects on traditional medicine aim at promoting cultivation of rare medicinal plants to reduce pressure on wild populations.	• uncoordinated issuing of collection and expert permits, ineffective monitoring and non compliance.	
Target 12: 30 percent of plant-based products derived from sources that are sustainably managed		
• **Science and Technology Policy (2001)** - has policy element for developing Intellectual Property Rights regimes as a measure to promote sustainable use of biological resources. • **Procedures and Guidelines for Access and Collection of Genetic Resources** - provides preliminary controls to ensure that only sources that are sustainably managed are used in bioprospecting. Malawi is however developing regulations that will regulate access to genetic resources. • Commercial Products from natural products such as indigenous fruit juices (e.g. Baobab juice), aloe products, moringa products are produces from sources that are either cultivated or are sustainably managed.	• Progress towards sustainable use of biological resources requires political will to create an enabling environment. • Despite the existence of a number of multisectoral policies, laws and regulations that in one way or another deal with sustainable use of biological resources, Malawi lacks a streamlined policy and legislative framework (or a cross-cutting biodiversity policy) that clearly articulates strategies on how biological resources can be used. • Inadequate human capacity to enforce the law and implement the policies is also affecting effective implementation of this target. • The existing regulations and outdated and ineffective to adequately monitor illegal access to genetic resources and unsustainable	• Develop regulations for bioprospecting.

	harvesting of resources. • Lack of guidelines and procedures on sustainable harvesting of natural resources.	
Target 13: The decline of plant resources, and associated indigenous and local knowledge innovations and practices, that support sustainable livelihoods, local food security and health care, halted.		
• Access to genetic resources by foreign investors is controlled by procedures and guidelines for collection of genetic of resources. Additionally access to genetic resources is adequately provided for in the revised Environmental Management Bill. • *In situ* conservation of forgotten plants such as bambara nuts and draught resistance crops such as sorghum and millet by the NPGRC has improved avilability of these crops to farmers. • Efforts have been made to document indigenous vegetables, fruits, tubers, medicinal plants. The information is being used to identify the widely used species and those with high nutrition value. These are being recommended for use in home base case as nutritional supplements. • Procedures and Guidelines for access and	• Inadequate policy, law and institutional framework to guide and regulate access to plant resources, • inadequate human capacity to enforce the current regulations; • inadequate coordination among the institutions providing licenses for collection of plant resources are the major constraints to achieving this target.	• Facilitate approval of the revised EMA by parliament.

collection of genetic resources adopted in 2002 discourage illegal and unsustainable harvesting of genetic resources. The initiative by the EAD to promulgate the regulations into law is a right step towards halting the current decline of plant resources.		
Target 14: The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programmes.		
• Malawi has for over four decades been implementing national tree plant programmes. This programme is inaugurated by the Head of State. The theme for 2010 aimed at promoting planting of trees to mitigate effects of climate change. In general national tree planting programmes raise the profile of the importance of plant diversity in sustaining life. The programme is accompanied by awareness campaign on the importance of plant diversity. • Environmental education programme being implemented by the National Botanic Gardens, MMCT, WESM and MEET targeting the youth focus include topics on plant conservation.	• Funding for the environmental education programmes • Lack of appreciation on the value of plant diversity	• Revise the communication strategy.

• Natural resources and environmental education taught in tertially and secondary schools have a focus on plant conservations and their importance in sustaining life.		
Target 15: The number of trained people working with appropriate facilities in plant conservation increased, according to national needs, to achieve the targets of this Strategy.		
• Different Government Departments and Organisations including NGOs have human capacity enhancement programmes. The exact number of people that have been trained can not be determined but available information show that people have been trained at different levels. For example under SABONET, the Biodiversity Support Programme, Norwegian Science Council (NUFU) over 30 people have been trained in various fields. Over 100 students have been trained in environmental sciences at masters level at Chancellor College since 2002. On going staff development at Forestry Department and National Parks gives staff opportunity to train in general botany, taxonomy, ethonobotany and inventories.	• Inadequate financial resources and qualified staff to teach plant sciences in schools	• Review the carriculum of teacher training colleges to include courses on plant conservations.
Target 16: Networks for plant conservation activities established or strengthened at national, regional and international levels		
• Malawi is an active member of regional network such as SABONET, FISNA (Forest	• Inadequate collaboration of national institutions;	• Develop guidelines for sharing of information and biological resources.

Invasive Species Network for Africa) which is currently chaired by FRIM and Plant Resources of Tropical Africa (PROTA) whose regional office for Southern Africa is based at NHBG. • Malawi is a signatory to regional protocols such as SADC protocol on Wildlife Conservation and Law Enforcement, Protocol on Environmental, Protocol of unshared water systems. • At the national level, Malawi has a network on information exchange and sharing.	• inadequate access to information; • inadequate financial support for electronic networking.	

Annex IV – Goals and Targets of the Programme of Work on Protected Areas

Goals	Target	Progress	challenges	Priorities

Goals	Target	Progress	challenges	Priorities
1.1. To establish and strengthen national and regional systems of protected areas integrated into a global network as a contribution to globally agreed goals.	By 2010, terrestrially [4]/ and 2012 in the marine area, a global network of comprehensive, representative and effectively managed national and regional protected area system is established as a contribution to (i) the goal of the Strategic Plan of the Convention and the World Summit on Sustainable Development of achieving a significant reduction in the rate of biodiversity loss by 2010; (ii) the Millennium Development Goals – particularly goal 7 on ensuring environmental sustainability; and (iii) the Global Strategy for Plant Conservation	Forest Reserves were created principally to conserve soil and water and as such they are distributed in major catchments. Approximately 14 Forest Reserves were established with biodiversity conservation in mind. National Parks on the other hand were established to conserve wild animals and their ecosystems. Despite this, major vegetation types, wetlands and aquatic ecosystems are represented in the protected areas systems. Institutional framework for the management of PAs is available and if adequately capacitated canfacilitate effective management of	Effectiveness ifsconstrained by iadequate human capacity and funding. Limited land means that there is limited opportunity for establishing new protected areas.	Establish adequacy, representativeness and effectiveness of PAs of Malawi based on IUCN Protected Areas categories.

[4]/ Terrestrial includes inland water ecosystems.

Goals	Target	Progress	challenges	Priorities
		Protected Area. Land shorate has forced Malawi to concentrate more on the protection of the existing protected areas than on creating new protected areas. Most aquatic ecosystems are not protected except southern part of Lake Malawi, Vwaza Marsh, part of Lake Malombe (as part of Liwonde National Park). Lake Chilwa is a Ramsar site and was designated as a wetland of international importance for waterfowl habitat in 1997. There are plans to turn part of the wetland into a community conservation area.		
1.2. To integrate protected areas into broader land- and seascapes and sectors so as to	By 2015, all protected areas and protected area systems are integrated into the wider	Management of protected areas follow an Ecosystem Approach. A good example		

Goals	Target	Progress	challenges	Priorities
maintain ecological structure and function.	land- and seascape, and relevant sectors, by applying the ecosystem approach and taking into account ecological connectivity [5]/ and the concept, where appropriate, of ecological networks.	is the Liwonde – Mangochi Forest Management Plan that was development jointly by the Forestry Department and Department of National Parks. The management plan follows a holistic approach.		
1.3. To establish and strengthen regional networks, transboundary protected areas (TBPAs) and collaboration between neighbouring protected areas across national boundaries.	Establish and strengthen by 2010/2012 [6]/ transboundary protected areas, other forms of collaboration between neighbouring protected areas across national boundaries and regional networks, to enhance the conservation and sustainable use of biological diversity, implementing the ecosystem approach, and improving international cooperation	Transboundary management plan is being implemented between Zambia and Malawi for Nyika National Park. The plan include two parks in Malawi (Nyika and Vwaza) and three PAs (two forest reserves and one national park) from Zambia. There is also an MoU for the management of transboundary area between Zambia and	Unharmonised national policies and national priorities.	Establish transboundary management plans and agreements with Tanzania and Mozambique targeting Lake Malawi and Lake Chilwa.

[5]/ The concept of connectivity may not be applicable to all Parties.
[6]/ References to marine protected area networks to be consistent with the target in the WSSD plan of implementation.

Goals	Target	Progress	challenges	Priorities
		Malawi on Kasungu National Park. WWF Miombo ecoregion programme of Malawi identified four areas of biodiversity importance. The Nkhotakota - kasungu area of biodiversity importance was prioritised being a migratory route for animals. Transboundary Conservation Areas are supported by regional SADC protocols wildlife, water and forests.		
1.4. To substantially improve site-based protected area planning and management.	All protected areas to have effective management in existence by 2012, using participatory and science-based site planning processes that incorporate clear biodiversity objectives, targets, management strategies and monitoring programmes,	Five National Parks and Four Wildflive Reserves have master management plans. A general management plan for all Forest Reserves is available. In addition to this through the EU	Management plans based on science will require adequate capacity and funding which are not available. Most PAs management plans do not have targets and indicators. This does	Support capacity building for collection and analysing relevant scientific data that can facilitate planning and in decision making in management of PAs.

Goals	Target	Progress	challenges	Priorities
	drawing upon existing methodologies and a long-term management plan with active stakeholder involvement	project, all participating forest reserve havel developed forest management plans. Mulanje Mountain Forest Reserve has a managemet plan which is being jointly implemented by the Forestry Department and MMCT.	not facilitate monitoring and evaluations of achievements.	
1.5. To prevent and mitigate the negative impacts of key threats to protected areas.	By 2008, effective mechanisms for identifying and preventing, and/or mitigating the negative impacts of key threats to protected areas are in place.	Implementation of EIA guidelines in all projects to be undertaken in PAs to prevent and mitigates impacts of key threats. Illegal harvesting, poaching and encroachment is being prevent through enforcement of relevant laws and policies. Fire management plans contribute to biodiversity conservation of forest reserves.	Inadequate financial and human resources. Lack of capacity for law enforcement.	Build capacity for law enforcement.

Goals	Target	Progress	challenges	Priorities
2.1. To promote equity and benefit-sharing.	Establish by 2008 mechanisms for the equitable sharing of both costs and benefits arising from the establishment and management of protected areas	Department of Forestry has developed resource use programmes in most forest reserves. This has promoted sustainable harvesting of timber and other non-timber forestry products. The National Parks and Wildlife Act was amended in 2004 to take into consideration the concept of collaborative management. Prior to this Malawi had in 1996 approved resource use and revenue sharing schemens in National Parks and Wildlife Reserves. Nyika-Vwaza Association was established to management funds realised from the revenue sharing scheme. The funds are used for community	Inadequate legal framework for benefit sharing in PAs.	Study economic importance of PAs (costs, benefits and impacts from PAs). Develop Access and benefit sharing regulations and guidelines in PAs. Harmonise benefit sharing programme, policies and laws in National Parks and Wildlife Reserves and Forest Reserves.

Goals	Target	Progress	challenges	Priorities
		development activities. The Department of Forestry has provisions in the Forest Ecosystem and Biodiversity Strategy and Action Plan for developing access and benefit-sharing mechanisms. Malawi is in the process of developing regulations for Access and Benefit Sharing		
2.2. To enhance and secure involvement of indigenous and local communities and relevant stakeholders.	Full and effective participation by 2008, of indigenous and local communities, in full respect of their rights and recognition of their responsibilities, consistent with national law and applicable international obligations, and the participation of relevant stakeholders, in the	The existing policies and legal frameworks in Forestry, and National Parks and Wildlife, including the Local Government Act have provisions for community participation. This promotes the participation of local communities in	About 52% of Malawi's population lives below the poverty line and as a result local communities are forced by the low economic base to use natural resources for a living. Hence, although local communities are aware of their rights and	Review relevant laws and policies to fully address the rights and responsibilities of local communities. Documents indigebous knowledge systems in PAs and integrate them in PA management to promote participation of local

Goals	Target	Progress	challenges	Priorities
	management of existing, and the establishment and management of new, protected areas	planning and management of PAs through local level NRM committees.	responsibilities, they are unable to implement them due to poverty.	communities.
3.1. To provide an enabling policy, institutional and socio-economic environment for protected areas.	By 2008 review and revise policies as appropriate, including use of social and economic valuation and incentives, to provide a supportive enabling environment for more effective establishment and management of protected areas and protected areas systems.	The Forestry Policy was revised in 1996 to align it with the Environmental Management Act. Implementation of the policy is supported by the National Forestry Programme, which adequately integrates biodiversity conservation. Furthermore the Ecosystems and Biodiversity Strategy Action Plan strengthens the position of forestry department in integrating biodiversity issues into forestry management plans and programmes. The National Parks and Wilidelife Policy was also	An assessment of policies and legislation dealing with protected areas (2002) revealed that the Forestry Act appear not to have been adequately harmonized with the Environmental Management Act particularly with regards to issues relating to declaration and revocation of forest reserves and environmental impact assessments. There is also need to harmonize the Forestry Act with Land Act, the Electricity Act, the Local Government Act and National Parks and Wildlife since their provisions affect directly or	Review policies and legislations to promote economic valuation and incentives. Revise the Forestry Policy and Forestry Act to strength issues of law enforcement and benefit sharing.

Goals	Target	Progress	challenges	Priorities
		revised in 2000 to align it with NEP and EMA. The National Parks and Widlife Act of 1996 was amended to include aspects as collaborative management. These instruments provisions for promoting some kind of incentive measures mainly through Resources use programmes and Revenue sharing. Community NRM Programmes have instilled sense of ownership to communities and this has reduced to some extent encroachment into PAs.	otherwise forestry issues. The National Parks and Wildlife Act has provision to declare any piece of land as PA but the act is silent on whether the communities should be consulted before an area is declared a national park.	
3.2. To build capacity for the planning, establishment and management of protected areas.	By 2010, comprehensive capacity-building programmes and initiatives are implemented to develop knowledge and skills at individual, community and	Capacity building in PAs is an ongoing programme. Further information on PAs management is shared through national and	Inadequate financial resources for formal and informal training. Lack of appropriate programmes for capacity	Conduct a capacity needs assessment and develop capacity building programmes for local communities.

Goals	Target	Progress	challenges	Priorities
	institutional levels, and raise professional standards	international workshops and conferences.	building of the local communities.	
3.3. To develop, apply and transfer appropriate technologies for protected areas.	By 2010 the development, validation, and transfer of appropriate technologies and innovative approaches for the effective management of protected areas is substantially improved, taking into account decisions of the Conference of the Parties on technology transfer and cooperation.	Limited Progress	Inadequate financial resources and human capacity.	Document all relevant technologies appropriate for protected areas.
3.4. To ensure financial sustainability of protected areas and national and regional systems of protected areas.	By 2008, sufficient financial, technical and other resources to meet the costs to effectively implement and manage national and regional systems of protected areas are secured, including both from national and international sources, particularly to support the needs of developing countries and countries with economies in transition and small island developing States.	The recent inclusion of Climate Change and environment as a priority area in the MGDS will facilitate resource allocation through the National Budget. Malawi Environmental Endowment Trust (MEET) and Mulanje Mountain Conservation Trust (MMCT) provides a sustainable source of financing for	PAs are a priority area for the government; hence they are not adequately funded through the national budget.	Use the economic valuation developed by PEI to lobby government on the value of PAs in economic development and justfy more Government funding for PAs.

Goals	Target	Progress	challenges	Priorities
		management of PAs. Mulanje Mountain Endowment Fund continues to support implementation of the management plan for the Mulanje Mounain Forest Reserve. There is an opportunity to establish an endowment fund with support from the GEF for the management of the Nyika Transfrontier Conservation Area.		
3.5. To strengthen communication, education and public awareness.	By 2008 public awareness, understanding and appreciation of the importance and benefits of protected areas is significantly increased	In line with Environmental Education and Awareness Strategy the Department of Forestry and DNPW in collaboration with NGOs such as WESM, CURE, MMCT, MEET and the EAD run awareness campaigns covering a wide range of subjects through Radio, TV programmes, leaflets and other public education	Inadequate financial resources to implement public awareness programmes.	Harmonize communication and public awareness programme between DNPW and Forestry Department.

Goals	Target	Progress	challenges	Priorities
		materials. PAs management is integrated into tertiary education system (Malawi has college of Forestry and National Parks which trains staff in PA management).		
4.1. To develop and adopt minimum standards and best practices for national and regional protected area systems.	By 2008, standards, criteria, and best practices for planning, selecting, establishing, managing and governance of national and regional systems of protected areas are developed and adopted.	Limited progress	Limited capacity and financial resources	Update the National Forestry Programme to include standard and criteria for PA governance and ensure that IUCN guidelines for protected areas management are integrated.
4.2. To evaluate and improve the effectiveness of protected areas management.	By 2010**,** frameworks for monitoring, evaluating and reporting protected areas management effectiveness at sites, national and regional systems, and transboundary protected area levels adopted and implemented by Parties	Limited progress. Despite the limited progress Forestry Department is in the process of developing criteria and indicators for sustainable use of forest biodiversity.	Limited human and financial resources.	Conduct a national wide effectiveness of management of protected areas using appropriate tools.
4.3. To assess and monitor	By 2010, national and regional	Limited progress	Inadequate human and	Develop a national PA

Goals	Target	Progress	challenges	Priorities
protected area status and trends.	systems are established to enable effective monitoring of protected-area coverage, status and trends at national, regional and global scales, and to assist in evaluating progress in meeting global biodiversity targets		financial resources	monitoring systems with full participation of stakeholders.
4.4 To ensure that scientific knowledge contributes to the establishment and effectiveness of protected areas and protected area systems.	Scientific knowledge relevant to protected areas is further developed as a contribution to their establishment, effectiveness, and management	Ecological monitoring research in MMCT is generating results that are facilitating decision making on management of Mulanje Mounatin Forest Reserve.	Limited human and financial capacity.	Promote collaborative research in PAs. Conduct research need assessment and prioritise research needs in PAs.