



REPUBLIC OF MOZAMBIQUE
Ministry for the Coordination of Environmental Affairs



**th National Report on Implementation of the Convention on Biological
Diversity in Mozambique**

Maputo, June 2009

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List of Main Acronyms

TFCA – Transboundary Conservation Areas
CBD – Convention on Biological Diversity
CDS – Sustainable Development Center
CGIAR – Consultative Group on International Agricultural Research
CONDES – National Council for Sustainable Development
DINAC – National Directorate for Protected Areas
GEF – Global Environmental Facility
GNP – Gorongosa National Park
HIV – Human Immunodeficiency Virus
IIAM – Mozambican Institute for Agriculture Research
IIP – Mozambican Institute for Fishing Research
IUCN – International Union for conservation of Nature
LNP – Limpopo National Park
MICOA – Ministry for the Coordination of Environmental Affairs
NBSAP – National Biodiversity Strategy and Action Plan
GMO – Genetically Modified Organisms
NGO – Non Governmental organizations
PARPA – Action Plan for Reduction of Absolute Poverty
PES – Social and Economic Plan
PG – Government Program
UNDP – United Nations Development program
RIEAM – Mozambican Network for Ecological and Environmental research
SABONET – Southern African Botanical Diversity Network
SADC – Southern African Development Community
SDIS - Documentation and Information System
AIDS – Acquired Immune Deficiency Syndrome
SMEC International - Snowy Mountains Engineering Corporation
TFCA – Transboundary Conservation Areas
TRANSMAP – Transboundary Networks of Marine Protected Areas in East Africa
UEM – Eduardo Mondlane University
UNEP - United Nations Environment Program
USAID – United States Agency for International Development
QNP - Quirimba National Park
WWF – World Wildlife Fund

PREFACE

The 4th National Report of the implementation of United Nation Convention on Biological Diversity results from an intensive field research and a wider auscultation process involving different sectors in our country, particularly to those areas which are directly involved in the activities of conservation and sustainable use of biodiversity aiming to eradicate poverty in the country, as stated in the 5 years Governmental Program (2005 – 2009).

It is important to underline that the 4th National Report on the Implementation of the CBD has a particular importance, since it allows each party nation to independently and in a wider scope to describe its own biodiversity. The National Report focuses on four major pillars, based on the parameters established by the convention parties, namely, (i) the general state of the biodiversity; the trends and endangerments; (ii) the current state of the Strategy and Action Plan implementation for the conservation of Biological Diversity; (iii) sectorial and inter-sectorial integration of biodiversity and achievements made on the implementation of the major goals established at the Sustainable Development Summit held in 2002, pertaining to a significant reduction of the current biodiversity tax loss until 2010, at national, regional, and global levels. (iv) the Action Plan of the Convention and conclusions.

It is of a particular interest to indicate that Mozambique, with 2,770 Km of extension along with the Indian Ocean, is rich of biodiversity constituted by 5,500 species of plants, two endemism centers, 300 species within a red list, including 120 endangered ones. With respect to fauna, in Mozambique there are 4,271 registered species of which the majority includes insects, followed by birds, representing 72% and 17%, respectively. The 735 registered bird species, the majority includes migratory birds.

The country, with a long coastal line, presents various marine and coastal habitats, and the critical ones include coral reef, mangroves and marine herbs platforms which totalize 13 species.

For conservation and protection of sensible habitats, this has increased the percentage of protected areas from 11% in 1995 to 16% in 2008. The increasing of the protected areas was mainly a result of creation of new parks and national reserves, including marine, coastal and trans-border areas, and due to implementation of programs and various initiatives of rehabilitation and maintenance of degraded habitats.

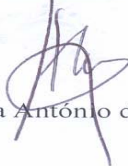
The achieve results is following under the linkage in different governmental institutions related with environmental and biodiversity issues in particular in governmental public policies (Action Plan of Poverty Alleviation II, and the Social Economic Plan) in different sectorial actions plans which include government action plans in district and provincial level. They also approved environmental policies and laws which ensure the sustainable use of biological diversity in Mozambique.

The positive results which are being achieved in biodiversity conservation are the best effort from the all social sectors. Therefore, currently environment is transversal agenda for the country. The relevant information which has been suggested during the process of this report shows that the majority of the programme and extremely important projects are being implemented.

The challenges which we proposed to achieve in the future are ambitious in particular the enhancement of inter-institutional coordination avoiding in this manner an effort duplication, capacity building to enlarge the scope of our intervention, *ex situ* conservation, strengthening environmental education of the communities so that these can feel as being integrated part of the environment and part of the environmental problems, and fundraising to ensure the implementation of the environment related programs as well as research development enabling the materialization of convention goals.

The current National Report of assessment for Convention implementation on Biological Diversity will contribute for reflexion, correction of the weaknesses faced and transformation of the challenges in our goals for improvement of the conditions for conservation of the natural and national heritage for sustainable development.

The Minister



Dr^a Alcinda Antonio de Abreu

EXECUTIVE SUMMARY

The Mozambican government through the Ministry for the Coordination of Environmental Affairs (MICOA) has the mandate of coordinating and fulfillment of the international initiatives on environment and biodiversity issues as well as to adopt the basic legislation that links to the national policy for environment. The Convention for Biological Biodiversity (CBD), ratified by Mozambique in 1995, envisages the mainly the conservation of biodiversity, sustainable utilization of its components benefit sharing arising from utilization of genetic resources, effective management of protected areas as well as *ex-situ* conservation of biodiversity.

General state and trends of biodiversity, its major threats in Mozambique

Mozambique has about 5,500 species of plants (including macroalgae) distributed in five fito-geographical regions and organized in communities with miombo, mopane, undifferentiated woodlands and coastal mozaic (Figure 1) being the most common. The Mozambican vegetation can also be divided into groups of land use and cover. Two centers of endemism (CE) were identified in Mozambique namely Maputoland and Chimanimani-Nyanga CE. However, additional sub-centers are proposed for the coastal forests (northern Mozambique) and inselbergs (in central and northern Mozambique). From the point of view of utility, the country has the timber species (the precious used for sculptures production, the first-class woods used for furniture and other categories below - the second and third most), not-timber (grouped in species used for house construction, fuel production, production of utensils, etc.). Other uses include for medicinal purposes, where 10% of plant species in Mozambique are used in traditional medicine for treatment of diseases such diarrhea, respiratory complications, opportunistic diseases of AIDS, parasitic infections, etc. Mozambique has about 300 species in the red list of which about 120 are threatened. The threats to plant diversity include the deforestation of vegetation for fuelwood production especially in areas adjacent or surrounding population centers, itinerant agriculture (slash and burn), increasing human settlements and urbanization and uncontrolled fires. The National Center of Plant Resources is the leading institute in Mozambique, the promotion of genetic resources especially plants with agricultural importance.

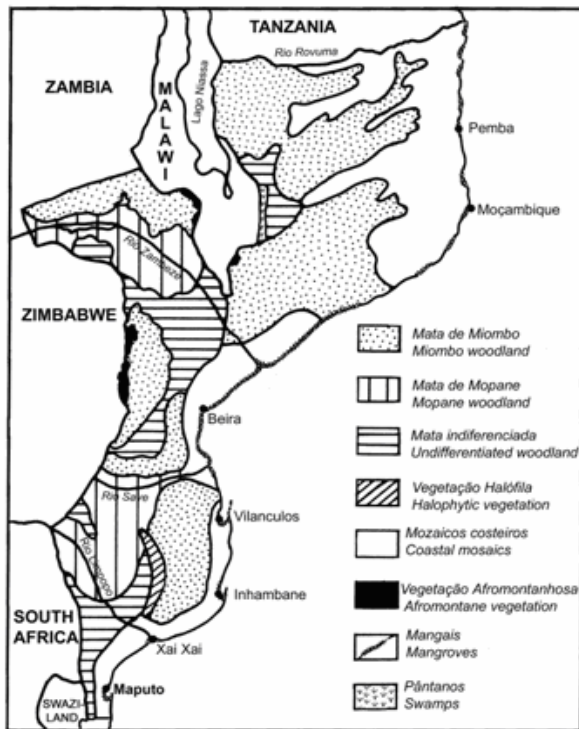


Figure 1. Distribution of the seven main types of vegetation in Mozambique (after White, 1983).

About 4,271 species of terrestrial wildlife were recorded being 72% insects, 17% birds, 5% mammals and 4% reptiles. The terrestrial fauna has undergone a major change in the last 40 years due to population increase, development and the past political instability that confining most of the large mammals to existing conservation areas. 8 Mammals are either extinct or in danger of extinction in Mozambique and these include also the black rhino, the giraffe. The man-animal conflict is the main problem in the conservation areas. 735 species of birds, most of them migratory, occurs in quite all habitats of Mozambique; emphasis to the complex of Marromeu which supports many species of waterfowl in this country. Many of the identified endemic species, rare and threatened habitats are associated with isolated mountain, as are the cases of inselbergs, Chipirone and Namule hills, Mecula and Gorongosa Mountains and Chimanimani massive. About 17 species of birds make up the Mozambican red list. Threats to birds are mostly from anthropogenic activities such as deforestation of vegetation, hunting, trade bird cage, use of birds in traditional medicine, poisoning (for crop protection) and to an increased degradation of the alluvial plains and wetlands. Table 1 shows the current statistics on the terrestrial diversity in Mozambique, their main threats and trends.

Table 1. Terrestrial Fauna and Flora in Mozambique

Group	N° of species	Areas of endemism and primary occurrence of fauna	N° of species in the red data list	Main threats	Trends
Flora	5500 (4800 of higher plants)	Maputaland Center of Endemism Chimanimani Center of Endemism (Coastal Forests and inselbergs sub-centers yet to confirm)	300 (122 threats)	- clearing of vegetation, - slash & burn agriculture, -human settlements, -uncontrolled fires	Reduction of primary vegetation and its transformation into a secondary land.
Fauna	4 271 (72% insects, 17% birds 5% mammals, 4% reptiles, 2% amphibians)	Lager mammals mostly confined to conservation Areas	Around 8 species of mammals threatened	Hunting, uncontrolled fires/ forest fires, destruction of habitats	Confinement of large mammals to conservation areas

Mozambique with its coastline of 2770 has several marine and coastal habitats and the most critical are the coral reefs, the mangroves and the seagrass meadows (Table 2). The coral reefs cover about 1,860 km² of area of the coast, mostly concentrated in the northern Mozambique coastline occurring almost continuously within Quirimbas archipelago (in Cabo Delgado), they also occur within Primeiras and Segundas Islands (located south of Nampula). In the south of the country (e.g. Bazaruto Archipelago and Inhaca island) the reefs are more dispersed and their growth is limited to waters subjected to less hydrodynamics. Threats to coral reefs are due to increasing human activities (fisheries, inadequate tourism) and coral bleaching due to climate change, affecting a large percentage of reefs observed. Mozambique, with about 400 000 ha of mangroves has the largest mangrove forest in eastern Africa. South of the Save River mangroves occur extensively in the Morrumbene estuary, Inhambane Bay, Maputo Bay and Inhaca Island. The Bay of Maputo is one of the most extensive areas of mangrove in the south region. The largest mangrove forests occur in center of the country successfully established mainly due to

considerable freshwater discharge from about 18 rivers (including the deltas of the Zambezi, Púngue, Save and Búzi). The mangroves of the Zambezi delta extending continuously for nearly 180 km along the coast and may go up to 50 km inland. The mangroves in the northern Mozambique ranges from the Rovuma River to Angoche, being well developed around Lumbo, Ibo-Quissanga and Pemba bay. The deforestation of mangrove as a source of fuelwood and timber, particularly in population's centers, is now the main threat to mangroves in Mozambique. Seagrass meadows are the most visible phenomenon in low spring tides. The seagrasses are catalysts for the support of the people that tirelessly run on ebb-tide of these habitats to collect invertebrate resources for their food security. Seagrass meadows provide enormous livelihoods. Despite this, Mozambique still do not know the total area covered by seagrasses only that the Quirimbas archipelago, a region of Fernão Veloso (along the Nacala) and Maputo Bay are the largest known areas with seagrasses. Rought estimates of 2003 indicated existence of at least 439 Km² of seagrasses in Mozambique. 13 species occur in Mozambique, *Zostera capensis* being a vulnerable seagrass species.

Table 2. Summary of critical coastal marine habitats in Mozambique and its characterization.

Habitat	Area	Nº of species	Principal localization in Mozambique	Red Data List	Principal threats	Trends
Mangroves	396.080 ha	8	- Northern zone (Ibo, Pemba) - Middle Zone (Zambeze delta and surroundings) - Southern zone (Morrumbene Estuary, Inhambane Bay Maputo Bay)	-	-Deforestation (Exploitation of fuel wood) -Aquaculture -Construction of salt pans	Pressure of cutting higher in urban areas Reduction of cover area from 408.079 ha in 1979 to 396.080 ha in 1990
Coral Reefs	1860 km ²	194	-Northern shores(Quirimbas Archipelago to Primeiras and Segundas Islands) -Bazaruto Archipelago - Inhaca Island - Ponta d'Ouro	-	- Coral bleaching - Increase in activities (eg. fisheries, tourism) in coral reefs	- Decline in coral cover due to different factors. (eg. decrease in coverage of hard (58%) and soft (90%) corals in Lake Bilene due to 2000 floods) - Decrease due to bleaching by climate change
Seagrasses	> 439 km ²	13	- Fernão Veloso Quirimbas Archipelago, Inhaca Island	- <i>Zostera capensis</i> proposed as threatened (vulnerable) species	- Siltation of seagrasses due to rain and floods - Revolving of seagrasses to collect invertebrates - Intensive trampling - Destructive fishing techniques in seagrass meadows	Decrease in area coverage of seagrasses mainly <i>Zostera capensis</i>

Mozambique has many aquatic habitats including rivers, natural lakes and dams as illustrated in Table 3. The main biological diversity of freshwater courses include, submerged aquatic plants and surrounding vegetation, the ichthyofauna and the plankton.

Table 3. Statistics available on the aquatic environment in Mozambique

Habitat	Number	Area (Km ²)	Examples
Rivers	~100	50 km ²	Zambeze, Save, Limpopo, Rovuma, Incomati
Natural lakes	2 main lakes?	Lake Niassa (7.000 km ²)	Niassa, Chiúta, Amaramba and Chirua
Artificial lakes	6	?	Cahora Bassa, Massingir, Pequenos Libombos, Corrumane, Chicamba and Revue
Coastal lakes	~100	?	Bilene, Inharrime, Nhambavale, Quissico

Key actions taken to support the objectives of the Convention, its Strategic Plan and the target set for 2010

The global targets and indicators adopted under the Convention were used in the development of the NBSAP (NBSAP, 2003). Priority activities for different areas were planned on the basis of the priorities of the country and the obligations imposed by the CBD as aiming meeting the three objectives of the Convention viz. (i) the conservation of biological diversity (ii) the sustainable use of its components and (iii) the fair and equitable sharing of benefits arising from the use of genetic resources, including adequate access to resources, appropriate transfer of technologies, to safeguard the rights of the resources and technology transfer and also through adequate funding. The main activities and priorities defined in the NBSAP were:

1. Achieving a political and institutional commitment to reach the objectives of this strategy.
2. Promoting the coordination of efforts between and within institutions to ensure better organization and implementation of actions proposed in the action plan.
3. Identification of Biological Diversity components (updating data and/or new).
4. Promotion and establishment of an information system of current status of Biological Diversity components.
5. Establishment of measures to protect natural sensitive habitats and/or species in danger of extinction, including the recommendation of new areas of protection.
6. Strengthening the supervision on the exploitation (formal and informal) of natural resources, covering all aspects of human resources, material and financial aspects.
7. Biological Diversity monitoring, especially in areas subject to some level of exploitation, through a system of criteria and indicators for biological diversity monitoring.
8. Valorization of natural resources, assessment of the costs of the use of natural capital and merge costs and benefits in national accounts.
9. Promoting and enhancing the role of research in the production of information for decision-making on the use of natural resources.

10. Community management of natural resources and enhancement of traditional knowledge (intellectual property).
11. Conservation of plant and animal genetic resources.
12. Control and knowledge of GMOs and potential invasive species capable of affecting biological diversity.
13. Create conditions for improving the welfare of individuals from exploitation and sustainable use of natural resources.
14. Simplify and disseminate the Strategy and Action Plan for Biodiversity Conservation.

Incorporated in the different government institutions the issues related to environment and biodiversity in the government public policies (PG, PARPA and PES) and in different sectorial plans at province and districts levels. Policies and environmental laws adapted in order to create instruments and conditions for an integrated action of different affected stakeholders were the following facilities:

- Establishment of working group coordinated by Biodiversity Unity (UB) under the CBD focal point Unit;
- Creation of the National Council for Sustainable Development (CONDES) with the task of promoting and coordinating various sectors on sustainable use of natural resources;
- Creation of environmental units in the Ministries of Agriculture, Energy, Mineral Resources, Public Works and Health
- Presence of focal points for environmental issues in some government institutions.

Several examples on biodiversity studies have been conducted in the country and they have tried to cover aspects of ecosystems and taxa. Three centers for Sustainable Development (CDS) were created to deal with research, implementation of projects and provide technical assistance on environmental issues at the province and district level. One of the centers is located in the south, in Xai-Xai and focuses mainly on issues concerning the coastal zone, the other in the central Mozambique, in Manica, which deals with issues concerning the conservation and management of natural resources and the last in the north, in Nampula whose duties fall under the urban environment issues. More recently it was also created in the north, the Research Center of Marine and Coastal Environment in Pemba (CEPAM) for both coastal and marine issues. Institutions that have databases with information on some components of biodiversity were identified, one of the examples is the database created under the project TRANSMAP (UEM), the website of IIAM (Agronomic Institute) that contains some information about some biodiversity studies, the website of MICOA that contains the various conventions, protocols and other documents related to biodiversity conservation. Proposed a creation of a national database with relevant aspects of biodiversity to be managed by MICOA.

For biodiversity conservation it is advocated the establishment of several measures to protect sensitive habitats that resulted in an increase in the percentage of protected areas from 11% to 16% with the creation of new national parks and reserves including coastal and marine environments namely:

- Quirimbas National Park, Limpopo National Park, and Chimanimani National Park.
- Formation of new TFCAs (Libombos, Great Limpopo, Chimanimani).
- Restoration of Gorongosa National Park.
- Formation of the Marromeu complex (containing the Marromeu reserve and 4 game hunting) as wells as Ramsar site.
- Proposal for creation of new conservation areas in Lake Niassa and the Primeiras and Segundas Islands.

- Proposal for new TFCAs, Rovuma (Mozambique and Tanzania) and Zimoza (Mozambique, Zimbabwe and Zambia).
- In advanced stage of the proposed proclamation of the area of Ponta do Ouro as an area of marine conservation followed its proclamation as a World Heritage.

In this context however, many activities are underway or being planned to evaluate the quality of protected areas to make them more efficient and/or draw more effective alternatives for biodiversity conservation.

Towards sustainable of biodiversity resources, some additional steps have been taken under the NBSAP such as:

- Approval of Traditional Medicine Policy (2004) aimed to the protection, promotion and sharing of traditional knowledge of local communities as it relates the practices and products of nature.
- Establishment of marine sanctuaries in the Quirimbas National Park managed by the communities of fishermen, these sanctuaries help in the recovery of the fish stocks.
- Presence of various projects for community management of natural resources and other community projects such Madjedjane, Gala, Limpopo and Mecula.
- Community management of wild farms in Mahel, Txuma Tchato and Chimpage

In addition facilities were created in the form of legal instruments, and specialized centers for the regulation and control of implementation of these activities:

- Environmental Law (Law N° 20/97) which provides for among others the participation of local communities in the formulation of policies and laws related to natural resource management, management of protected areas.
- Creation of the Ethnobotany Research Center in Namaacha (2009).
- Creation of the Madjedjane Community Research Center (IUCN/UEM/ Community of Madjedjane).

Substantial steps to promote fair and equitable sharing of benefits arising from the use of the natural resources:

i) Concerning the genetic resources

Constitution of the Inter – Institutional Bio safety group and adoption of the following regulations: regulation on Management of GMOs (2007) and regulation on the management of alien and invasive species (2008)

In this context the following proposals were also made: proposal list of invasive and alien species of the country (2003) and proposal of Regulation on National Bio safety

ii) concerning the sustainable use and sharing of benefits it should be noted:

- Approval of the Environmental Strategy for Sustainable Development (2007);
- Regulation of Forests and Wildlife (2002) which states that 20% of profits from the holdings of forests and wildlife should revert to the communities that hold them. In the context of the environmental law (20/1997) also recommends that communities in protected areas maintain their rights and can use them to negotiate returns from income-generating activities;
- The existence of different community projects in natural resources management.

Areas where national implementation was more effective:

The mobilization in order to reach the targets set for 2010 can be summarized in the following key actions underway in Mozambique:

- Increase the percentage of conservation area from 11% to 16%
- Increase in the number of people with formal education on biodiversity and resource management;
- Publication of activities such as census of wildlife, national forest inventory reports and conservation areas;
- Several studies published including universities thesis;
- Increase in number of conservation areas. New conservation areas proposed covering both terrestrial and marine environment and the TFCAs (Trans-frontier conservation areas);
- Development of strategies such as combating desertification, climate change and sustainable development;
- Rehabilitation of habitats: focus on initiatives for rehabilitation of mangroves in Lumbo (Nampula) (under UNEP-WioLab initiative);
- Strategy to combat and control of invasive plants;
- Initiatives under MCT: About biotechnology, research on medicinal plants;

- Outreach programs implemented by international NGOs. The WWF has a strong presence in national parks and in implementing the vision of the EAME (East Africa Marine Ecoregion). The IUCN has been heavily involved in environmental education in financing and implementing projects in almost all provinces of Mozambique also involving various actors and institutions.

Limitations encountered where:

- The activities are not always coordinated on the CBD initiative. Some are implemented only as part of strategies of various institutions, NGOs, etc;
- Mozambique has limited financial resources and the funding of biodiversity protection in the field may have been neglected.
- weak coordination at inter-institutional level;
- Lack of qualified personnel to perform the various specific tasks in the evaluation and protection of biodiversity;

Future priorities, scenarios for biodiversity and further recommendations

Progress towards the goals and objectives of the Strategic Plan of the Convention have been significant and visible in Mozambique. However there are areas that require further intervention:

- Needed more institutional and inter-institutional integration (mainstreaming) activity that will foster fulfilling the gap by bringing instruments and institutional frameworks to solve existing and real environmental and biodiversity problems.
- Needed more institutional capacity and strengthening the technical capacity of various institutions dealing with biodiversity;
- The establishment of policies for ex-situ conservation both fauna and flora including genebanks.
- Need to establish a centralized database. Regular thematic publications from this is also needed.
- Strengthen inspection and environmental monitoring;
- Strengthening the role of environmental education;
- Need to address emerging issues such as wild fires, climate change and man-animal conflicts.

Three scenarios have demonstrated the trend in the relationship between biodiversity and poverty in Mozambique for the period 2005-2025. Using MSA (mean of species abundance) and robust data on poverty three scenarios were forecasted (Fig.2). Scenario A: a rather accentuated decrease in biodiversity due to maintenance of the status whereby deforestation rate is kept to 0.6%, population growth increase from 20 to 28.5 milhões in the period 2005-2025, most of them concentrated in rural areas and little or no evolution in agrarian productivity therefore having an increase of agriculture area in 7%. Scenario B, with a dramatic decrease of biodiversity given the prevalence of market factors such as the need of forest plantations, bio-fuels, intensive and extensive agriculture and increased infrastructure including roads. Scenario C, with a slight decrease on biodiversity, were land use is oriented for biodiversity conservation by means of intensification of subsistence agriculture that no extra land will be needed to cover population growth, conservation of the protected area following the law; sustainable use and rehabilitation of area of great biological importance; use of agroforestry systems to balance production of firewood and charcoal. Scenario C is the most favorable but this is highly dependent on a strong political will.

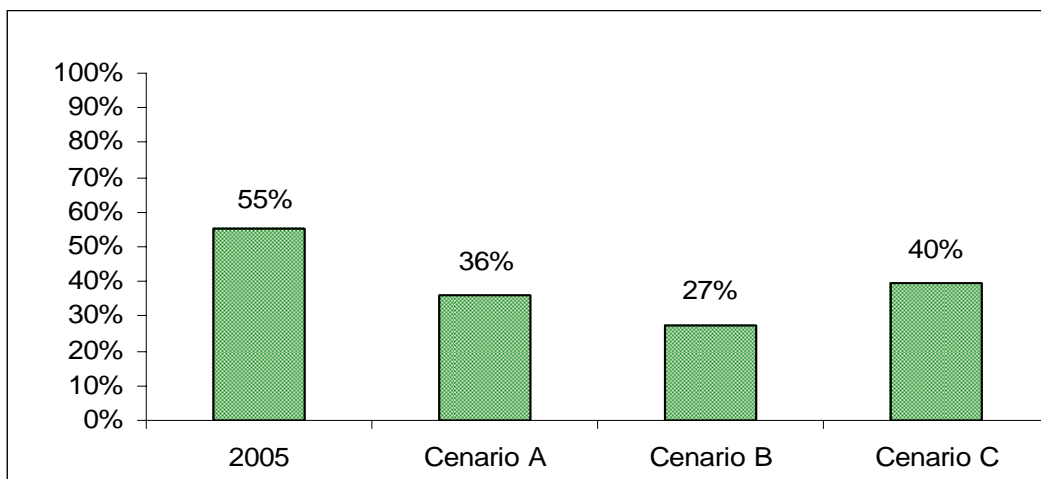


Fig. 2. Trend scenarios in the relationship between biodiversity and poverty in Mozambique for the period 2005-2025.

Inputs for upcoming COP meeting could be a resolution to reinforce connectivity between sustainable biodiversity protection approaches and poverty alleviation and the need to increase funding for sustainable biodiversity use.

Chapter I – Overview of Biodiversity Status, Trends and Threats

1. The biodiversity of Mozambique

1. Overview of the phyto-geographic zones of Mozambique

Five phyto-geographical zones or plant floristic regions occur in Mozambique (Fig. 3): (i) Swahilian regional centre of endemism (ii) Swahilian-Maputaland regional Transitional zones, (iii) Maputaland-Tongoland regional mosaics, (iv) Zambebian Regional Centre of Endemism and (v) Afromontane centre of endemism (White 1983, Burgess and Clarke 2000, van Wyk & Smith 2001).

Maputaland-Pondoland Regional Mosaics occurs mainly in Maputo province extending southward the Limpopo River till northern South Africa (up to near Port Elisabeth), and from the coastline till Libombo Mountains (covering also Swaziland). The coastal plain is composed of cretaceous and Tertiary marine sediments. In some places the landscape is more undulated, rising up to 1600 m in South Africa. The southern tip of Mozambique and neighbouring regions of South Africa and Swaziland is home of Maputaland centre of endemism, known to house some 230 endemic species in Mozambique and northern South Africa (KwazuluNatal) (Wyk and Smith 2001). The woody grassland and Sand forest (Licuati forest) possess a large number of endemic species.

The Swahilian regional centre of endemism and the Swahilian-Maputaland regional Transitional zones was part of the former Zanzibar-Inhambane Regional Mosaic and occupies part of coastal provinces, going from Rovuma to Limpopo River. The climatic characteristics are in general those of the coastal areas, which are a tropical humid climate, with a rainy, hotter season between October and March, and a cooler drier season in the rest of the year. Mean year rainfall is about 1200 mm. Mean year temperature rises from south to north and from the coast to the interior, being about 23°C and 26°C in coastal of the south and north of the country, respectively. Most of the land lies below 200 m, but in the northern part there are hills and plateaus rising high, as the Mueda and Muidumbe Plateaus. There are about 3.000 species with several hundred endemics. Some endemic in general are *Stuhlmania*, *Hymenaena* and *Bivinia*. Vegetation types go from varies types of forests (lowland rain forest, transitional rain forests, undifferentiated forests, and swamp forests), woodlands, evergreen and semi-evergreen bushland forests and grasslands (edaphic grassland and woody grassland).

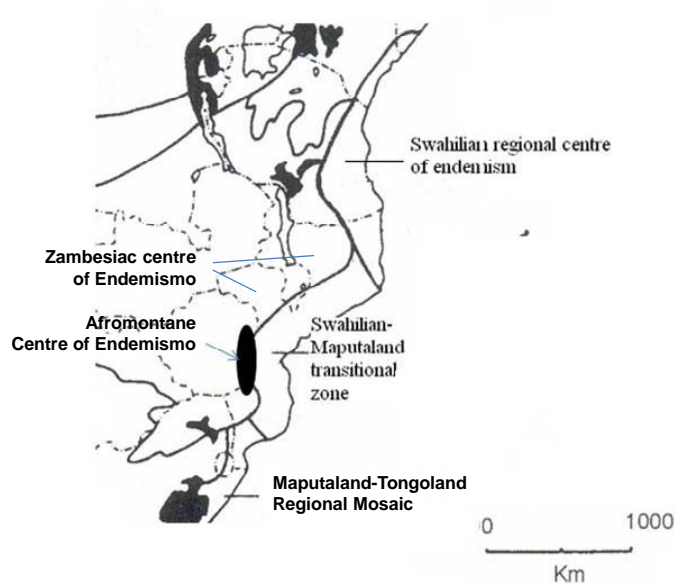


Fig 3: The phytogeographical zones of Mozambique (adapting from White (1977) & van Wyk & Smith (2001)).

Afromontane centre of endemism is limited to highlands and mountains areas of Chimanimani (border region between Mozambique and Zimbabwe) and north east border in Milange regions and further north western Niassa province (bordering with Malawi).

Zambeziac Regional Centre of Endemism extends from 3° S to 26° S and from the Atlantic Ocean almost to the Indian Ocean, occupying all interior provinces and part of the coastal. The climate is tropical, continental, with one rainy season from November to April (500 and 1400 mm per year, generally decreasing from north to south). Mean air temperature is related to altitude and varies from 18° to 24° C. The zambeziac centre is the second largest phytocorion (Phytogeographical region) in Africa, probably having the richest and more diversified flora. There are at least 8500 species, 54% of which being endemic (e.g. of endemic genera are *Diplorhincus*, *Bolusantus* and *Cleistochlamis*). Some of the vegetation types are dry forest, swamp forests and riparian forest, woodlands, thickets and grasslands.

1.1.2. The main vegetation types in Mozambique

Seven main vegetation types are known in Mozambique (Fig. 4). The Miombo Woodland is the more extensive vegetation type, and it dominates in the north and centre parts of the country. In the southern part it is found in parts of Gaza and Inhambane provinces. This vegetation type is characterized mainly by the presence of species such as *Brachystegia*, *Julbernardia* and *Pteleopsis*, many times mixed with *Pterocarpus*, *Vitex payos*, *V. doniana*, *Cussonia spicata* and others. Mopane Woodland is the second more extensive vegetation type, and it occurs in the southern (in between the Limpopo and Save rivers, covering most of Inhambane province) and northern (in the upper part of the Zambezi valley, covering all southern part of Tete province) parts of the country. Species that characteristically compose this vegetation type are *Colophospermum mopane*, *Adansonia digitata*, *Azelia quanzensis* and *Sterculia rogersii*. The Undifferentiated Woodland covers extensive parts of the south, centre and northern country. It is composed by a large variety of species, mainly *Acacia* spp. in the drier areas, but also *Azelia quanzensis*, *Sclerocarya birrea*, *Albizia versicolor*, *Terminalia sericea* and *Petoporum africanum*. In places of higher altitude, whether under drier or moist conditions, a specific vegetation type develops.

Afromontane Elements are confined to the central (Manica province, in the border with Zimbabwe) and northern part (northeast Tete and west Zambezia, also in the limits with Malawi). They occur only at high altitudes, between 1500 and 2000 m, and common species are *Widdringtonia cupressoides*, *Podocarpus milanjanus*, *Khaya*, *Macaranga*, *Zanha golungensis* and others. The main afromontane elements in Mozambique are Chimanimani Mts (around 1500 species, 100 known endemic occurring this Mozambique-Zimbabwe border afromontane, highest point is Binga Mt 2440), Namuli (2419 metres, around 330 species, 16 endemic species), Chiperoni (229 species, 3 new species), Mabu (1710 m, at least 250 species and one considered new) with one of the largest moist forest in southern Africa, Inagu Mt still little known but apparently with a new *Encephalartus* species. Proeminent aditonal Mountains/inselbergs are those from Niassa (e.g. Lipilichi 1848m, Nacaonda 1738, Mecula 1441, Txa-txe 1324m, Jao/Yao 1336, Natukwe/Cuamba 1332 m), Nampula and Cabo Delgado provinces. The coastal areas are covered by different vegetation types that typically grow along the coast. All those constitute the Coastal Mosaics, which include sand forests, swamp forest, dune forests, woodlands, grasslands and mangroves. Along the valley of the Changane River (a tributary of the Limpopo) it is found a unique inland halophytic vegetation type. The highly saline soils, locally known as “tonga”, only allow halophytic succulent, creeping plants to grow, the only capable to cope with the arid conditions. Some of those are *Arthrocnrmum* sp., *Chenolea* sp. and *Salicornia* sp. The last major vegetation type in the country occurs on the Malawi-Mozambique border, a Swamp Vegetation, associated to freshwater swamps. Wild and Barbosa (1957) have mapped the vegetation in the Flora Zambesiaca Area, and thus the vegetation of Mozambique, providing detailed information on the vegetation types of the country. This map was used as basis for subsequent investigations on the flora of the area and is still an instrument of great value.

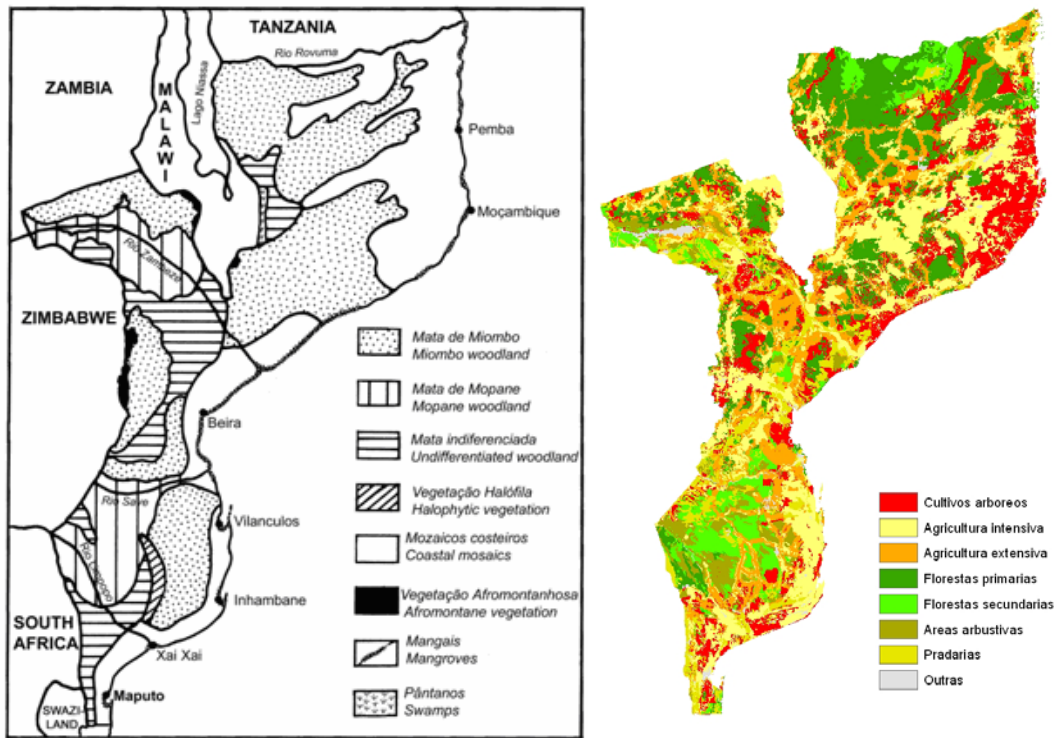


Fig 4: Left: Eight main vegetation types can be distinguished in Mozambique (After White, 1983). Right: Shown a land cover and use map (DNTF, 2008).

1.1.3. Floristic diversity

Previous records have indicated existence of around 5500 plant species in Mozambique. Plant studies in Mozambique area summarized in the text below.

The study of plants in Mozambique started during XIX century in colonial period. The first plant collections where those collected in areas where economic development such as railways and plantations were taking place. The establishment of herbaria – LMU (1964) at the University and LMA (1967) at the Institute for Agronomic Research – and the existence of a program for floristic studies - Flora Zambesiaca e Flora de Moçambique – edited respectively in London and Lisbon further stimulated for more botanical expeditions for better understanding of the Mozambican flora.

LMU Herbarium incorporated material from the extinct Herbarium from the Institute of Scientific Research of Mozambique – LMC and, LMA Herbarium, had incorporated materials from the extinct herbaria from the Directorate of Agriculture and Forestry – LM and the Herbaria of the Cotton Scientific Research Institute – LMJ. Main plant collections in Mozambique are those from: L.A.G. Barbosa, M.F. Carvalho, M.F. Correia, J. de Koning, L.M.A. Macêdo, M. Myre, A. Nuvunga, L.G. Pedro, J. Pedrogão, A.M. Pereira, A.F.G. Sousa, and A.R. da Torre. LMU and LMA store in total 120 000 plant specimens (Angiosperms, Gymnosperms and Pteridophyte and macroalgae). Aboard, the main collections of Mozambique are found mostly in Lisbon (LISC), England (K), South Africa (PRE), Zimbabwe (SRGH), EUA (MO) and The Netherlands (WAG).

In the last 20 years or so, most vegetation studies in Mozambique targeted surveys on specific areas of interest, such as protected areas (national parks and reserves), centres of endemism and suspected biological hotspots (Muler et al, unpubl.; Timberlake et al., 2003; Ribeiro, 2005; Bandeira e Nacamo, 2007; Timberlake et al., 2007). Up to now, the higher figure for plants diversity in Mozambique is 5.641 species (Table 4), of which 177 are endemic and 300 are Red List Plants (MICOA, 2003).

Table 4: Number of plant species in Mozambique (source: MICOA, 2003)

	Family	Genera	Species
Spermatophyte	173	1375	4810
Pteridophyte	20	37	103
Bryophyte	-	-	-
Marine algae	59	165	338
Freshwater algae	32	76	207
Fungi	5	59	183
Total	289	1712	5641

1.1.4. Uses

Plant resources in Africa represent an important source of a variety of products, such as food, medicine, timber, building material, material for crafting, fuel, etc (Table 5).

Wild fruits can be divided in categories: 1st, 2nd and 3rd class wild fruits. The 1st class wild fruits generally encompass species with multiple uses such as *Sclerocarya birrea*, *Strychnos madagascarienses*, *Trichilia emetica* and *Garcinia livingstonei*, usually not only used for direct consumption, but also for other important purpose such as production of alcoholic drinks, kernels for cooking meals (e.g. *Sclerocarya birrea*) and production of cooking oil (*Trichillia emetica*). Extensive documentation of those resources throughout the country is still needed.

Medicinal use is of great importance, since it accounts for more than 70% of basic health care in Africa (World Conservation Monitoring Centre, 1992). Mozambique possesses many plant species diversity with medicinal importance, locally playing a key role for rural sub-urban people. They provide basic health care for more than 60% of the population. In Mozambique up to 10% of the total plant species have been identified as utilized in traditional medicine (Bandeira et al. 2001). These plant species are used for an array of diseases, ranging from simple or complex pathogens complications to psychological and mental illnesses. Nearly all diseases have traditional treatment in Mozambique, except illnesses requiring major surgical intervention. Major diseases with traditional intervention in Mozambique include: diarrhoea, malaria, respiratory complaints, hypertension, malnutrition/anaemia, parasitic infections, sexual complaints etc. (Barbosa, 1995; Bandeira et al., 2001). Traditional medicine also plays a role in slowing opportunistic infections related to AIDS.

Non-medicinal uses of plants include wood for house building, furniture and handcrafting. Wood is classified into 4 main categories: precious wood, normally used for crafting (e.g.: *Berchemia zeyheri*, *Dalbergia melanoxylon*, *Diospyrus kirkii*, *Ekebergia capensis*, etc); first class wood, which produces high quality wood, largely used for furniture and also much exported (e.g.: *Azelia quanzensis*, *Millethia sthulmanii*, *Pterocarpus angolensis*); second class wood (e.g. *Brachystegia spp.*, *Trichilia emetica*, *Newtonia hildebrandtii*); third class wood (e.g. *Acacia nigrescences*, *Celtis africana*, *Sideroxylon inerme*), and fourth class wood (e.g. *Tamarindus indica*, *Acacia spp.*, *Fernandoa magnifica*).

Fuel wood is one of the most important sources of domestic fuel in peri-urban areas across the country. Fuel wood production generally targets species with high calorific value, smokeless burning and easy to cut. Preference in Libombo mountains region goes to species such as *Acacia karro*, *A. nigrescens*, *Combretum imberbe*, *C. apiculatum* (Bandeira et al., 1999).

Other non medicinal uses of plant include those for veterinary purpose (*Aloe parvibrateata*, *Cissus rotundifolia*, *Commelina sp.*, etc), smoking (*Aloe chabaudii*), breakfast tea (*Combretum hereroense*, *Boscia albitrunca*) (Bandeira et al., 1999), etc.

Table 5: Selected uses of some plant species of southern Mozambique (Sources: Bandeira, 1994; Barbosa, 1995).

Species	Plant Family	Uses					
		Fuel wood	Timber	Utensils	Food	Medicine	Other
<i>Bridelia cathartica</i>						Stomach ache Venereal diseases	
<i>Psydrax obovata</i>	Rubiaceae	√	√				√
<i>Mimusops caffra</i>	Sapotaceae	√	√	√	Edible fresh fruit; Alcoholic drink		√
<i>Pavetta revolute</i>	Rubiaceae	√					
<i>Sizigium cordatum</i>	Myrtaceae	√		√	Edible fresh fruit Alcoholic drink		√
<i>Garcinia livingstonei</i>	Clusiaceae	√			Juices Alcoholic drink		√
<i>Avicennia marina</i>	Avicenniaceae	√		√			
<i>Syderoxylon inerme</i>	Sapotaceae	√	√				
<i>Strychnos spinosa</i>	Strychnaceae				Edible fruit, sometimes mixed with porridge	Stomach ache Oral hygiene Epilepsy	√
<i>Sclerocarya birrea</i>	Anacardiaceae			√	Alcoholic drink Gastronomy (kernel)	Diahoreia Stomach ache	√
<i>Terminalia sericea</i>	Combretaceae		√	√		Dysentery Diaphoresis Stomach ache	
<i>Phoenix reclinata</i>	Arecaceae			√	Edible fruit Alcoholic drink		
<i>Diospyrus rotundifolia</i>	Ebenaceae	√	√		√		
<i>Tabernamontana elegans</i>						Dysentery Dihorea Venereal diseases	
<i>Trichilia emetic</i>	Meliaceae				Gastronomy Oil production	Dihorea Stomach ache	√
<i>Vagueria infausta</i>	Rubiaceae				Edible fruit, fresh, drought or mixed with porridge	Dihorea Stomach ache Oral hygiene	√



Vangueria infausta, one of the most important edible wild fruit in Mozambique

Theats trends to vegetation and red data list

Habitat conversion by mean of vegetation clearing and agricultural practice (slush and burn /encroachment) has been a major driver for vegetation degradation. These factors are usually of high magnitude and the damage to the vegetation tends to be irreversibility. Uncontrolled fires, specially its several recurrences as well as increased human settlements are also an important driver of vegetation degradation. The table below summarizes plant diversity, its threats and trends.

Table 6. Plant diversity and its threats

Group	N° of species	Areas of floristic endemism	N° of species in the red data list	Main threats	Trends
Flora	5500 (4800 of higher plants)	-Maputaland CE -Chimanimani CE -Costal Forests of northern Mozambique -Inselbergs (e.g. Namuli, Chiperoni, Mabu, Mecula, Garuso). More yet to be documented	300 (122 threatened)	clearing of vegetation, slush & burn agriculture, human settlements, uncontrolled fires	Reduction of primary vegetation Eg:Maputaland endemic <i>Raphia australis</i> (Bobole) -Increase of secondary or transformed vegetation



Uncontrolled fire in Cabo Delgado (northern Mozambique)

Up to now 300 species of plants are listed in Mozambique Red List (Table 7). One out of these is extinct in the wild (*Sueda sp.*), 6 are critically endangered (*Encephalartos lebomboensis*, *E. munchii*, *E. ngoyanus*, *E. pterogonus*, *E. senticosus*, *E. umbeluziensis*) and 6 are endangered (*Crassula maputensis*; *Icuria dunensis*, *Cyphostema barbosa*, *Encephalartos aplanatus*, *E. chimanimaniensis*, *Sarcocornia mossambicensis*). The others are vulnerable, at low risk or with deficient data (Izidine & Bandeira, 2002).

55% of the Red List Species are confirmed endemics, and 22% are confirmed near endemic (Izidine & Bandeira, 2002). In fact, confirmed and suspected endemic and near endemic totalize 85% of the Red List Species.

Table 7: Number of taxa in each Red List category in Mozambique. (Source: Izidine & Bandeira, 2002).

Red List Status	Number of taxa
Extinct (EX)	1
Critically endangered (CR)	6
Endangered (EN)	6
Vulnerable (VU)	109
Lower risk near threatened (LR-nt)	16
Lower risk least concern (LR-lc)	23
Data deficient (DD)	139
Total	300

The major threats to plant species in Mozambique are related to non-sustainable forms of use. Placed on the top of the list is exploitation for domestic fuel, which is particularly high close to urban areas and other densely populated places (Burgess and Clarke, 2000; Izidine and Bandeira, 2002). Other main causes are traditional agricultural practices (slush and burn agriculture), human settlements and urbanization (Izidine & Bandeira, 2002).

1.1.6. Genetic diversity

The National Center of Plant Resources, located at IIAM (Institute of Agricultural Research of Mozambique) is the main institution in Mozambique that promotes the protection of genetic resources. The main objective of this center is to preserve and promote the sustainable use of genetic resources in the country, especially those of importance to agriculture and food security. The Center only does conservation of genetic resources of crops species.

The main activities of the center are: Inventory and collection of germplasm, the survey of the needs of re-introduction of germplasm in areas that have suffered genetic erosion, conservation of germplasm, propagation and characterization of germplasm and documentation.

Currently (February 2009) there are in the centre 2074 samples of seeds of different food crops such as maize, rice, Sorghum, "pigeon pea", "bambara" Groundnut, wax bean, sunflower, soybean, wheat, etc. 58.7% of the collection are cereals, 41 % are vegetables, and 0.3 are other cultures.

During the period 2006 – 2008 4 missions of germplasm collection of the main crops took place in the provinces of Gaza, Manica, Sofala and Cabo Delegado, during which 326 samples were collected. Currently the center keeps 2.074 seed samples of different food crops.

The information is systematized in the "SADC Documentation and Information System (SDIS). This program is used at regional level, allowing the management of information about the material stored. Table 8 shows the material that is kept in the center.

Table 8: Material kept in the National Center of Fotogenetic Resources (Source: IIAM, 2008)

	Crop	Scientific name	Number of access
1	Gourd	<i>Cucurbita maxima</i>	27
2	Peanut	<i>Arachys hipogea</i>	41
3	Rice	<i>Oryza sativa</i>	344
4	Rice	<i>Oryza sp</i>	4
5	Wild rice	<i>Oryza longistaminata</i>	26
6	Wild rice	<i>Oryza puntacta</i>	1
7	Wild rice	<i>Leersia hexandra</i>	5
8	Broad bean	<i>Vicia faba</i>	1
9	Red gram	<i>Cajanus cajan</i>	19
10	Lablab bean	<i>Lablab purpureus</i>	15
11	Mung bean	<i>Vigna radiate</i>	14
12	Jugo bean	<i>Vigna subterranean</i>	106
13	Velvet bean	<i>Mucuna pruriens</i>	19
14	Cowpea	<i>Vigna unguiculata</i>	144
15	Wild bean	<i>Vigna sp</i>	1
16	Common bean	<i>Phaseolus vulgaris</i>	234
17	Sesame	<i>Sesamum sp</i>	9
18	Sunflower	<i>Helianthus annus</i>	21
19	Inhame	<i>Discorea sp</i>	2
20	Macadam	<i>Macadamia sp</i>	18
21	Sorghum	<i>Sorghum bicolour</i>	281
22	Water melon	<i>Citrullus lanatus</i>	130
23	Pearl millet	<i>Pennisetum glaucum</i>	29
24	Maize	<i>Zea mays</i>	334
25	Mutica	<i>Tephrosia vogelli</i>	2
26	Finger millet	<i>Eleusine coracana</i>	12
27	Pecanas	<i>Canya sp.</i>	14

28	Cucumber	<i>Cucumis sativus</i>	10
29	Malagueta pepper	<i>Capsicum sp</i>	1
30	Okra	<i>Abelmoschus esculentus</i>	21
31	Soy	<i>Glycine max</i>	72
32	Wheat	<i>Triticum sp</i>	2
33	-	<i>Triticale + Triticum</i>	115
	Total		2074

2.2. Terrestrial fauna: Species diversity and distribution

Mozambique has a total number of 4271 terrestrial species registered (MICOA, 2003). 72% of this is represented by insects, 17% by birds while mammals and reptiles account for only 5% and 4%, respectively. The remaining 2% is filled by amphibious. According to the 2008 census of wildlife, there are five main areas where richness of wildlife species is particularly high. Apart from the western side of Tete province (north and south of Lake Cahora Bassa), all are protected areas or its surroundings. In northern Mozambique (Niassa Reserve, Chipanje area and its surrounding) there are considerable populations of buffalos, elands, impalas, wildebeests and zebras. Also three sub-species of large terrestrial mammals are endemic to this region: *Equus burchelli* subs. *boehmi* (zebra); *Connochaetes taurinus johnstonii* (blue Niassa wildebeest) and *Aepycerus melampus* subs. *johnstonii* (johnstonii impala). Other areas with substantial numbers of wildlife are central Mozambique (Gorongosa NP, Marromeu Reserve and coutadas 6, 7, and 9 to 5), Limpopo-Banhine-Zinave NP's complex and Maputo Elephant Reserve.

Threats and trends to wildlife

The last national census of wildlife indicates great changes in number and distribution of the main large mammals in the country, when compared to the 1970's (Table 9). The terrestrial fauna has undergone a major change in the last 40 years due to population increase, development and the past political instability that confined most of the large mammals to existing conservation areas. The terrestrial fauna of Mozambique suffered massive decline during the civil war period, when many herds fled to neighbourhood countries. Other animals were killed during the conflict, since hunting was uncontrolled and many conservation areas were not fully operating. After the end of the war in 1992 the national government has been directing efforts on the recovering of lost populations, especially within conservation areas. New polices have been drawn aiming to re-populate the conservation areas, and this includes more financial support as well as new partnerships with neighbourhood countries.

There have been reports of human-animal conflicts in many parts of the country, especially in those communities living inside or around conservation areas (National Census of Wildlife, 2008). Animals most frequently involved in conflicts are crocodiles, lions, elephants and hippos. From July 2006 to September 2008, 265 people were reported killed and 82 injured during conflicts with wildlife (National Census of Wildlife, 2008). Elephants and hippos not only attack human population but also invade agricultural fields, what presumably explains the fact that these two species were shot more frequently than the others, and that the number of animals killed was much superior to that of human victims. However, it was crocodiles that killed more people, and the number of attacks on people by crocodiles has been increasing in the last 10 years. Man-animal conflict is a difficult issue to handle as many times it ends up with death of problematic animals. For instance, one given recommendation to solve human-crocodile conflict was the removal of large animals from waters in rural areas. While this seems to be a solution for the conflict in one hand, it is also a threat to crocodile's survival, since large individuals constitute the breeding population. Long terms responses include the development of land use plans and creation of areas where wildlife can be managed with sustainability and provide benefits to the population without competing with people for resources.

Table 9: Number and distribution of species counted in the last census. Source: National Census of Wildlife 2008.

Species	Estimate (in 2008)	Distribution	
		in the 1970's	In 2008
Baboons (groups)	2125	-	-
Buffalo	5717	Widely distributed	LNP, Marromeu R, Magoa, Niassa R, Chipamge area
Duiker grey	45246	-	-
Eland	9382	Widely distributed	Niassa R (70% of the population); disappeared from the south
Elephant	22144	Widely distributed	MER, southern Inhambane, Limpopo/Gaza, Zambezi valley, Tete and central Mozambique, northern Mozambique (Niassa R. and QNP, Cabo Delgado)
Giraffe	125	In southern Moz.	LNP (re-introduced)
Hartebeest	5107	-	-
Hippopotamus	8388	Widely distributed	MER, Save river, GNP, Zambezi river, Cahora Bassa, Rovuma and Lugenda rivers
Impala	11677	Widely distributed	Similar in the south; in north confined to Niassa R
Kudu	15764	Widely distributed	Seen close to borders of conservation areas; absent from Inhambane, Zambezia, Nampula
Nyala	3435	-	-
Ostrich	1566	-	Limpopo/Banhine/Zinave complex
Reedbuck	12293	-	-
Black Rhinoceros	-	Sparse in central and northern Moz.; western Tete	Only one individual seen in northern Mozambique
White rhinoceros	20	Nationally extinct; re-introduced to Maputo R and Gorongosa NP	Limpopo NP
Roan antelope	525	-	-
Sable antelope	32393	Widely distributed	Similar to the 1970's
Warthog	18880	-	-
Waterbuck	9956	-	-
Wilbebeest	2031	Gile R, Gorongosa NP, Save valley, Banhine and Zinave NP's; along the border with Kruger NP	Niassa R, Limpopo NP
Zebra	7480	Widely distributed (scarce in Maputo and Inhambane)	Niassa R, along the border with Kruger NP and Limpopo NP, Magoa area.
Crocodile (>2m)	1511	-	-

Herpetofauna (reptiles and amphibians): diversity, threats and trends

Up to date only 167 species of reptiles are registered, which belong to 20 families. 6 species are endangered as documented for Chimanimani Mts. (e.g: the flat rock lizard *Platysaurus ocellatus* and a snake of a genus *Dromophis*); coastal forests of Zambezi province (a dwarf gecko *Lygodactylus sp.*) and Serra Mecula (a new species of lizard) (Hatton et al., 2001, Branch et al., 2005). The number of species of amphibian is not known and most species that occur in the highlands are believed to be endemic, such as *Bufo vertebralis* and *Anthrolrptis troglodytes*, both species from the Chimanimani Massif. These two species are in the red list for South Africa, as well as *Afrivalus aureus*, the last one a rare species. A known place of high diversity of herpetofauna is the Zambezi basin, where 200 species of reptile and 90 species of amphibians have been identified (Timberlake, 2000). In Maputaland Centre of Endemism 21 species of frog were identified in permanent and seasonal pans. This number corresponds to 16.28% of the total species occurring in southern Africa (SABONET, 2001). Threats to herpetofauna include collection for food, skin and medicinal purposes, pet trade and habitat destruction, although quantitative data on this is unknown. Due to perceived danger to man and livestock, snakes and cobras are more frequently killed.

Avifauna: threats, trends and birds of special concern

The number of bird species of Mozambique has reached 735 (MICOA, 2006). Most of the species are migratory and shared with neighbourhood countries. Freshwater ecosystems and wetlands are important sites for migratory and resident aquatic bird species. The Marromeu Complex supports one of the largest populations of aquatic birds in Mozambique; highlight for the great white pelican (*Pelecanus onocratalus*) and pink-backed pelican (*Pelecanus rufescens*), great cormorant (*Phalacrocorax carbo*), yellow billed stork (*Mycteria ibis*), african open bill (*Anastomus lamelligerus*), sacred ibis (*Threskionris aethiopicus*) and many species of heron. It also supports a number of species of wild ducks (spur winged goose; white-faced whistling-duck; fulvous whistling duck). Thousands of migratory Palaearctic and intra-African species depend seasonally on these habitats, including the flamingos. A number of species in the different habitats of the complex are endangered and threatened, or are of important commercial value (Bento & Beilfuss, 2003). The wide variety of coastal habitats also provides suitable feeding and breeding habitats for many bird species. The coastal barrier lakes are potential hotspots for avifauna (Parker, 1999). Many endemic, rare and threatened species identified up to date are associated with isolated mountain habitats, highlight to the inselbergs Chiperone, Namuli Mts., Serra Mecula, Gorongosa Massif and Chimanimani Mts. Table 11 presents a list of birds of special concern.

Most of the threats to birds are rooted in anthropogenic activities: deforestation, hunting (series threat to larger species such as ostrich), cage-bird trade, trade in traditional medicine and use of poisons to protect crops against insect pests and problematic animal. The degradation of floodplains and wetlands due to the exploitation of water resources for agriculture and construction of dams is likely to affect negatively the bird populations living in these habitats (Parker, 1999; Bento & Beilfuss, 2003; www.iucnredlist.org). Management of the water resources is required to prevent further degradation and consequences on the avifauna (Bento & Beilfuss, 2003).

Table 10: Bird species of special concern.

Common name	Scientific name	Endemism	Occurrence in Mozambique	Conservation status
Dappled-mountain Robin	<i>Modulatrix orostruthus</i>	Endemic (Mz and Tz)	Mt Namuli	Vulnerable
Southern banded snake eagle	<i>Circaetus fasciolatus</i>	-	Coastal and riverine forests (south Maputo; Save river)	Near threatened
Blue throated sunbird	<i>Anthreptes reichenowi</i>	-	Coastal forests and Ironwood forests inland	Near threatened
Chirinda apalis	<i>Apalis chirindensis</i>	Endemic (Mz and Zb)	Chimanimani-Nyanga Mts.	Least concern
Stierlin's woodpecker	<i>Dendropicops stierlingi</i>	Near endemic (Mz, Tz, Mw)	Brachystegia woodland	Near threatened
Swynnerton's forest Robin	<i>Swynnertonia swynnertoni</i>	Near endemic (Mz, Tz, Zb)	Chimanimani-Nyanga Mts.	Vulnerable
Long-billed apalis	<i>Apalis moreaui</i> subsp. <i>sousae</i>	Endemic (Mz and Tz)	Njesi Plateau	Critically endangered
Neegards sunbird	<i>Nectarinia neegardi</i>	Endemic (Mz; RSA)	Inhambane, Gaza, Maputo	Near threatened
Olive headed waver (separate subspecies)	<i>Ploceus olivaceiceps</i>	Endemic (Mz)	Northern and southern (Inhambane)	Near threatened

Wattled crane	<i>Grus carunculatus</i>	-		Banhine National Park; Zambezi Delta	Vulnerable
African skimmer	<i>Rhynchops flavirostris</i>	-		-	Near threatened
Cape vulture	<i>Gyps coprotheres</i>	Endemic to southern Africa		Libombo Mts.	Vulnerable
East coast alakat	<i>Sheppardia gunningi</i>	Mz, Tz, Kn, Mw		Chinizaia; Mt. Mabu	Near threatened
Thyolo alethe	<i>Alethe choloensis</i>	Endemic (Mz and Mw)		Namuli Mt; Chiperoni Mt.	Endangered
Namuli apalis	<i>Apalis lynesii</i>	Endemic (Mz)		Namuli Mts.	Near threatened
White winged apalis	<i>Apalis chariessa</i>	Near endemic (M, Tz, Mz)		Mt. Chiperoni	Vulnerable
Pink-throated two-spot	<i>Hypargos margaritatus</i>	Near endemic (Mz, Sw, RSA)		South Save River	Least concern

2.2. Red list species

National red list has eight threatened mammal species (Table 11). Apparently the only giraffes remaining in the country are those from Limpopo NP, a re-introduced population. Recently some giraffe was introduced to the Safari Park private wildlife area. White rhino was also re-introduced into Limpopo NP, while only one black rhino was seen in northern Mozambique during the last wildlife census. It is forbidden by law to hunt protected animals and fines for lawbreakers go from 1.000 MT (~ 40 USD) to 100.000 MT (~ 4.000 USD). The list of protected species “red list animals” include others species such as birds of prey and vultures, pangolin, ostrich, and all species of agave and gibbons. Major threats to terrestrial mammals are hunting, wildfires, non-sustainable use of forest resources and destruction of forests.

Table 11: Threatened large mammal species in Mozambique.

<u>Common name</u>	<u>Scientific name</u>
White rhino	<i>Cerato therium simum</i>
Mzanze	<i>Damaliscus lunatus</i>
Sitatunga	<i>Tragelaphus spekei</i>
Black rhino	<i>Diceros bicornis</i>
Giraffe	<i>Giraffa camelopardalis</i>
Matagaíça	<i>Hippotragus equinum</i>
Mountain Chango	<i>Redunca fulvorufula</i>
Cheetah	<i>Acinomyx jutabus</i>

Major crops in Mozambique and the economic value of Insects Pollinators

Connection between crop production and insects’ pollinators’ diversity are here presented following an extensive publication on standard conversions linking crop and pollinators (Klein et al 2007). Many crops have shown different degrees of dependence to animal pollinator; this dependency varying from high to small (Klein et al 2007). Taking in consideration the main crops production in Mozambique, in 2005, the corresponding share of the associated polinators have been established (Table 12).

Table12. Total major crop production value (source: National Institute of Statistics) and the corresponding money-share value of the insect pollinators.

Crop common name	Crop species	Crop category following FAO	Dependence upon animal pollination	Mean (D)	Producer price per metric ton	Production	Total value of crop (TVC)	Economic value of insect pollinators (EVIP)
sources: FAOstat (http://faostat.org)			sources: Klein et al. 2007		Sources = Instituto Nacional de Estatística (Year 2005) (US\$ / metric ton)	metric ton	Price * Production (US\$)	TVC*D (US\$)
Beans, dry	Phaseolus vulgaris	Pulse	Little	0,05	132	56000	7392000	369600
Cashew nuts, with shell	Anacardium occidentale	Treenuts	Great	0,65	176	104337	18363312	11936152,8
Cassava	Manihot esculenta	Roots and Tubers	Increase - breeding	-	57,84		0	-
Citrus fruit, nes	Citrus spp.	Fruits	Little	0,05	90,4	30000	2712000	135600
Coconuts	Cocos nucifera	Oilcrops	Modest	0,25	68	74000	5032000	1258000
Cow peas, dry	Vigna unguiculata	Vegetables	Little	0,05	132	48000	6336000	316800
Groundnuts, with shell	Arachis hypogaea	Oilcrops	Little	0,05	180	93000	16740000	837000
Maize	Zea mays	Cereals	No increase	0	60	942000	56520000	0
Rice	Oryza sativa	Cereals	No increase	0	100	65000	6500000	0
Seed cotton	Gossypium hirsutum, G. Herbaceum	Oilcrops	Modest	0,25	128	78500	10048000	2512000
Sunflower seed	Helianthus annuus	Oilcrops	Modest	0,25	104	7000	728000	182000
Tea	Camellia sinensis	Stimulant crops	No increase	0	40	16000	640000	0
Tomatoes	Lycopersicon esculentum	Vegetables	Little	0,05	149,92	-	0	0
TOTAL OR MEAN	-	-	-	0,14	-	1.513 837,00	131.0 11.312,00	17.547 152,80

In 2005, the economic value of insect pollinators per crop category was for tree nuts 11936152.8 USD (great dependence), for oilcrops 4789000 USD (modest dependence) and fruits 135600 USD, pulse 369600 USD (both little dependence); amounting to a total of 17.547 152, 8 USD in Mozambique.

2.3. Marine diversity

Mozambique has an extensive coast of approximately 2.770 km, which can be divided in 3 main natural regions (Table 13, Fig. 5).

Table13. Parameters of Mozambique coastline

Coastline type	Approximate Length	Location	Characteristics
Reef Coast	700	Rovuma river – Primeiras & Segundas Islands	Coral reef ridges

Swamp Coast	978	Angoche-bazaruto Island	Muddy, with soft sediments and alluvium deposits (mai fishery area in Mozambique)
Parabolic dune Coast	850	Bazaruto-Ponta de Ouro	Very high parabolic sand-dunes

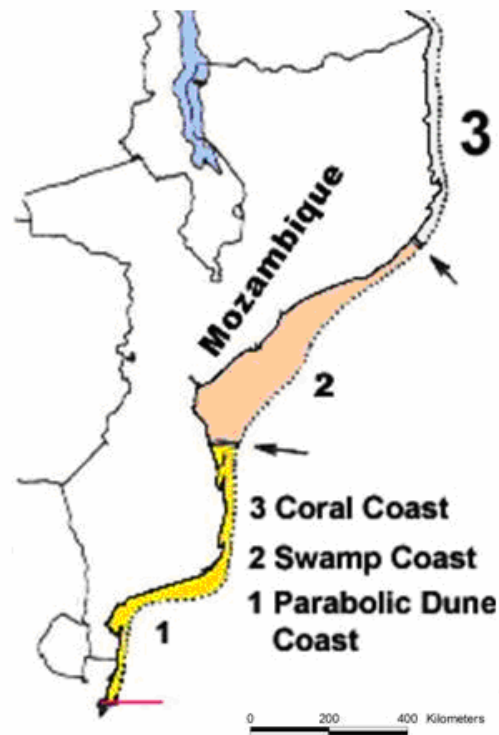


Fig 5. The Mozambican coast

2.3.1. Marine ecosystems and species diversity

Coral Reefs diversity and threats

Coral reefs cover an area of approximately 1860 km² along the Mozambican coast (Spalding *et al.*, 2001). Most of it is concentrated in the northern coast, where they appear almost continuously around the islands in the Querimbas Archipelago and Primeiras and Segundas Islands. In Bazaruto, Inhaca and Ponta d' Ouro the distribution of reefs is patchier and active growth is limited to shallow waters. Coral diversity estimate is of 194 species (Spalding *et al.*, 2001), 53 being of soft corals (Benayahu *et al.*, 2003).

Socio-economically coral reefs play an important role in providing livelihood source for coastal communities. Two of the major economic activities – fishing and tourism – are based on the exploitation of reef resources. Coral reefs constitute an important attraction for tourism development in Mozambique, many tourism infrastructures being built near important reefs. Corals are also exploited locally for building, production of lime and are sold to tourist as souvenirs (MICOA, 2003). The overexploitation of the resources and its destruction are major

threats to corals (MICOA, 2003). Main threats to coral reefs also include coral bleaching and increased coral reef activity (such as destructive fishing practices, diving). The El Niño oscillation in 1997-1998 caused severe coral reef bleaching, affecting important reef sites. In Nampula and Inhaca Island mortality was above 90% (Shleyer *et al.*, 1999). Other catastrophic phenomena, such as floods, hurricanes and storms may also threaten corals survivensess. One assessment in the coral communities in Xai-xai Lagoon, southern Mozambique, indicated a decrease in 58% and 90% of the cover of hard and soft corals, respectively, short after the 2000 floods (Pereira and Gonçalves, 2000). On the other side, other communities associated to coral reefs (turf algae, sponges, sea urchin, fleshy algae, etc) increased their percentage cover in an order that ranged between 34% and 164% (Pereira and Gonçalves, 2000). Increased damage to coral reefs may be subsequently caused by bio erosion as a consequence of the growth of populations of invertebrates (Pereira *et al.*, 2002). Less documented impacts are the increasing coral reef activity such as fishing, diving, etc.

However, the general status of reefs in Mozambique is good. Coral reefs are protected by law (decree 45/206), and collection of corals as well as all activities that may cause coral damage are forbidden. 4% of the total continental shelf is protected through Marine Protected Areas (Table 14), which include coral reefs and other ecosystems (Wells *et al.*, 2007).

Table 14. Conservation areas that include coral reefs in Mozambique. Source: Wells *et al.*, 2007

	<u>Year of gazzertment</u>	<u>Total Marine Area km²</u>
Quirimbas National Park	2002	1.522
Vilanculos Coastal Wildlife Sanctuary	2000	300
Bazaruto National Park	1971; expanded in 2001	1.430
Inhaca and Portuguese Islands Faunal Reserve	1965	1

Mangroves

Mangrove forests are widely distributed along most of the Mozambican coast, from north to south. South the Save river they occur extensively in Morrumbene estuary, Inhambane Bay and Maputo Bay (including Inhaca Island) where four main rivers discharge (Barbosa *et al.*, 2001).

The central sector is for excellence a muddy coast, with the most extensive and well established mangrove areas of the country. 18 main rivers flow between Save River and Angoche, including the Zambezi, Púngue, Save and Búzi deltas. The mangroves of the Zambezi delta cover close to 180 km of the coast line and can go up to 50 km inland. Mangroves in the northern section go from the Angoche up to Rovuma River. Natural conditions here are less favourable to the establishment of tidal forests, but well developed forests are found in Lumbo, Mecúfi, Ibo and Pemba City.

The main issue concerning mangrove conservation in Mozambique is deforestation. Mangroves are important sources of domestic fuel and wood in coastal communities (Saket e Matusse, 1994; Barbosa *et al.*, 2002; de Boer, 2004). This pressure tends to be particularly high close to urban areas, where population densities are higher, rising the demands for mangrove wood products. Information on mangrove cover area and deforestation rates for the whole country is outdated. The most complete study was that from Saket and Matusse (1994), and it showed a general trend of decrease of total mangrove area from 408.079 ha in 1979 to 396.080 ha in 1990 (although there were also new areas of mangrove). More recently other studies were conducted in localized areas – e.g.: Northern Mozambique in Cabo Delgado (Ferreira *et al.*, 2009), Maputo Bay (de Boer, 2000) and Incomati estuary (Bandeira *et al.*, unp). The results of the study in northern Mozambique (Cabo Delgado) are showed in Table 15. It was estimated that the total mangrove area was of 357 km² in 1995 and of 368 km² in 2005, showing an increase of about

3% in the total cover area. Around 336 km² remained intact in these ten years, while 21 km² were lost and 32 km² were gained. Main alterations on mangrove cover area occurred in Quiterajo and Rovuma estuary, and Pemba Bay, the last one probably a result of construction and exploitation of mangrove wood products mainly for house building.

Table15: Mangrove area change detection (in Km2) in Cabo Delgado (Pemba to Rovuma) between 1995 and 2005. Area in km² Source: Ferreira et al., 2009.

<u>Location</u>	<u>Constant area</u>	<u>Lost area</u>	<u>Gained area</u>	<u>Index of change</u>
Rovuma estuary	95	3	8	0.1
Ibo	43	1	2	0.07
Pemba Bay	27	2	1	0.1
Total area	336	21	32	0.14

In the Incomati river there was a decrease of 16,8% between 1991 and 2003, with a deforestation rate of 17ha/year (Bandeira et al., unpubl.). In Maputo Bay the overall effect of mangrove degradation and colonization of new areas reduced resulted in a decrease of only 8% (de Boer, 2000).

Seagrasses

The 13 species of seagrass that occur in Mozambique abound in the sandy and limestone regions of southern and northern coasts respectively, generally in mixed stands in the intertidal area. In southern Mozambique the main stands are composed by combinations of *Thalassia hemprichii*, *Halodule wrightii*, *Zostera capensis*, *Thalassodendron ciliatum*, and *Cymodocea serrulata* (Bandeira, 2002). Pure stands of *Z. capensis* are found in Maputo Bay, Bazaruto Archipelago and Quirimbas Archipelago. Northwards the seagrass beds occur mixed with seaweeds such as *Gracilaria salicornia*, *Halimeda spp.*, *Laurencia papilosa*, and *Sargassum spp.* Common seagrass species are *T. hemprichii*, *H. wrightii* and *T. ciliatum*. *Enhalus acoroides*, *Halophila stipulacea* and *H. ovalis* can be only found in this side of the country. In the subtidal area, the dominant species are *T. ciliatum* and *E. acoroides*.

The most important seagrass beds occur in Fernão Veloso, Quirimbas, Inhaca and Ponta do Ouro. Table 16 shows estimated cover areas in the main seagrass beds around the country. In Maputo Bay the total area was estimated in 80 km², which corresponds to 50% of the intertidal area (Bandeira, 1995; Bandeira, 2002). However, *Z. capensis* was reported to be declining, and beds in general are being threatened by erosion, sedimentation and human activities (Bandeira, 2002; Bandeira and Gell, 2003). This last includes pollution from sewage discharge, overfishing, destructive fishing practices, trampling and heavy concentration of tourist activities (Bandeira and Gell, 2003).

Table 16. Estimated seagrass cover in most important seagrass beds in the country. From Bandeira and Gell, 2003.

Site	Main species	Cover area (km ²)
Ponta d'Ouro	Tc, macroalgae	69
Inhaca Island	Cr, Cs, Ho, Hu, Hw, Si, Tc, Th, Zc	46
Maputo Bay	Hw, Ho, Tc, Th, Zc	37
Bilene	Rm, Hu	3
Xai-xai	Tc, macroalgae	0.04
Inhambane Bay	Hw	30
Inhassoro-Bazaruto Is.	Cs, Tc, Th	25
Goa Is.	Tc	1
Moz Isl-Lumbo-Cabaceira	Cr, Cs, Hm, Hw, Hu, Ho, Si, Tc, Th, Zc	15
Pequena		
Chocas Mar-Cabaceira	Tc, Th	19
Grande-Sete Paus Island		
Quitagonha Island	Cr, Hw, Tc, Th	34
Relanzapo	Tc, Th, macroalgae	8
Quissimajulo	Th	2
Fernão Veloso	Cr, Cs, Ea, Ho, Hm, Hu, Hw, Si, Tc, Th	75
Mecufi-Pemba	Hm, Ho, Hs, Hu, Hw, Si, Tc, Th, Zc	30
Quirimbas Archipelago	Cr, Cs, Ea, Hm, Ho, Hs, Hw, Tc, Th	45

Crustaceans (shrimp, crab, lobster)

Crustacean species with commercial importance in Mozambique comprise shrimps, lobsters and crabs. The most important commercial species are those of the family Penaeidae (*Penaeus indicus*, *P. semisulcatus*, *P. monodon*, *P. japonicus*, *Metapenaeus monoceros* and *M. stebbingi*). Other crustaceans with economical importance are the mangrove crab (*Scylla serrata*) and lobsters (which occur abundantly in northern Mozambique from Rovuma River up to Nampula, and Inhassoro, Bazaruto and Vilanculos in the south). Lobsters are common on rocky formations and within coral reefs. Also sand stone areas of South Mozambique are quite common with lobsters.

Molluscs (bivalves and gastropods) and Echinoderms

Diversity of mollusks and echinoderms (distribution and biology) is not well documented for Mozambique. Privileged species are those with economical importance and those which are part of the diet of local communities (Fisher *et al.*, 1990). It is important to mention though that many of the available data refer only to diversity and general distribution and very little is known about biology or stock assessment.

Molluscs bivalves include clams, oysters, sea mussels, arks, cockles, scallops, pen shells, and razor shells, all exploited commercially, either for food or ornamentation. Common species are *Macra cuneata*, *Choromytilus meridionalis*, *Perna perna*, *Sacostrea cucullata*, *Meretrix meretrix*, etc. Gastropods are also used as food, but moreover to produce jewellery and house ornamenting, which is sold to tourists. The species include those of the genus *Lambis*, *Conus*, *Cypraea*, and *Cerethidea decollata* and *Terebralia palustris*. Cephalopods are squids, cuttlefish and octopus, which are also part of the diet in coastal zones.

The main groups of echinoderms include starfishes, holothurians and sea urchins. Holothurians, locally known as "magajojo" is a resource highly pressured where it occurs. Although is not part of the diet in Mozambique, it is collected and exported to Asian countries, where it is a luxury dish. The resource has already been depleted at Catembe and Inhaca Island (Macia, pers. com.), and is currently intensely exploited in Inhambane, Nampula and Cabo de Delgado (Hill, 2008,

Brycesson and Massinga, 2002). Commercial species identified are 10, which's distribution is hardly known (Fisher *et al.*, 1990).

Sea urchins occur associated to rocky habitats, seagrasses and coral reefs. *Tripneustes gratilla* is the only edible species in Mozambique and eastern African region (ref).

Reptiles (sea turtles)

Among the seven species of marine turtles, five occur along the Mozambican coast: *Caretta caretta* (Loggerhead turtle), *Lepidochelys olivacea* (Olive Ridley turtle), *Chelonia mydas* (Green turtle), and *Dermochelys coriacea* (Leatherback) and *Eretmochelys imbricate* (Hawksbill turtle). They occur mostly on the northern and southern parts of Mozambique, where sandy beaches, used as nesting sites, occur. Sea turtles have a complex life cycle, with migration between different foraging grounds and nesting sites. Loggerhead and Leatherback turtles have their most important nesting sites between Ponta do Ouro and Machangulo Peninsula, Inhaca Island, Qewene Peninsula (Cabo São Sebastião) and Bazaruto Archipelago. The Green turtle nests from Qewene Peninsula to Quirimbas Archipelago, with more important nesting sites at Ilhas Primeiras e Segundas. Nesting sites of Hawksbill and Olive Ridley are unknown, but adult individuals occur in the northern coast.

There is very few information on the distribution, biology and ecology of the sea turtles species occurring in Mozambique. The most complete qualitative study on marine turtles in Mozambique is that from Videira *et al.* (2008), and it provides information on nesting, marking and mortality of marine turtles. It covered seven points of known occurrence of marine turtles in northern and southern Mozambique. It also identified the main limitations on the studies of these reptiles in the country, and these are: (1) deficient data collection; (2) lack of human and financial resources; (3) the area covered by the studies is considerably small due to lack of resources and (4) the used methodologies are not uniform, therefore not allowing comparisons between different areas (Videira *et al.*, 2008). The Table 16 below resumes the number of nests identified in the 13 study sites during 2007/2008. It is important to note that these are the figures that were found. Real numbers of nests in this area must be considerably higher. Nests of the hawksbill turtle were found in Bazaruto Archipelago, Querimbas National Park, and Vamize and Rongui islands.

Table 16. Number of nests found in 13 study sites. Source: Videira *et al.*, 2008.

Area	Marine turtles species					Total
	<i>C. caretta</i>	<i>C. mydas</i>	<i>D. coriacea</i>	<i>E. imbricate</i>	Non identified	
Ponta d'Ouro – Ponta Malongane	60	–	3	–	31	94
Ponta Malongane-Ponta Dobela	165	–	20	–	–	185
Ponta Dobela – Ponta Chemucane	171	–	9	–	–	180
Ponta Chemucane – Santa Maria	31	–	7	–	24	62
Inhaca Island	40	–	15	–	–	55
Macaneta	–	–	–	–	1	
Manhiça	–	–	–	–	18	
Bilene	–	–	2	–	7	9
Cabo São Sebastião	1	–	–	–	1	2
Bazaruto Archipelago	1	–	1	1	7	10

National Park						
Primeiras and Segundas Islands	–	–	–	–	–	–
Quirimbas National Park	–	9	–	1	4	14
Vamizi and Rongui islands	–	–	–	5	–	5
Total	469	9	57	7	93	635

Marine mammals

Eighteen species of marine mammals occur along the Mozambican coast, and these are dolphins, whales, dugongs and seals.

Dolphins and whales occur along the whole coast, with more emphasis to south the Zambezi delta. There are seven species of dolphins, namely *Sousa chinensis*, *Tursiops truncatus*, *Stenella longirostris*, *S. attenuata*, *Dolphinus delphis*, *Steno bredanensis* and *Pseudorca crassidens*, the first two being the species more largely distributed. The greater populations of dolphins occur in Inhaca Island, Machangulo Peninsula and Bazaruto Archipelago (Coopinger & Williams, 1990; Best et al., 1991; Guissamulo 1996). Among the eight species of whales, three are migratory; those are *Megaptera novaeangliae*, *Balanoptera acutorostrata* and *Eubalaena australis*. The other species, less common, are *Pseudorca crassidens*, *Orcinus orca*, *Globicephala melas*, *Kogia breviceps* and *Feresa attenuata*.

Dugongs occur in the southern part of the country – Inhambane Bay (Linga-Linga) and Bazaruto Archipelago (Guissamulo, 1996; Coopinger and Williams, 1990).

The occurrence of one of the two species of seal (*Arctocephalus tropicalis*) is considered accidental, since it is usually found in much cooler waters in southern Cape. The other species is *Lobodon carcinophagus*.

2.3.2. Marine Red List Species

Protected marine species include sea turtles, dugongs, whales and dolphins. All marine mammals in Mozambique are species of special concern. Dugongs are seriously endangered, the population in Bazaruto Archipelago being probably the most viable population in eastern Africa region (MICOA, 2006). Up to 200 dugong were counted in 2007 in Bazaruto (Guissamulo, personal communication). Most species of whale that occur in Mozambique are under low risk, exceptions for *Megaptera novaeangliae* (vulnerable on a global scale) and *Feresa attenuate* (deficient data). On a global scale, the seven species of dolphin that occur in Mozambique are of least concern or have deficient data (www.iucnredlist.org).

One of the major threats to marine mammals is accidental catches by fisherman, especially when using shark, gill and trawl nets. When those animals are caught, accidentally or not, they are rarely returned to water, since their meat is highly appreciated (especially dugongs). Habitat degradation may also cause migration or mortality of sensitive species. Dolphins are sometimes found stranded on the beach, as it happened in 2006 in Bazaruto. Dolphin stranding phenomenon occurs elsewhere but its reasons are unknown. Sea turtles are occasionally caught by fisherman, mostly accidentally. Its meat is appreciated, and the carapace is used to produce ornamental articles (earrings, necklace and bracelets). The eggs when caught used as food. Sea turtles are used in traditional medicine as well, where people believe in its magic power to cure diseases and give longer life. Other threats to sea turtles include driving on beach, entanglement in fish nets and natural events (erosion, predation of eggs by ghost crabs) (MICOA, 1998). All the five sea-turtles species are protected by law (*Chelonia mydas* and *Dermochelys coriacea* are

critically endangered species in the IUCN red list). The only protected nesting sites are those ones located inside protected areas n MER, PNAB, QNP, Inhaca Island Forestry Reserve.

2.4. Freshwater biodiversity

Mozambique has several aquatic habitats, including rivers (about 100 basins with more than 50 km²), natural and artificial lakes, lagoons and swamps. The main rivers are (from north to south) Rovuma, Messalo, Lúrio, Ligonha, Licungo, Zambeze, Púngue, Búzi, Save, Limpopo, Incomati, Umbelúzi and Maputo. Excluding Licungo, Ligonha, Lúrio and Messalo, all the others are shared with other countries. The major natural lakes are Niassa and Chiúta, shared with Tanzania and Malawi, respectively. Cabora Bassa, Chicamba Real and Massingir are important artificial lakes (reservoirs) for fisheries production, where the most important species are tilapia and kapenta. Pequenos Libombos reservoir provides drinking water for Maputo and Matola cities, while reservoirs with great importance for agriculture include Massingir/Macarretane, Corumana, Pequenos Libombos and Chipembe. It is estimated that the demands for agriculture vary between 11.500 m³ to 12.000 m³ per ha/year, i.e., agriculture needs 1,2 million m³/year of water. Some coastal lagoons are important for tourism, such as Bilene and Nhambavale.

The Zambeze River is the fourth longest river in the African continent and the longest flowing into the Indian Ocean from Africa. The river rises in Zambia and flows through Angola, along the borders of Namibia, Botswana, Zambia and Zimbabwe to Mozambique. Two important power stations were built along the river basin – Cabora Bassa dam in Mozambique and Kariba dam in Zimbabwe. The river is also of great importance on the subsistence economy of the local communities (Davies, 1986; Bento, 2002).

Cabora Bassa dam is a typical example of how profoundly human transformation can affect a natural ecosystem. When it was constructed in 1973, the dam drastically reduced the river flow and inundation area. This led to a decrease of 40% of the mangrove forest, and other wetland ecosystems upstream are also reducing gradually (Bento and Beilfuss, 2003).

The river and its tributaries (Kabompo, Lungwembung, Cuando, Kafue, Lwangwa, Luenha and Chire) show a high faunal diversity. The hippo's *Hippopotamus amphibious* are very abundant, so do crocodiles (*Crocodylus niloticus*) and other reptiles. Avifauna is rich, and includes herons (*Ardea melanocephala*), flamingos (*Ixobrychus sturmii*), pelicans (*Anhinga rufa*), docks (*Plectropterus gambiensis*), storks (*Leptoptilus crumeniferus*), and the African fish eagle (*Haliaeetus vocifer*) (Bento and Beilfuss, 2003). The riparian vegetation also supports a wide variety of large mammals, such as zebras, buffalos, giraffes and elephants. However, with the dam construction and control of the annual floods, the natural habitat of these animals is reducing with the correspondent reduction on the population size.

The Zambezi is also habitat for hundreds of fish species, some endemic of the river. Important species include the Cichlids which are caught for food, the cat fish (super-order Ostariophisi), tiger fish (*Hydrocynus vittatus*) and other species. The bull shark (*Carcharhinus leucas*), also known as Zambezi shark, is a cosmopolitan species normally found in coastal waters, but also upstream in big rivers such as the Zambezi. It is an aggressive species and responsible for many human attacks.

The Rovuma River makes the border between Mozambique and Tanzania. It rises close to Niassa Lake and flows to the Indian Ocean. The river has the following tributaries: Lukimva, Muhuwesi, Lumesule in the Tanzanian side; and Messinge, Lucheringo, Lussanhando, Chiulezi and Lugenda in the Mozambican side.

Limpopo River is the second major river in southern Africa with 1750 km. It borders South Africa, Botswana and Zimbabwe, flowing to the Indian Ocean through Gaza province in Mozambique. This river and its tributaries show great seasonality and some tributaries are even just episodic (Ashton et al., 2001).

The Limpopo flow is inter- and intra-annually very variable. Many wetlands are found distributed in swampy zones along the river: for instance, the swamps in the confluence between Limpopo and Elefantes rivers and the floodplains in the confluence between the Limpopo and Changane rivers (Brito et al., 2003). Halophytic communities in the interior also occur along the Changane River, vegetation being composed of succulent species such as *Arthrocnemum* sp., *Chenolea*, *Salicornia*, *Atriplex* and *Sueda*, etc. The ichthyofauna of the Limpopo is rich, with at least 11 families and 26 species. Some are of important for fisheries and local economy, such as *Barbus* spp., *Clarias* spp., *Tilapia rendalii*, *Oreochromis mossambicus*, etc.

The Incomati River rises in Transvaal province, South Africa, and crosses Mozambique through Ressano Garcia, flowing to the Indian Ocean (Rafael, 2002). Its tributaries are the Sabie, Mazinchopes, Uanetse, Bobole and Incoluane. Incomati is one of the major rivers in southern Mozambique. The river is shared by South Africa (64%), Mozambique (31%) and Swaziland (5%).

The presence of invasive macrophytes along the course of the Incomati represents a potential impediment to local transport and fisheries, and limits the available amount of drinking and irrigating water. The water hyacinth (*Eichhornia crassipes*) is one of the most problematic species. This plant forms dense mats that cover the river bed and affect the biodiversity, by reducing the amount of water and oxygen for other organisms. However, it also provides habitat to a numerous macrofauna that grows under the extensive roots (mollusks, annelids and insects) (Mello et al., 2003, cited by Rodolfo, 2007). The development of other aquatic invasive species, such as *Pistia stratiotes*, *Azolla filiculoides*, *Ludwigia stonolifera* and *Myriophyllum spicatum* may be related to the low motion of the river waters, which allows these plants to anchor in the bottom (Rodolfo, 2007).

The Save River rises in Zimbabwe, flows south and crosses Mozambique from west to east to the Indian Ocean. It divides Mozambique into two distinct ecological marine regions, though terrestrial ecosystems remain similar in the north and south. However, the mountain forests found north Save are distinct from those found south Save.

Niassa Lake is located between Mozambique, Malawi and Tanzania, in the latitudes 9°30' and 14° 30' S and longitudes 34°51' and 34°57' E. The altitude is of approximately 500 meters above sea level (Eccles, 1974). This lake is one of the numerous fresh water lakes in the Rift Valley System representing rare habitats of global importance.

Emergent macrophytes (*Phragmites mauritianus*) are part of the flora in the lake. The fauna is constituted by zooplankton: copepods (*Mesocyclops leuckart*) and Cladocera (*Diaphanosoma excisum*, *Bosmina longirostris*, *Diatomus* sp) and several species of fish (Table 17).

The Chiúta Lake is a shallow lake (maximum depth of 2.7 m), located on the border between Malawi and Mozambique, in latitude 15°20 'and 35°40 South' east, 622 meters above sea level (Agnew, 1979, Lancaster, 1979).

The flora of Lake Chiúta is quite diverse, and, according to Howard-Williams (1979), consists of macrophytes: emergent species (*Typha domingensis*, *Aeschynomene pfundii*, *Cyperus alopecuroides*, *Vossia cuspidata*), floating species (*Nymphaea caerulea*, *Pistia stratiotes*), submersed species (*Ceratophyllum demersum*, *Utricularia* spp.) and phytoplankton, such as *Oscillatoria* sp., *Trachelomonas* spp., *Spirogyra euglena*, *Phacus* sp., *Cyclotella* sp., *Nitzsche* sp., *Anabaena* sp., *Scenedesmus quadricauda* and *Peridinium* sp. (Moss, 1979). The fauna in Lake Chiúta is composed of Zooplankton (*Diaphanosoma excisum*, *Tropodiatomus kraepelin*, *Daphnia barbata*, *Micrura moina*, *Ceriodaphnia cornuta* and *Mesocyclops leukarti* (Kalk, 1979); benthic invertebrates (*Nilodrum brevibucca*, *N. brevipalpis*, *Ecnomus* sp., *Dipseudopsis* sp., *Lanistes ovum*, *Bulinus globosus* and *Biomphalaria* sp. (McLachlan, 1979); and fish (*Barbus paludinosus*, *Claris gariepinus*, *Sarotherodon shiranus chilwae*, *Haplochromis callipterus* and *Hemigrammopetersius barnardi* (Furse et al., 1979a).

The lake has great importance for the local communities, as fishing is the main source of livelihood (Furse et al., 1979b). Also many species with economical value, such as rice, maize and tobacco, are grown in the seasonally inundated areas within the lake basin.

The Bilene Lagoon or Uembje coastal lagoon is located in Gaza province, between latitudes 25°17'27"S and 33°16'48"E. This lagoon is about 16 km long and 2-3 km wide, and is part of a long string of coastal lagoons in the south of the Save river, between the provinces of Maputo and Inhambane. The water is brackish as a result of the mixture of fresh water that runs down from several small rivers and salty water, coming in from the Belacuine channel that establishes a non-permanent communication with the open sea. The main problem distressing the ecosystem is the siltation of the channel, which occurs from time to time. This process is gradually diluting the brackish water into fresh, affecting negatively the existence of many marine species. It is also lowering the quality of water due to stagnation, and the beach is gradually being colonized by halophytes. This not only affects the development of tourism, but also other economic activities that depend on the pond (MICOA, 1999).

According to De Sales (2000), fish species diversity is very high, and the families best represented in terms of number of species are Carangidae, Leiognathidae, Sparidae and Lethrinidae.

Fishing is an important economical activity. Captures are dominated by *Pomadasys commersonii*, *P. maculatus*, *Caranx sexfasciatus*, *Ephinephelus sp.* and *Scomberoides commersonianus* (MICOA, 1999). *Oreochromis mossambicus* is an important freshwater species.

The Cahora Bassa Artificial Lake and dam is located in Tete province and was built in the middle course of the Zambezi River, between the latitudes 15°29' and 16°00' S and longitudes 30°25' and 32°44' E, 314 meters above sea level (Bernacsek & Lopes, 1984; Mafuca, 2000). It has a surface area of 2,600 km², approximately 246 km long and a maximum width of 39, 8 km. Average depth is 18,5 m (Mafuca, 2000).

Differently from the rest of Tete province, which has two distinct seasons in a year, Cahora Bassa has 3 seasons: the rainy season, which runs from November to April; the cold and dry season, which runs from May to August; and the hot and dry season which runs from September to November (Vostradovsky, 1984). Although more data is needed to sustain the 3-season climate regime of Cahora Bassa, it is believed that the microclimate is a result of the imposition of a new ecosystem and increased rates of evaporation that affected all other aspects of the climate of the area.

The dam is divided into seven sub-basins: Zumbo, Messenguezi, Carinde, Mucanha, Mague, Chicoa and Garganta (Mafuca, 2000). Due to the characteristics of each sub-basin, but mostly to logistic issues, nearly all studies have been conducted in only Garganta, Chico and Mague, the last two very shallow and productive. .

Cahora Bassa dam was designed to be the largest producer of hydroelectric power, producing about 4000 mega watts, which is used to supply domestic needs and is also exported to South Africa and Zimbabwe (Beadle, 1981). When the dam was being built, fisheries were not considered a priority, but it soon became an activity with great potential and great economic importance to the local community's subsistence.

Artisanal fishery potentially catches 4,000 tonnes of fish/year (Vostradovsky, 1984; Marshall 1994). Semi-industrial fishing was primarily devoted to kapenta (*Limnothrissa miodon*, Boulenger 1906), a pelagic species from Lake Tanzania introduced to Lake Kariba around 1967-1968 (Marshall, 1994). It is believed that this species has been dragged up to Cahora Bassa (Mafuca, 2000), and, once adapted to the lake conditions, it reproduced quickly, supporting in the last years catch estimates of 20000 tones per year (Mafuca, 2005).

Fish diversity seems to be reducing since the construction of the dam (Jackson & Rogers, 1976; Bernacsek & Lopes, 1984; Vostradovsky, 1984; Marshall, 1994; Cabanelas, 2005). The reduction could be explained by changes in the natural conditions of the lake that occurred when the system was turned from lotic to lentic (Lowe-McConnel, 1975; Merona et al., 2003). The introduction of invasive species threatens the general stability of the ecosystem, and can result in extinction by competition or hybridization (Shneider, 2003). It is possible that *Oreochromis niloticus*, a species introduced accidentally in the 2000 floods, is having this effect in the lake (Mafuca, 2001).

The zooplankton of the Lake is not known in detail, though 3 families have already been identified (Cladocera, Copepoda and Rotifera). The lake is surrounded by typical vegetation, which includes Mojave (forests and shrubs dominated by *Colophospermum mojavae*) and baobab (*Adansonia digitata*). Floating species are *Eichhornia crassipes* and *Salvinia molesta*. The phytoplankton is quite diverse, and predominant species are diatoms (*Melosira* spp., *Synedra* sp.), Blue-green algae (*Eudorina* sp., *Tetrastrum* sp., *Scenedesmus* sp., *Mycrocystis* sp., *Sphaerocystis* sp., *Anabaena* sp., *Oscillatoria* spp., *Lyngbya* sp.) and flagellates (*Trachelomonas* sp.).

The Chicamba Real Artificial Lake is a subtropical artificial lake that resulted from the construction of Chicamba Dam in the midcourse of Revue River. The hydroelectric dam is situated in the coordinates 19°08'S and 33°08'E (Weyl & Hecht, 1999; Weyl, 2007), with an altitude of 625 m above sea level (Weyl & Booth, 1999). The main tributary of Chicamba Lake is the Revue River which rises near the border with Zimbabwe, 17.5 km northwest of Manica city. Other tributary rivers are Zonué, Mupandeia, Bonde, Dupodzi and Messica.

Climate is warm and humid from December to April (flood season) and cooler and dry from May to December (drought season). The substrate is muddy and there are still some traces of the previous vegetation (submerged trees). Phytoplankton is sparse and poor in species diversity. The main taxonomic groups are: Cyanophyceae (*Anabaena* sp., *Chroococcus* sp., *Microcystis* sp.), Diatomophyceae (*Fragilaria* sp., *Aulacoseira* sp.), Dinophyceae (*Ceratium* sp.), Chlorophyceae (*Scenedesmus* sp., *Staurastrum* sp.) and Chrysophyceae (*Centritactus* sp.). Chicamba and its tributary rivers have no floating or rooted aquatic macrophytes. Exception is the Revue River that has less than 5% of the area covered by native water lily (*Nymphaea* sp.).

The Massingir artificial Lake is located southeast of Gaza province, southern Mozambique, in the latitude 23°55'22" S and longitude 32°02'48" E. With a total area of 109.0 km², the lake resulted from the construction of Massingir Dam on the Elephants River between 1972-1977, for water storage, hydroelectric power production and flood control downstream. The reservoir of Massingir is one of the most important water storage structures in southern Mozambique (Norplan, 1993). The main tributaries are the Elephant's River, Machampana and Chilalane rivers (Norplan, 1993).

The reservoir is habitat for birds (e.g. *Ardea melanocephala*, *Anhinga rufa*, *Plectropterus gambiense*, *Haliaeetus vocifer*), hippopotamus (*Hippopotamus amphibious*) and crocodiles (*Crocodylus niloticus*). The vegetation in the edges is composed by herbaceous species. Small trees of *Colophospermum mopane*, *Commiphora* spp, *Terminalia prunioides* and various types of acacia are dominant in the slopes of the banks around the lake (Norplan, 1993).

There are several species of phytoplankton found in the lake, including: Cyanophyceae (*Anabaena* spp., *Anabaenopsis* spp., *Microcystis aeruginosa*, *Cylindrospermopsis curvispora*, *Phormidium* sp., *Oscillatoria* sp., *Chroococcus* sp.), Chlorophyceae (*Pediastrum duplex*, *Staurastrum* spp., *Scenedesmus* sp.), Diatomophyceae (*Aulacoseira granulata*, *Fragilaria* sp., *F. crotonensis*, *Cyclotella* sp., *Melosira* sp., *Stephanodiscus* sp.) and Dinophyceae (*Ceratium brachycerus*, *Peridinium* sp., *Gymnodinium* sp.).

The zooplankton is represented by the following taxa: Rotifera (*Hexarthra spp.*, *Trichocerca spp.*, *Keratella cochlearis*, *Keratella quadrata*, *Keratella tropica*), Copepoda (*Nauplii*, *Copepoditos* and *Mesocyclops sp.*) and Cladocera (*Bosmina sp.*).

About thirty species of fish were identified in Massingir. Tilapia is both the predominant and main target species for fishery. These species became important for the local communities, because it is an extra-source of animal protein.

Pequenos Libombos dam is located in Maputo province, close to the southern border of Mozambique, between the latitudes 25°40' and 26°20'S and the longitudes 32°12' and 32°20'E (Mussagy, 1990). It was built in 1983-1987, in the lower basin of the Umbeluzi, and its major tributaries are Umbeluzi, Maputo and Calichane rivers (Mussagy, 1990). The climate is a hot and wet between October and March, and cool and dry between April and September. Mean temperature varies between 15°C and 25°C. Other data are: surface area 42 km²; average depth 10.5 m; average volume 307*10⁶ m³ (Mussagy, 1990).

Pequenos Libombos was built to ensure a regular supply of water to Maputo city, provide water for irrigation, flood control and production of hydroelectric power (Hatton et al., 1993). Fishery is a minor activity in the lake (Chaucer, 1998).

According to Mussagy (1990) and Chaúca (1998), phytoplankton species in the lake are: Cyanophyceae (*Microcystis spp.*, *Cylindrospermopsis sp.*, *Merismopedia sp.*, *Anabaena sp.*, *Phormidium sp.*, *Cyanodictyon imperfectum*), Diatomophyceae (*Aulacoseira spp.*, *Cyclotella spp.*, *Fragillaria sp.*), Dinophyceae (*Peridinium sp.*, *Ceratium sp.*), Cryptophyceae (*Cryptomonas sp.*), Euglenophyceae (*Trachelomonas sp.*) and Chlorophyceae (*Pediastrum sp.*, *Scenedesmus spp.*, *Tetraedron sp.*, *Closterium sp.*, *Staurastrum spp.*). The taxonomic groups of zooplankton are: Copepods (*Cyclopoida*, *Calanoida* and *Nauplii*), Cladocera (*Ceriodaphnia spp.*, *Diaphanosoma spp.*, *Moina sp.*), Rotifera (*Hexarthra spp.*, *Keratella spp.*, *Trichocerca spp.*, *Cephalodella spp.*, *Dutera spp.*), Ctenophore and Protozoa (*Cyclidium spp.*) (Lindberg & Liras, 1997; Chaúca, 1998).

Table 17. Common fresh water fish species.

Fish	Massingir	Chicamba real	Cahora Bassa	Niassa
<i>Anguilla mossambica</i>	x			
<i>Anguilla marmorata</i>		x		
<i>Brycinus imberi</i>	x			
<i>Clarias gariepinus</i>	x	x	x	
<i>Clarias ngamensis</i>	x			
<i>Tilapia rendalli</i>	x	x	x	x
<i>Synodontis zambezensis</i>	x		x	
<i>Schilbe intermedius</i>	x		x	
<i>Oreochromis spp</i>	x	x	x	x
<i>Labeo congoro</i>	x		x	
<i>Labeo ruddi</i>	x			
<i>Labeo altivelis,</i>	x		x	
<i>Labeo cylindricus</i>		x		
<i>Labeo mesops</i>				x
<i>Labeo molybdinus</i>	x	x		
<i>Cyprinus carpio</i>	x	x		
<i>Distichodus mossambicus</i>	x			
<i>Glossogobius shirensis</i>	x			

<i>Hydrocynus vittatus</i>			X	
<i>Barbus trimaculatus</i>		X		
<i>Barbus radiates</i>		X		
<i>Barbus lineomaculatus</i>		X		
<i>Micropterus salmoides</i>		X		
<i>Brycinus imberi</i>			X	
<i>Brycinus lateralis</i>			X	
<i>Mormyrus longirostis</i>			X	
<i>Mormyrops anguilloides</i>			X	
<i>Cyphomyrus discorhynchus</i>			X	
<i>Distichodus shenga</i>			X	
<i>Limnothrissa miodon</i>	X		X	
<i>Sargochromis spp</i>			X	
<i>Serranochromis condrictonii</i>			X	
<i>Pseudocrenilabrus philander</i>			X	
<i>Pharyngochromis acuticeps</i>			X	
<i>Opsaridium microcephalus</i>				X
<i>Varicorhinus nyassensis</i>				X
<i>Bagrus meridionalis</i>				X
<i>Bathyclarias sp</i>				X
<i>Haplochromis spp</i>				X
<i>Lethrinops sp.</i>				X
<i>Pseudotropheus sp.</i>				X
<i>Labidochromis sp.</i>				X
<i>Labeotropheus sp.</i>				X
<i>Serranochromis thumbergi</i>				X

Implications of changes of biodiversity on human well-being

The notion of loss of biodiversity is in a higher and accelerated pace today than in the past, and that is due to accelerated growth of human population (UNEP, 2007). If the current rent of population growth was to continue, around the year 2030 Mozambique could have a population of about 30 million (Macamo and Bandeira, 2008).

In Mozambique, it is evident the conversion of forests into cultivated land, the fragmentation of river basins to build dams, deterioration of habitat due to floods and droughts, and, as in other countries, loss of genetic diversity of major crops with negative impacts on food security that have not been quantified. All this are not simple artifacts. The flora is lost because men uses it as source for domestic fuel (Burgess and Clark, 2000; Izidine and Bandeira, 2002) and in some cases it yields the industrial development (Izidine & Bandeira, 2002), other due to traditional agriculture (Izidine & Bandeira, 2002) and even for human settlements and urbanization (Izidine & Bandeira, 2002). Revisiting other groups of biota, we conclude that is the very man who damages an environment that should be good to himself: hunting and burning he reduces the large mammals population (Ntumi et al., 2008), destroys forests and kills birds (Parker , 1999; & Beilfuss Benedict, 2003); applies poisons to protect crops from insects and problematic animals (Parker, 1999; & Beilfuss Benedict, 2003), over-exploites the marine resources, uses destructive fishing gear (MICOA, 2003), and destroys mangroves, particularly for the building (Macamo and Bandeira, 2008).

All of the above shows that men are to use the ecosystem to get resources for their welfare – the flora, mammals, birds, fish, coral, just to name a few have a socio-economic role for humans. The fish, crustaceans, mollusks and echinoderms are part of the diet of communities (Fisher et

al., 1990); the turtles have medicinal value, its meat is much appreciated (MICOA, 1998), the carapace is used for ornamentation and adornment (MICOA, 1998) and the eggs serve as food.

But the benefits of biodiversity for humans consist of simple raw materials (MA, 2005). Therefore, loss of biodiversity has negative effects on many aspects of welfare. Just remember that, as the examples cited above show, the biodiversity is crucial to food security of many Mozambicans, and its loss would increase the vulnerability of the country to natural disasters, reduce energy security, and reduce access to clean water, deteriorate health and affect social relationships (MA, 2005).

The energy crisis will also probably affect the biodiversity. The race for oil in the basins of the Zambezi and Rovuma, the mining concessions in Tete, Cabo Delgado and Nampula provinces, the new hydroelectric dams (Cahora Bassa - North, Mpanda Nkua and other), industries of timber and charcoal and recent race to bio-fuels are all necessary for human development in the short and medium term. The lessons of the past indicate that in many parts of our planet, environmental changes caused by humans on ecosystems changed patterns of disease in society and resulted in increased pressure on the standards of human welfare. This is because loss of genetic diversity and fragmentation increase the probability of outbreaks of various diseases. For the sad fate of man is the biodiversity that is the cure of many of these diseases. Worse than that, the majority of the population of Mozambique lives in rural areas of traditional medicine. The UNEP, in 2007 estimated that between 2002 and 2003, 80 percent of new chemicals introduced as drugs worldwide may have been inspired or developed from natural products (UNEP, 2007).

The loss of cultural values, spiritual and traditional knowledge and practices due to a reduction of biodiversity is also a problem that affects the welfare of people in Mozambique. The loss or reduction of the values mentioned can cause enormous pressure, over-use of resources and conversion of land for new crops to replace the food system and current practices.

Chapter II – Current status of Implementation of National Biodiversity Strategy and Action Plan (NBSAP)

Description of NBSAP

The National Biodiversity Strategy and Action Plan was approved in 2003 by the Mozambican Government. This strategy defines: i) the guidelines for conservation of biodiversity and sustainable use of biological resources; ii) the strategic objectives and activities to be realized and iii) the goals to be achieved until 2010.

The NBSAP has the following objectives:

1. Fulfill the requirement of the article 6 of the Convention on Biological Diversity (CBD) that appeals to the parts to develop national strategies that reflect the measures defined in the convention.
2. Identify issues that need national priority actions and that need immediate efforts coordination.
3. Have a basic tool that help the government agencies and the society to assure that all government policy plans related to biological diversity are realized, specially through efforts to coordinate relevant sectorial policies, programs and strategies.

The strategic objectives included in NBSAP were developed based on the above listed objectives. Therefore the NBSAP is specially designed to achieve the following strategic objectives:

- Conservation of the country's biological resources, based on knowledge, research, and rehabilitation and strengthening of the conservation areas as well as conservation measures extended to fragile or important ecosystems.
- Sustainable use of biological resources, through reinforcement of inspection measures, change of attitudes and practices harmful to biological resources, promotion of use of sub-products derived from natural resources, observation of genetic viability, enforcement of institutional coordination, control on introduction of invasive species, capitalization of the use of natural resources specially wildlife, marine, and coastal resources to improve economic and social status of the country.

These strategic objectives were designed to respond to the articles 6 and 7 of the Convention on Biological Diversity (CBD)

There are several priority activities included in NBSAP. Priority activities as well as other activities defined under the NBSAP contribute to the implementation of some of the articles of the Convention on Biological Diversity (CBD), namely articles 7, 8, 9 e 10. Article 7 of the CBD deals with the identification and monitoring of biological diversity important to conservation and sustainable use, and the processes and activities with adverse impacts on biological diversity; article 8 and 9, are related to the promotion and reinforcement of the *in situ* and *ex situ* conservation respectively; and article 10, deals with sustainable use of the biological diversity.

Priority activities/ main activities defined under the NBSAP

1. Obtention of a political and institutional commitment to achieve the objectives of this strategy.
2. Promotion of coordination efforts among and within institutions in order to assure a better organization and implementation of the actions proposed in the action plan of the NBSAP.
3. Identification of the components of biological diversity (updated and/or new data).
4. Promotion and establishment of an information system regarding the current status of the components of biological diversity.
5. Establishment of protection measures for sensible natural habitats e/or endangered species, including if necessary recommendations of new areas to be protected.
6. Reinforcement of the inspection on informal and formal exploitation of natural resources, covering features related to human, material and financial resources.
7. Monitoring of biological diversity, especially in areas under exploitation, using a system of criteria and indicators to monitor biological diversity.
8. Valuation of natural resources, evaluation of the costs related to utilization of natural capital and incorporation of the costs and benefices into national accounts.
9. Promotion and valuation of the role of research into information production and decision making processes about natural resources utilization.
10. Community management of natural resources and valuation of traditional knowledge (intellectual property).
11. Conservation of plants and animals genetic resources.
12. Control and knowledge of GMO and potential invasive species, which are capable of harming the biological diversity.
13. Creation of conditions to improve the well being of people throughout the exploitation and sustainable use of natural resources.
14. Simplification and dissemination of the NBSAP.

Global and National targets and indicators and the NBSAP

Mozambique Strategy and Action Plan for Biodiversity were produced to fulfill the 6th article of the Convention which advises countries to develop strategies that incorporate measures adopted under the CBD.

Global targets and indicators adopted under the convection were used to develop the NBSAP (Table 18) however national targets and indicators developed under the NBSAP are not numerical; therefore it is difficult to evaluate the progress of some of the activities proposed in NBSAP.

Table 18. below shows the incorporation of targets and indicators on NBSAP

Goals	Indicators	Incorporation of targets and indicators on NBSAP
Protection of 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	<ul style="list-style-type: none"> Coverage of protected areas Trends in extent of selected biomes ecosystems and habitats Trends in abundance and distribution of selected species 	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.1, 1.2, 1.4, 1.5 and 1.7 of NBSAP.
Target 1.2: Areas of particular importance to biodiversity	<ul style="list-style-type: none"> Trends in extent of selected biomes, ecosystems and habitats Trends in abundance and distribution of selected species Coverage of protected areas 	
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	<ul style="list-style-type: none"> Trends in abundance and distribution of selected species Change in status of threatened species 	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.2, 1.4, 1.5 and 1.7 of NBSAP.
Target 2.2. Status of threatened species improved	<ul style="list-style-type: none"> Change in status of threatened species Trends in abundance and distribution of selected species Coverage of protected areas 	
Goal 3. Promote the conservation of genetic diversity		
Target 3.1: Genetic diversity of crops, livestock, and harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained	<ul style="list-style-type: none"> Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socio-economic importance <i>Biodiversity used in food and medicine (indicator under development)</i> Trends in abundance and distribution of selected species 	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.3, 1.5, 2.1 and 2.2 of NBSAP.
Promote sustainable use		
Goal 4. Promote sustainable use and consumption		
Target 4.1: Biodiversity –based products derived from sources that are sustainably managed, and production areas managed consistent with the conservation of biodiversity	<ul style="list-style-type: none"> Areas of forest, agricultural and aquaculture ecosystems under sustainable management <i>Proportion of products derived from sustainable sources (indicator under development)</i> Trends in abundance and distribution of selected species Marine trophic index Nitrogen deposition Water quality in aquatic ecosystems 	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 2.1 and 2.4 of NBSAP. No national targets and indicators are defined for Marine trophic index, nitrogen deposition and water quality in aquatic ecosystems in NBSAP
Target 4.2: Unsustainable consumption of biological resources, or that impacts upon biodiversity, reduced	<ul style="list-style-type: none"> Ecological footprint and related concepts 	No national targets and indicators are defined in NBSAP for the target 4.2
Target 4.3 No species of wild flora and fauna endangered by international trade	<ul style="list-style-type: none"> Change in status of threatened species 	No national targets and indicators are defined in NBSAP for the target 4.3
Address threat 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	<ul style="list-style-type: none"> Trends in extent of selected biomes ecosystems and habitats Trends in abundance and distribution of selected species 	Some national targets and indicators to fulfill this Goal are defined under the strategic objective 1.7 of

	<ul style="list-style-type: none"> Marine trophic index 	NBSAP. No national targets and indicators are defined in NBSAP for Marine trophic index
Goal 6. Control threats from invasive alien species		
Target 6.1. pathways for major potential alien invasive species controlled	<ul style="list-style-type: none"> Trends in invasive alien species 	Some national targets and indicators to fulfill this Goal are defined under the Strategic objective 1.8 of NBSAP.
Target 6.2 Management plans in place for major alien species that threaten ecosystems, habitats or species	<ul style="list-style-type: none"> Trends in invasive alien 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	<ul style="list-style-type: none"> Connectivity/fragmentation of ecosystems 	No national targets and indicators are defined in NBSAP for this goal
Target 7.2 Reduce pollution and its impacts on biodiversity	<ul style="list-style-type: none"> Nitrogen deposition Water quality in aquatic ecosystems 	
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 and services maintained	<ul style="list-style-type: none"> <i>Biodiversity used in food and medicine (indicator under development)</i> Water quality in aquatic ecosystems Marine trophic index Incidence of Human-induced ecosystem failure Trends in invasive alien species 	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.8, 2.1, 2.3 and 2.4 of NBSAP. No national targets and indicators are defined in NBSAP for Marine trophic index
Target 8.2. biological resources that support sustainable livelihoods, local food security and health care, especially of poor people maintained	<ul style="list-style-type: none"> Health and well-being of communities who depend directly on local ecosystem goods and services <i>Biodiversity used in food and medicine</i> 	
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.	<ul style="list-style-type: none"> Status and trends of linguistic diversity and numbers of speakers of indigenous languages <i>Additional indicators to be developed</i> 	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 2.1, 2.3 and 2.6 of NBSAP.
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	
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		
Target 10.1. All access to genetic resources is in line with the Convention on Biological Diversity and its relevant provisions	<i>Indicator to be developed</i>	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.8, 2.1, 2.3 and 2.4 of NBSAP.
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	<i>Indicator to be developed</i>	

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	<ul style="list-style-type: none">• Official development assistance provided in support of the Convention	No national targets and indicators are defined in NBSAP for this goal
Target 11.2 Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph 4.	<i>Indicator to be developed</i>	

Current status of implementation of international Goals, targets and indicators

The main achievements within the country to fulfill the national and international targets and indicators include:

- Increase in coverage of protected areas from 11% in 1995 to 16% in 2008
- Extension of coastal forest due to gazetment of QNP in Northern part of the country
- Coastal forests and Inselberg areas recognized as potential areas with specific biodiversity.
- Wildlife utilization areas have increased in recent years.
- Creation of Ethnobotany Center.
- Regulation of aquaculture activities to protect mangroves trees.
- Regulation on Traditional medicine approved in 2004 which protect and promote the traditional knowledge
- Creation of new conservation areas: Great Limpopo TFCA, QNP, Chimanimani TFCA, Marromeu Complex which is a Ramsar site.
- Some new areas of importance to protected biodiversity are in advanced stage of establishment including: Lake Niassa, Ponta d'Ouro and Primeiras e Segundas Islands.
- Identification of some areas of high biodiversidade that should be under special attention such as (SMEC International, 2001 cited by USAID, 2008): the Gorongosa Mountain - Rift Valley Complex; the Cheringoma Plateau; the Zambezi Delta Grasslands and Swamps; the Great Inselberg Archipelago; the Chimanimani Massif; the Maputaland CE; Coastal Barrier Lakes and Pebane Evergreen Coastal Forests
- Conservation and aerial monitoring of the dugong populations in PNAB
- Conservation and marking of turtles;
- Replanting of the African potato (*Hypoxis hemecrocalidea*).

Progress in the implementation of priority activities

Priority Activity	Level of implementation	Facilities	Gaps/obstacles founds
<p>1 - Obtention of a political and institutional commitment to achieve the objectives of this strategy</p> <p>2 - Promotion of coordination efforts among and within institutions in order to guarantee a better organization and implementation of the actions proposed in the action plan of the NBSAP.</p>	<ul style="list-style-type: none"> - Integration of issues related to biodiversity in government public policies (PG, PARPA and PES) and in different provincial and district sectorial plans - Approval of several environmental policies and laws 	<ul style="list-style-type: none"> - Establishment of the working group for biodiversity coordinated by the Focal point of CBD. - Establishment of National Council for sustainable development (CONDES) with a mandate to promote and coordinate sustainable use of natural resources at different sectors of government - Establishment of environment units in Ministry of Agriculture, Ministry of Energy, Ministry of Mineral Resources, Ministry of Public Works and Ministry of Health. - Establishment of focal points for environmental issues in some Ministries. 	<ul style="list-style-type: none"> - Establishment of priorities of environmental policies are nor specific neither clear (Cabral & Francisco, 2008) - Low level of coordination and articulation among different institutions - Lack of definition of priorities during budgeting of different activities - Weak implementation of current legislations and policies - Weak technical and financial capability to enforce the current legislation. - Limited sharing of information related to biodiversity among institutions - Lack of systematization of the country's biodiversity information
<p>3 - Identification of the components of biological diversity (updated and/or new data).</p>	<ul style="list-style-type: none"> - Several biodiversity studies were realized in the country, covering some ecosystems and taxa. Examples of some of those studies are: Parker, 2001; Parker, 2005 and Spottiswoode <i>et al.</i>, 2006; who carried out studies about birds. Stanwell-Smith <i>et al.</i>, 1998; Whittington <i>et al.</i>, 1998; Gell & Whittington, 2002 and Hill, 2008, who carried out studies on marine Biodiversity of Northern Mozambique. Da Silva <i>et al.</i>, 2004, who listed the county's vascular plants using herbarium collections. Bandeira <i>et al.</i>, 2007, who studied the vegetation of Quirimbas National Park. Timberlake <i>et al.</i>, 2007 e Spottiswoode <i>et al.</i>, 2006, who studied plant and animal biodiversity of Chiperone Mount. Gibson, 2000; Craig & Gibson, 2002; Craig & Gibson, 2004, who inventoried the wildlife of Niassa Reserve and surrounding areas. 	<ul style="list-style-type: none"> - Establishment of three centers for sustainable development (CDS) located in: southern part of the country (Xai-Xai, deals with issues related to costal zones), Central part of the country (Manica, deals with issues related to conservation and management of natural resources) and in northern part of the country (Nampula, deals with issues related to urban environment). These centers perform research activities, project implementation and technical help about environmental issues at provincial and district level. - Establishment of Marine and Costal Research Center in Pemba. 	<ul style="list-style-type: none"> - Limited sharing of information related to biodiversity among research institutions that can result in duplication of efforts - Limited geographical and ecosystem covering of the studies realized. Some parts of the country and some ecosystems were not covered by the studies - Lack of systematization of information about biodiversity studies realized in the country.
<p>4 - Promotion and establishment of an information system regarding the current status of the components of the biological diversity.</p>	<ul style="list-style-type: none"> - Establishment of databases with biodiversity information in some institutions. One of the examples is the database created under TRANSMAP project. - The IIAM website also has some information about some biodiversity studies carried out by that institution. 	<ul style="list-style-type: none"> - MICOA website has several conventions protocols and other documents related to the conservation of biodiversity - Establishment of the Biodiversity Unit at MICOA 	<ul style="list-style-type: none"> - Lack of centralization of the biodiversity information in one institution, (biodiversity information is spread throughout several institutions). As solution it is proposed the establishment of a central database to store all biodiversity information. This database should be located in MICOA.
<p>5 - Establishment of protection measures for sensible natural habitats e/or endangered species, including if necessary recommendations of new areas to be protected.</p>	<ul style="list-style-type: none"> - Increase in percentage of protected areas from 11% to 16% with the creation of new national parks and reserves including marine and costal areas. - Establishment of new conservation areas such as: Quirimbas National Park to conserve marine and costal ecosystems, Limpopo National Park and Chimanimani National Park. - Proclamation of new TFCA areas (Libombos, Great Limpopo, Chimanimani) - Restoration of Gorongosa National Park. - Proclamation of Marromeu complex (Marromeu Reserve and 4 hunting areas) as Ramsar site. - Proposals for the establishment of new conservation areas in Niassa Lake, and in Primeiras e Segundas Islands. - Proposal for the creation of a new TFCA in: Rovuma (linking 	<ul style="list-style-type: none"> - Elaboration of a proposal of the "conservation policy". - Definition of criteria to define conservation areas in order to isolate local people. - Establishment of the "Conservation Fund". - There is political will by the government to establish measures to protect biodiversity. - Development of partnership models between government and private sector/foundations to co-manage and co-finance some conservation areas such as the case of Niassa Reserve and Gorongosa National Park. 	<ul style="list-style-type: none"> - Limited technical and financial resources. - Lack of update of the country's Red Data Lists of different organisms. It is proposed the revision of current country's Red Data Lists using the new information produced by the recent studies carried out in the country.

	Mozambique and Tanzania), Zimoza (linking Mozambique, Zimbabwe and Zambia) - Proposal to proclaim Ponta do Ouro area as a marine conservation area and world heritage site.		
6 - Reinforcement of the inspection on informal and informal exploitation of natural resources, covering features related to human, material and financial resources.	- Training of conservation areas inspectors	- Training courses offered by National Directorate for Conservation Areas (DINAC) - TFCA projects that help reinforce institutional and financial capabilities of these areas - Partnerships with private institutions that improve the management of the conservation areas (example Carr Foundation promote reinforcement of human and financial capability of Gorongosa National Park)	- Limited technical and financial resources.
7 - Monitoring of biological diversity, especially in areas under exploitation, through a system of criteria and indicators to monitor biological diversity.	- Forest inventory which is carried out with 5 years intervals. - Wildlife inventory in Niassa Reserve. - Wildlife inventory planned to cover the whole country. - Dugongs inventory in Bazaruto National Park and surrounding areas - Fisheries inventory carried out during IIP cruises		- Limited technical and financial resources. - Lack of Monitoring criteria and indicators. - Deficient publication of the inventory results.
8 - Valuation of natural resources, evaluation of the costs related to utilization of natural capital and incorporation of the costs and benefices into national accounts.	- Some resources valuation studies were carried out in the country. - National Statistics Institute in coordination with MICOA are designing a proposal to introduce some environmental issues into National Accounts.	- Website of Agriculture and Forest Engineering Faculty (UEM) has posted some resource valuation studies carried out by the institution.	- Deficient information sharing among institutions - Lack of information systematization specially statistic data.
9 - Promotion and valuation of the role of research into information production and decision making processes about natural resources utilization.	- Increase in the number of institutions capable of carrying out biodiversity studies. - Establishment of Ecological and Environmental Research Network (RIEAM)	Establishment of the three Sustainable Development Centers and the Marine and Coastal Research Center in Pemba.	- The decisions regarding natural resources utilization are mainly made without taking in account the results of the research studies; the only time research results and scientific information are used is when there is conflicts and controversy . - Lack of investments for research many times result in political decision making
10 - Community management of natural resources and valuation of traditional knowledge (intellectual property).	- Approval of Traditional Medicine Policy (2004) which protects and promotes the traditional knowledge of local communities. - Establishment of marine sanctuaries in Quirimbas National Park managed by fishmen communities; these sanctuaries help the recovering of the fisheries stock. - Establishment of several natural resources community managed projects such as: Madjedjane, Gala. Limpopo, Mecula etc. - Community managed wildlife ranches in Mahel, Txuma Tchato and Chimpaga	- Environmental law (Law n° 20/97) which promotes the participation of local communities in processes of formulation of natural resources management, and conservation areas management policies and laws. - Establishment of Ethnobotany Research Center in Namaacha - Establishment of Madjedjane community Research Center (IUCN/UEM/Madjedjane community)	
11 - Conservation of plant and animal genetic resources.	- IIAM Project to promote the use of agrobiodiversity of local crops varieties. - Realization of regular inventories and collection of germoplasm by the Center of Fitogenetic Resources (Gene Bank) of IIAM. - Realization of census by the Center of Fitogenetic Resources of IIAM to discover the needs for germoplasm re-introduction in areas that have suffered genetic erosion. - Conservation of germoplasm of food crops specially cereals, and pulses in gene bank of the Center of Fitogenetic	- Center of Fitogenetic Resources of IIAM. - Partnership between the Center of Fitogenetic Resources of IIAM and CGIAR centers in order to share germoplasm. - Regional partnership between the Center of Fitogenetic Resources of IIAM and similar institutions in SADC countries in order to share germoplasm and technical training. - University Botanical Garden that works with <i>Ex-situ</i> conservation of native species of plants	- Limited financial resources to carry out germoplasm collection. -Lack of conservation of genetic resources of native flora and animals. It is proposed the realization of studies to found other <i>ex situ</i> conservation measures

	Resources of IIAM Systematization of all information regarding the conserved material in "SADC Documentation and Information System (SDIS)". - Establishment of a medicinal plants garden on Ethnobotany Research Center in Namaacha		
12 - Control and knowledge of GMO and potential invasive species, which are capable of harming the biological diversity.	- Approval of the Regulation about the Management of GMO (2007). - Draft list of exotic and invasive species of the country (2003). - Approval of the regulation about the management of exotic and invasive species (2008). Proposal design of the regulation on national bio-security	Establishment of inter-institutional group on bio-security	
13 - Creation of conditions to improve the well being of people throughout the exploitation and sustainable use of natural resources	- Approval of environmental strategy for sustainable development (2007). - Approval of Forest and Wildlife Regulation (2002) which determine that 20% of the profits resulting from forest and wildlife explorations must go to the communities that hold the resources. - Establishment of several natural resources community management projects.	- Approval of the new forest and wildlife regulation. - Environmental law (20/1997) which praises that community within protect areas keep their rights and can use these rights to negotiate returns through income generation activities.	
14 - Simplification and dissemination of the NBSAP.	- The NBSAP is available in MICOA website		There is a need of finding other ways to divulge the NBSAP There is lack of divulgation of the NBSAP at school level There is a need to simplify the NBSAP in order to be understood by laymen.

Main constraints on implementation of NBSAP

- Weak sectorial and inter- sectorial collaboration.
- Overlapping and duplication of the mandates of different institutions.
- Lack of technical and financial capability of the institutions that deal with biodiversity issues.
- Lack of group vision of the institutions that deal with biodiversity issues.
- Limited dissemination of information about biodiversity issues.
- Lack of qualified technicians to carry out biodiversity conservation studies
- Limited incorporation of cross cutting issues during planning and budgeting processes. During annual national, provincial and district planning and budgeting processes there is no incorporation of issues related to the environment, gender and HIV- AIDS, therefore it is difficult to implement any action related to biodiversity.
- Lack of use of similar tools by the different institutions that deal with biodiversity, making difficult to share the same vision and objectives.
- Need for systematization of information produced by various institutions that deal with biodiversity issues in a unique institution.
- The changes in the leadership of an institution in the middle of their mandates make difficult to comply with the institutions programs.
- Limited availability of the information related to the activities of the convection (lack of culture of information sharing)
- Limited financial resources to implement the proposed activities
- Limited monitoring of the activities carried out.
- Deficient harmonization of plans of the different institutions
- Deficient environmental awareness.

Proposed solution

Some solutions proposed to minimize the constraints found during implementation of the NBSAP are:

1. Adjust the mandates of some sectors that deal with biodiversity;
2. Enforce the Biodiversity Unit and other institutional units that deal with environmental. For example one of the activities of the Biodiversity Unit should be to design mechanisms to improve the communications among different institutions that deal with biodiversity.
3. Avoid whenever is possible the ceasing of technical functions in the middle of the mandates (try to keep the institutional memory);
4. Establishment of a functional and open access database with information about country's biodiversity.
5. Reinforce MICOA responsibility as leader institution in issues related to biodiversity.
6. Reinforce the role of local governments and community leaders on biodiversity monitoring.
7. Reinforce the role of environmental education.
8. Reinforce the technical capability of the various institutions that deal with biodiversity issues.
9. Lobby with the decision makers to raise money to implement the planned activities.
10. Define priority activities during the planning process,
11. Reinforce the monitoring system.
12. Reinforce the environmental inspection.
13. Improve the coordination among different institutions that deal with biodiversity issues.
14. Reconcile the implementation of activities with the country's key documents. Governmental institutions, NGO's, universities, civil society among other should follow what is written in the country's key documents approved and adopted at national and/or international level such as PARPA, National strategies, legal frameworks, etc
15. Reinforce partnerships among institutions

Funding of NBSAP activities;

Many of actions that lead to the implementation of priority activities defined in NBSAP have been carried out throughout projects funded by several international organizations. Among these organizations we emphasize the following:

- World Bank and GEF-have been funding tourism development and TFCA (Limpopo, Lubombo and Chimanimani), GNP and marine & coastal biodiversity projects.
- "Japanese Policy and Human Resources Development" – has been funding the TFCA of Limpopo, Lubombo and Chimanimani.
- French Development Agency – has been funding QNP, LNP, The Design and Implementation of a National Policy to Protect and Manage Wildlife in Hunting Areas, and sustainable development programs.
- Germany – has been funding LNP
- European Commission – has been funding programs to promote sustainable management of natural resources in QNP and surrounding areas.
- Portugal – has been funding the reestablishment of GNP, and Zambeziian flora (Mozambique).
- WWF – has been funding QNP, PNAB and studies for the creation of a new conservation area in Niassa Lake which will contribute to protect the biophysical resources of the lake.
- USAID – has been funding studies for the establishment of a new conservation area in Niassa Lake which will contribute to protect the biophysical resources of the lake; the establishment of a community managed reserve adjacent to LNP (Cubo Community

Nature Reserve); the propagation of African potato a native specie used to alleviate HIV/AIDS related symptoms; and the reestablishment of GNP.

- UNDP and UNEP – Has been funding projects of environmental conservation and poverty
- Carr Foundation – has been funding the reestablishment of GNP.

Effectiveness of NBSAP

One of the main successes of the implementation of the NBSAP and the CBD was the increase in the coverage of the protected areas in the country that led to the increase in the population of the large mammals within the country as well as the recover areas with coastal forests in northern Mozambique (due to gazetment of QNP).

Further improvement of the implementation of NBSAP would need to cover:

- Mobilization of more financial and technical resources.
- Reinforcement of the Biodiversity Unit
- Realization of mid-term evaluations of the activities to be carried out in order to improve the implementation of NBSAP and definition of adaptive measures whenever necessary.
- Improve the coordination among different institutions that deal with biodiversity issues

It is recommended a revision of the Mozambique NBSAP

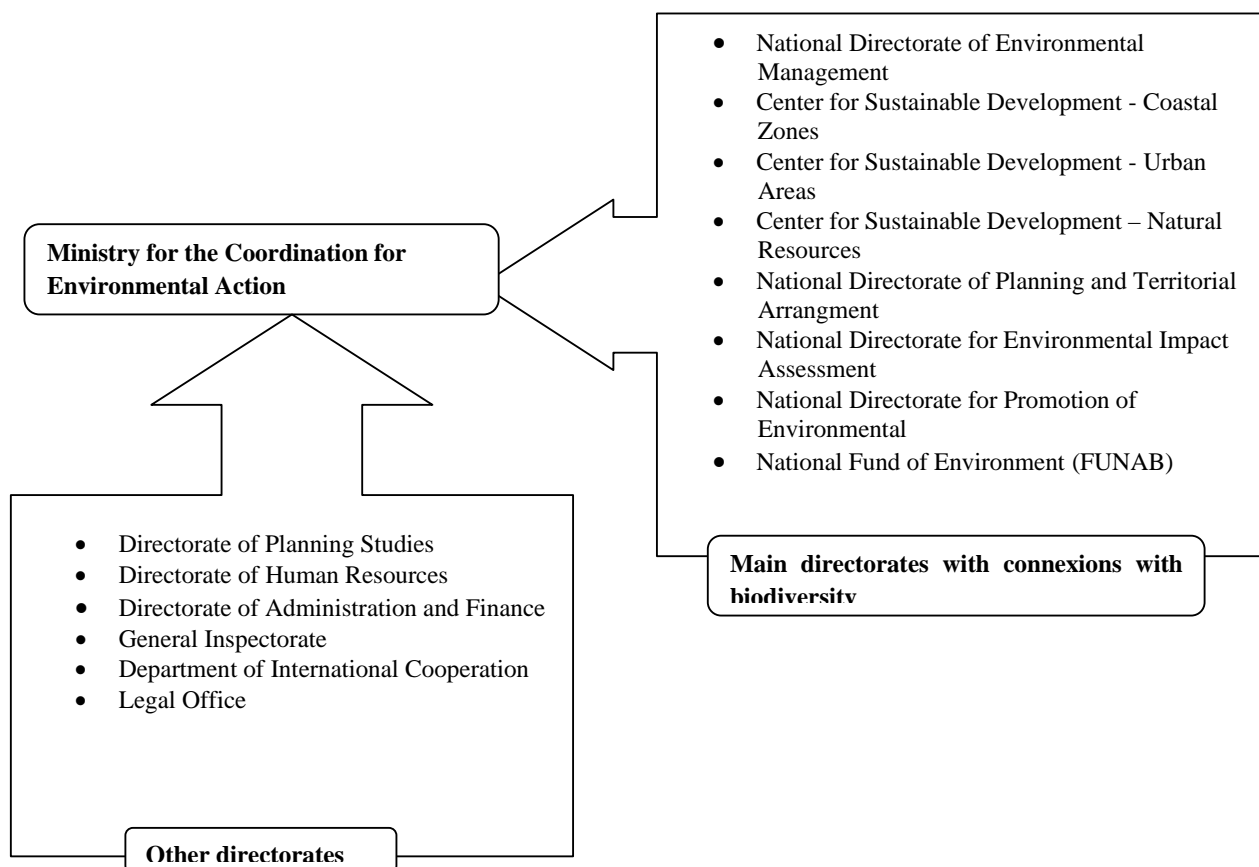
Chapter III - Sectoral and cross-sectoral integration or mainstreaming of biodiversity considerations in Mozambique

In this chapter we assessed the degree of engagement of Mozambican sectors (key actors) in the conservation and sustainable use of biodiversity. These main institutions, its sectors (main directorate), roles in dealing with biodiversity issues; its mandates and institutions framework area death below. The institutions list were comes mainly from CONDES (National Council for Sustainable Development). In addition this document deals with national, regional and international instruments most relevant to the approach and protection of biodiversity.

This is later followed by the analysis on biodiversity incorporation on institutions, its integration, exiting ecosystem approach adopted and issues related with biodiversity on EIA. This report bring existing mechanisms in Mozambique that promotes and makes mainstreaming happening highlight to adopted strategies by the government, NGO and CBO programmes and outputs. Examples of mainstreaming in Mozambique are provided.

Institutions and main directions dealing with biodiversity

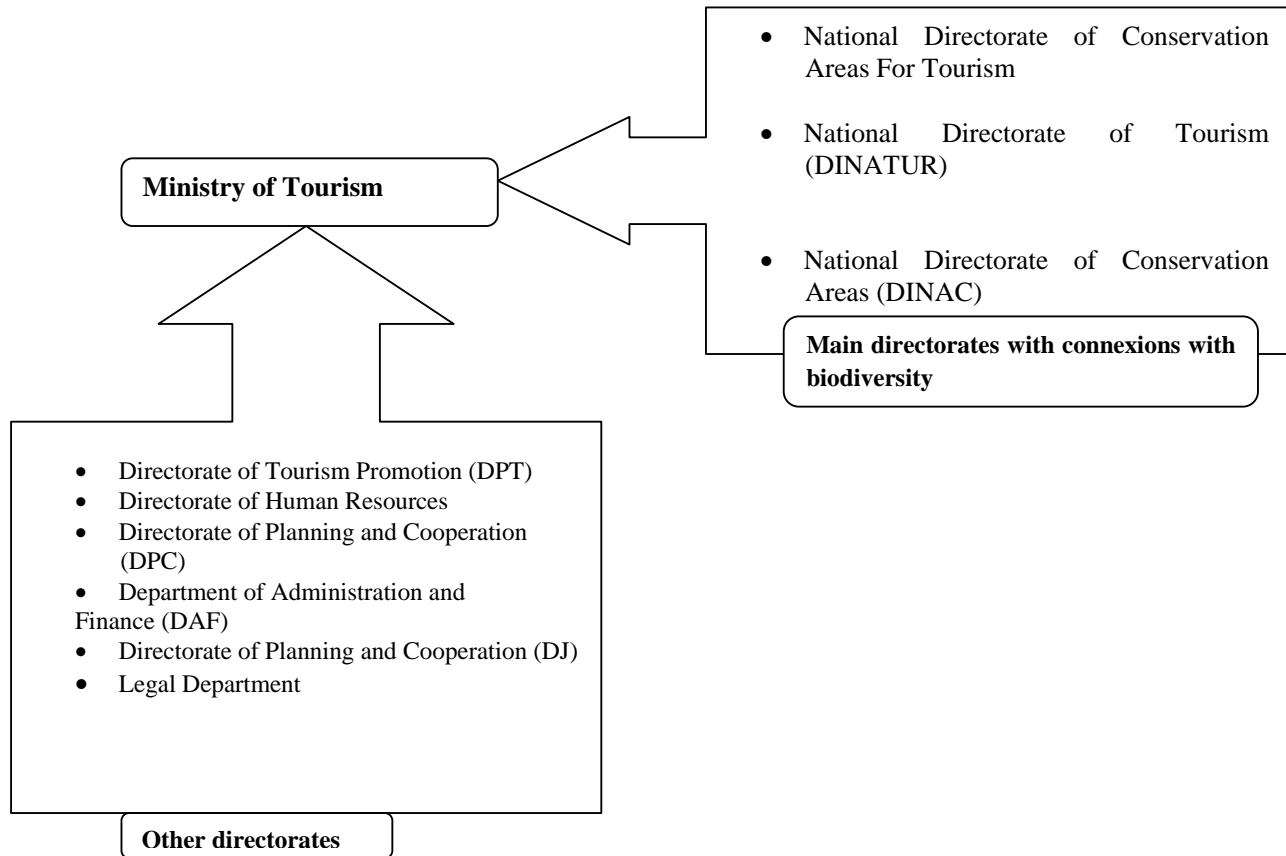
1. Ministry for the Coordination for Environmental Action



Main functions related with biodiversity/environment:

- Decide on the studies of environmental impact inherent in the realization of socio-economic activities in the context of development projects of sectors;
- Decide on the technical quality of assessments of environmental impacts;
- Conducting environmental audits and to activation of due legal procedures when there are violations under the Environment law;
- Propose to the Council of Ministers policies for sustainable development of the country;
- Communicate and inform, regularly, on the environmental situation of the country;
- Recommend to the government to create environmental incentives;
- Decide, after the areas of supervision and research institutions on the establishment of areas of ecological value and/or environmental;
- Decide on the sustainability of development plans.

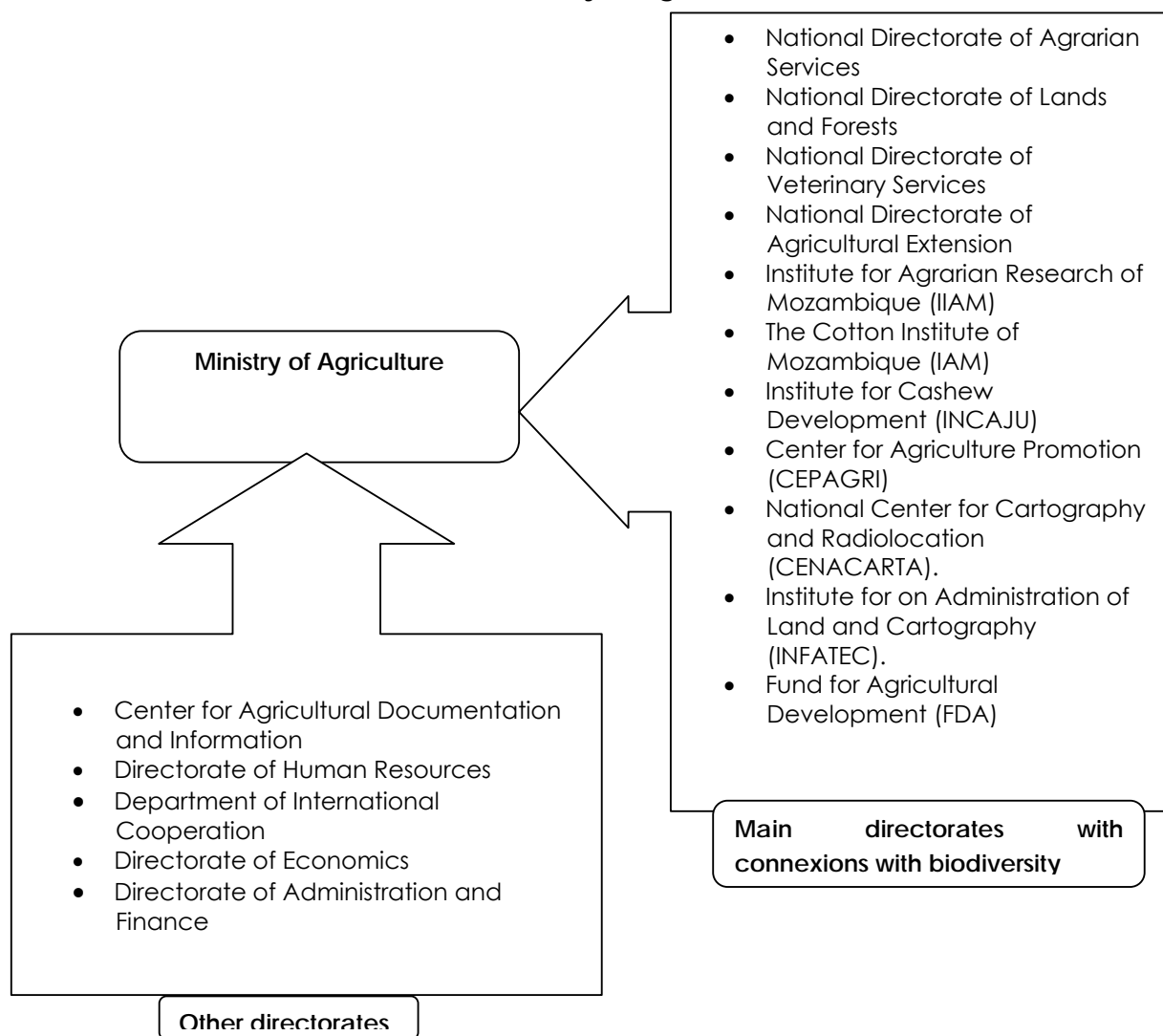
2. Ministry of Tourism



Main functions related with biodiversity/environment:

- Promotion of development of sustainable tourism;
- Promoting the conservation of wildlife in its use as a component necessary for the development of tourism;
- Contribution to the establishment of a licensing policy for the expansion of the practice of gambling in hotels and similar establishments;
- Promote training of professionals to improve the quality of services provided by the tourism sector;
- Ensure the development of tourism through the establishment of tourist infrastructure and sustainable management of sensitive ecosystems, conservation areas, areas of unique beauty and shrines of great biological diversity;
- Planning and preparation of joint proposals for election of new areas for conservation and management;
- Licensing concessions (game preserve and other areas of protection) and other areas for tourism infrastructure.

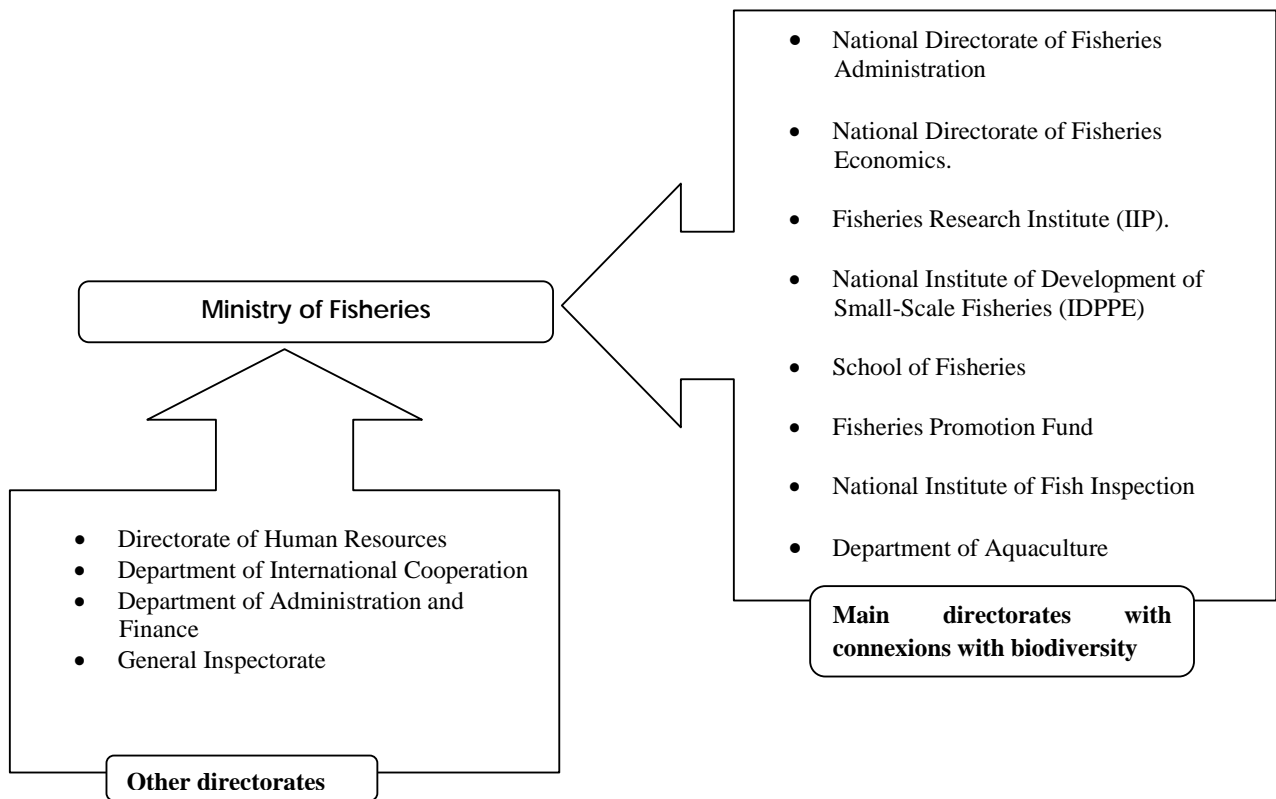
3. Ministry of Agriculture



Main functions related with biodiversity/environment:

- Promotion of production, agro-industrialization, commercialization of agricultural products and inputs;
- Plant and animal health protection;
- Extension and technical assistance to producers;
- Development of agricultural research and technology and its dissemination;
- Management and exploitation of forest resources and biodiversity;
- Management of land and allocation of rights to use and exploit;
- Agro-ecological, agricultural and veterinary research;
- Development and rural extension.

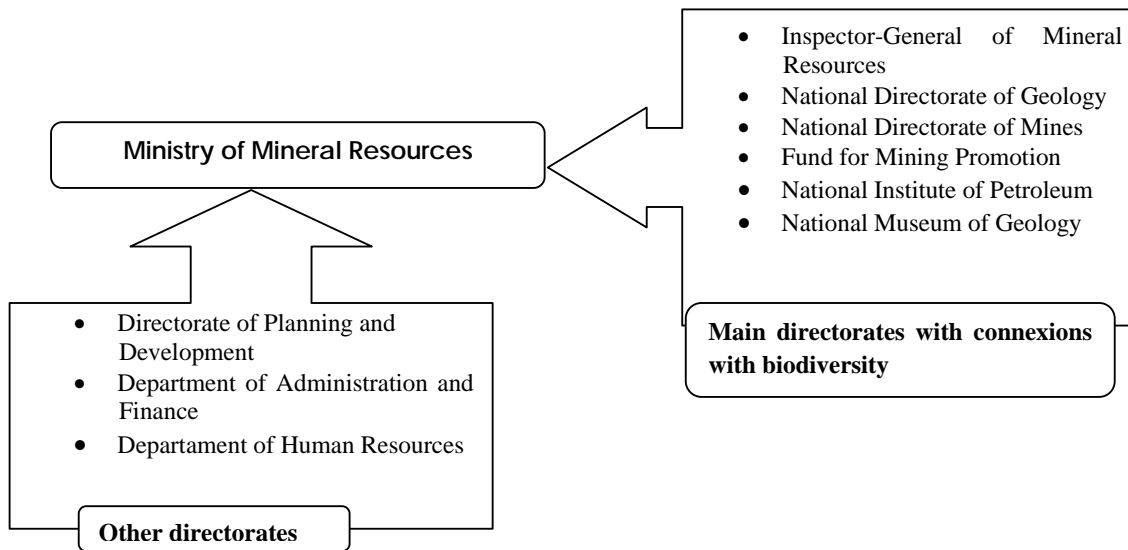
4. Ministry of Fisheries



Main functions related with biodiversity/environment:

- Ensure protection and conservation of marine resources and sustainable exploitation of fisheries resources;
- Promote the empowerment of the sector and improve the quality of life of fishing communities;
- Evaluation of current reserves and zoning by type of fish and events;
- Evaluation of the sensitivity of marine ecosystems and lacustes considered;
- Environmental impact assessment of the capture effort;
- Environmental licensing;
- Evaluation of environmental impacts of activities on land (agriculture, mining, public works) in the productivity of marine ecosystems and lake;
- Selection of sites and environmental impact assessment of aquaculture and its sustainability.

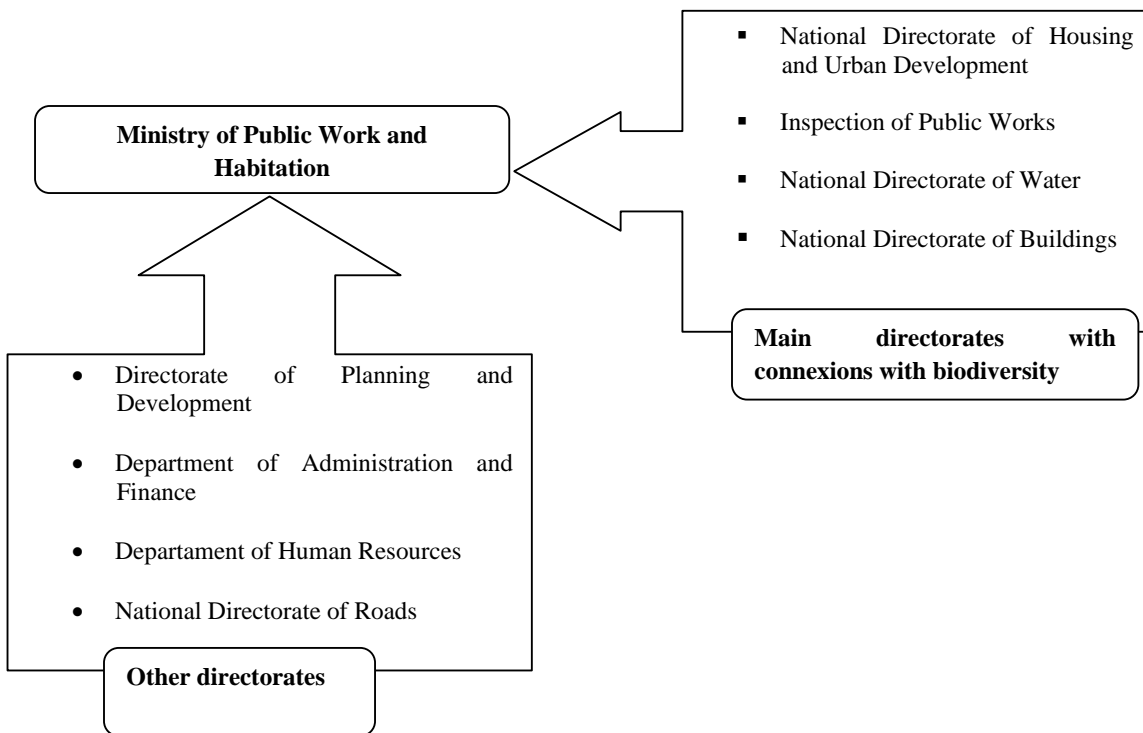
5. Ministry of Mineral Resources



Main functions related with biodiversity/environment:

- Sustainable use of sustainable techniques of mining that cause the least environmental impact;
- Assessing the impact of traditional mining;
- Environmental impact assessment of major projects (coal, oil, gas and other minerals);
- Strengthening the Environmental Unit of the sector of mineral resources;
- Assessment of appropriate technologies for mining and sustainable causing minimal damage to the environment;
- Assessment of commissioning and closure of mining properties;
- Selection of sites and spatial planning, taking into account the impact on human settlements and the mining community.

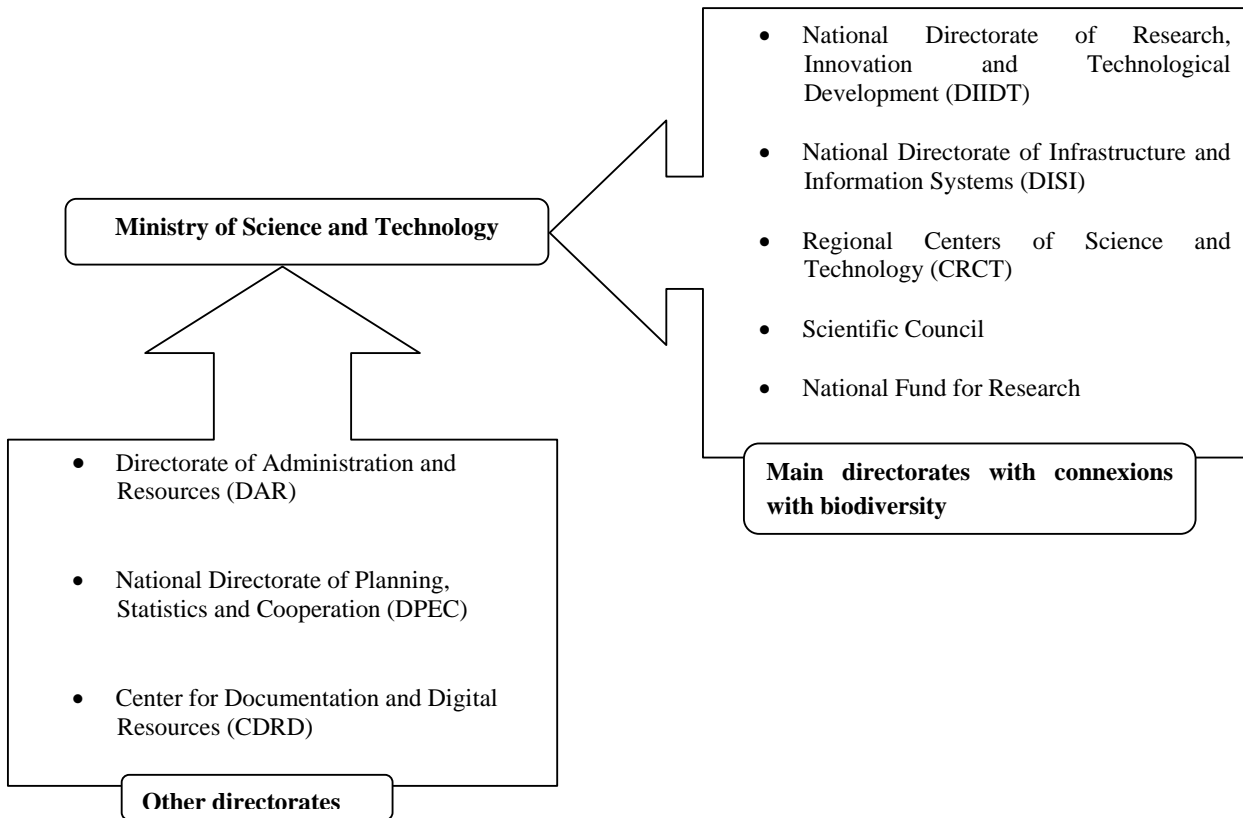
6. Ministry of Public Works and Habitation



Main functions related with biodiversity/environment:

- Evaluation of environmental impacts of projects;
- Analysis of the sustainability of the works and projects;
- Selection of sites for the implementation of projects to avoid fragile ecosystems;
- Appropriateness of technology and design of large engineering works for the environment;
- Impact of agreements on shared water management;
- Increasing access, assessment and monitoring of availability and water quality;
- Planning and implementation of reorganization measures at low cost;
- Monitoring of the impacts of environmental disasters (floods, droughts and other);
- Selection of areas suitable for urban expansion;
- Infrastructure and sanitation in selected areas of urban sprawl;
- Elaboration of structure plans;
- Adoption of eco-design as a way to adjust the types of housing to the environment;
- Development and implementation of prototypes of rural housing.

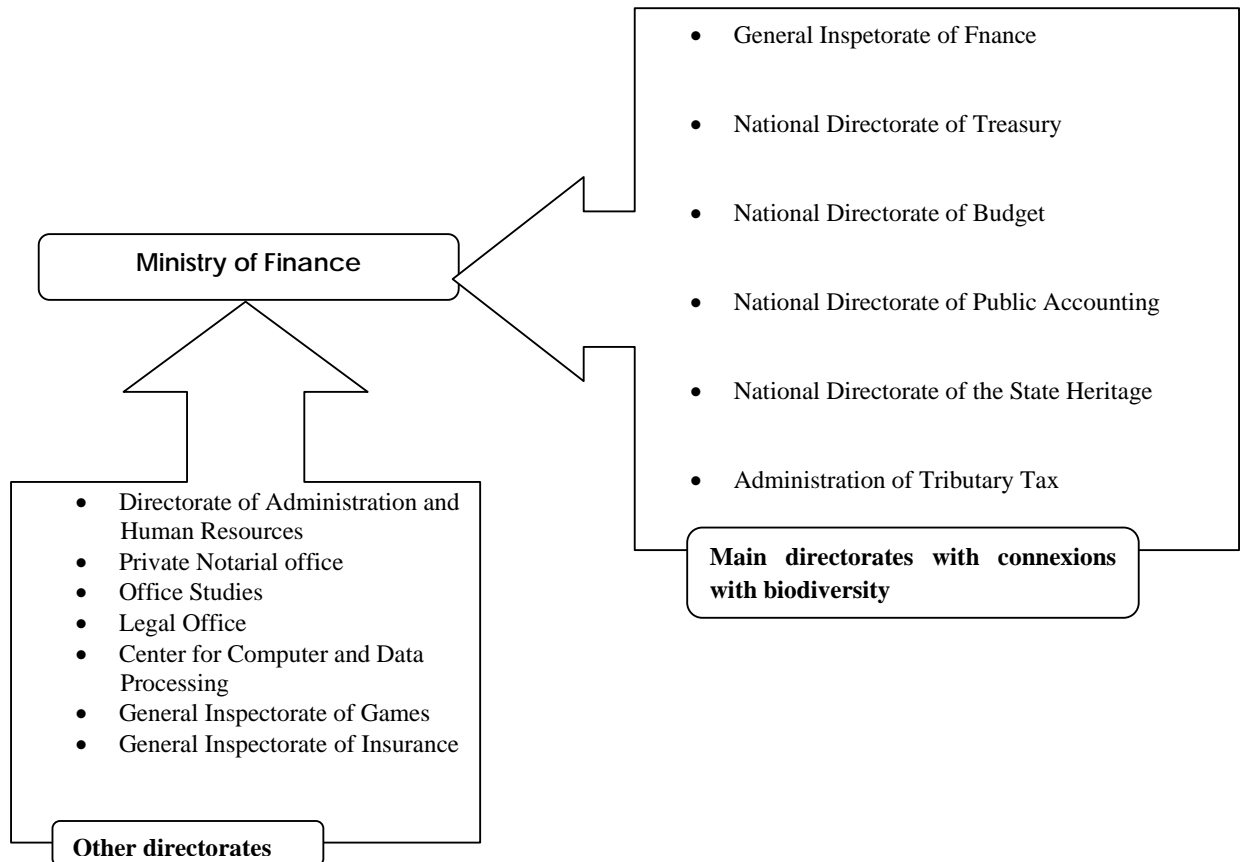
7. Ministry of Science and Technology



Main functions related with biodiversity/environment:

- Synergies in the preparation of training plans and facilitating training in environmental matters;
- Coordination of the research topics that have reflected on technologies and production processes environmentally friendly;
- Coordination of research projects and training which would reflect results from mining practices lead to environmental impacts;
- Promotion of environmental education of communities;
- Restructuring curriculum for the inclusion of materials that relate to the environment and sustainable development;
- Determines, regulates, plans, coordinates, develops, monitors and evaluates the activities within the science and technology;
- Formulating policies and strategies for the development of science and technology;
- Normalization, standardization, regulation, coordination of development in the areas of science and technology;
- Promotion of scientific research and technological innovation;
- Promoting the dissemination of science and technology;
- Promoting the enhancement of local knowledge and its dissemination;
- Promoting protection of intellectual property rights;
- Promotion of methodologies for research and technological innovation that are based on values of ethics and ensure benefits to the economic, social and cultural life of the country;
- Promoting development through the introduction of new tip technologies;
- Coordination of research and technology development.

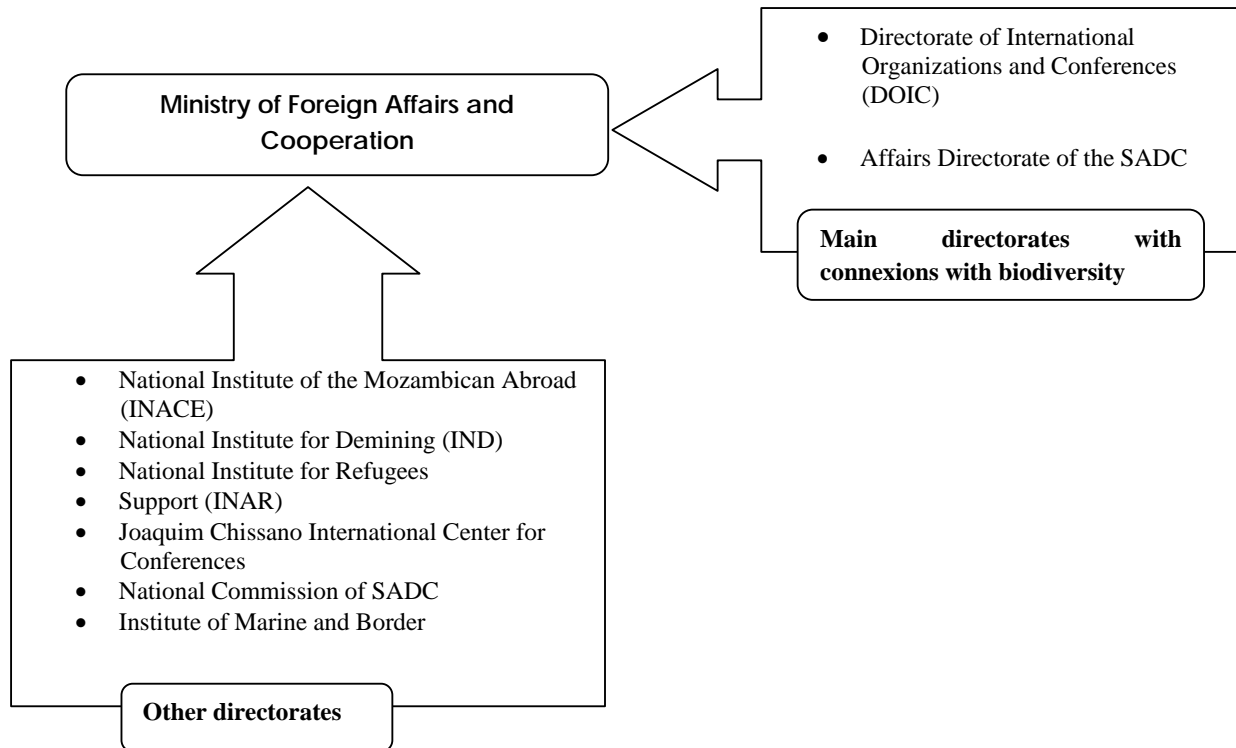
8. Ministry of Finance



Main functions related with biodiversity/environment:

- Catalyze actions that led to environmental protection and poverty reduction;
- Promotion and financing of activities with direct impact on poverty reduction and the use and management of natural resources;
- Promotion of inter-sectoral cooperation in implementing the PARPA;
- Integration of sustainability concerns in the various plans and programs of development and the Millennium Development Goals;
- Facilitation of funds subsidized the business initiatives aimed at protecting the environment or minimize the impact of current business;
- Granting tax benefits to operators that differ in environmental protection;
- Creation of a green funds;
- Promotion of actions to enable the companies retain additional funds obtained by means of "cleaner production";
- Facilitation of investment activities of eco-efficiency
- Formulation of indicators of sustainable development within the PARPA.

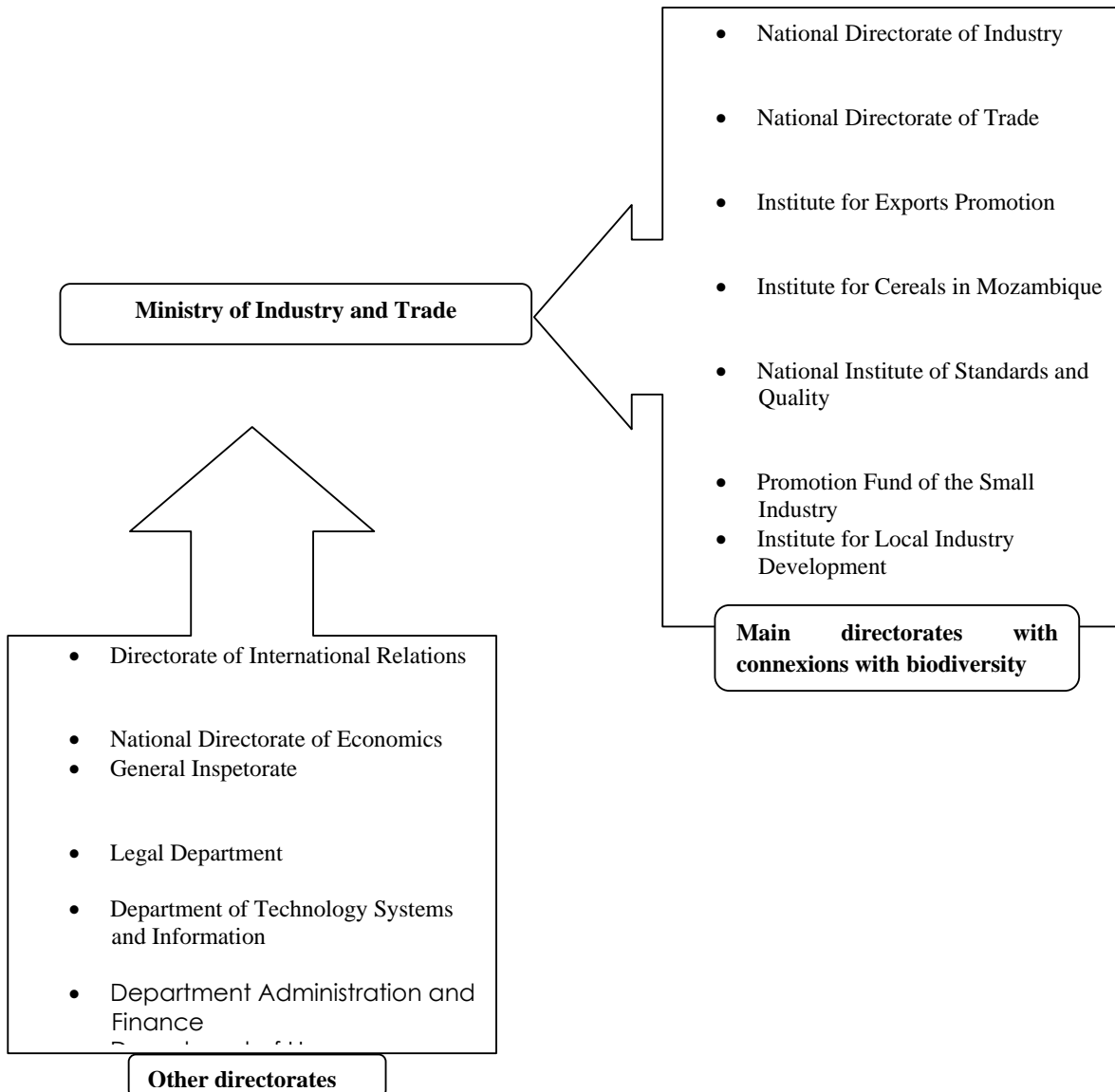
9. Ministry of Foreign Affairs and Cooperation



Main functions related with biodiversity/environment:

- Monitoring the fulfillment of the Millennium Development Goals United Nations and the recommendations of Johannesburg;
- Monitoring the process of signature and ratification of international protocols;
- Divulgence of agenda and achievements of the environment sector in the international arena;
- Mobilization of the international community to provide resources to ensure compliance with the goals of sustainable development;
- Promotion of relationships with other countries of Africa and the world to gather experience on the relationship of economic development with the environmental agenda;
- Accreditation of international NGOs.

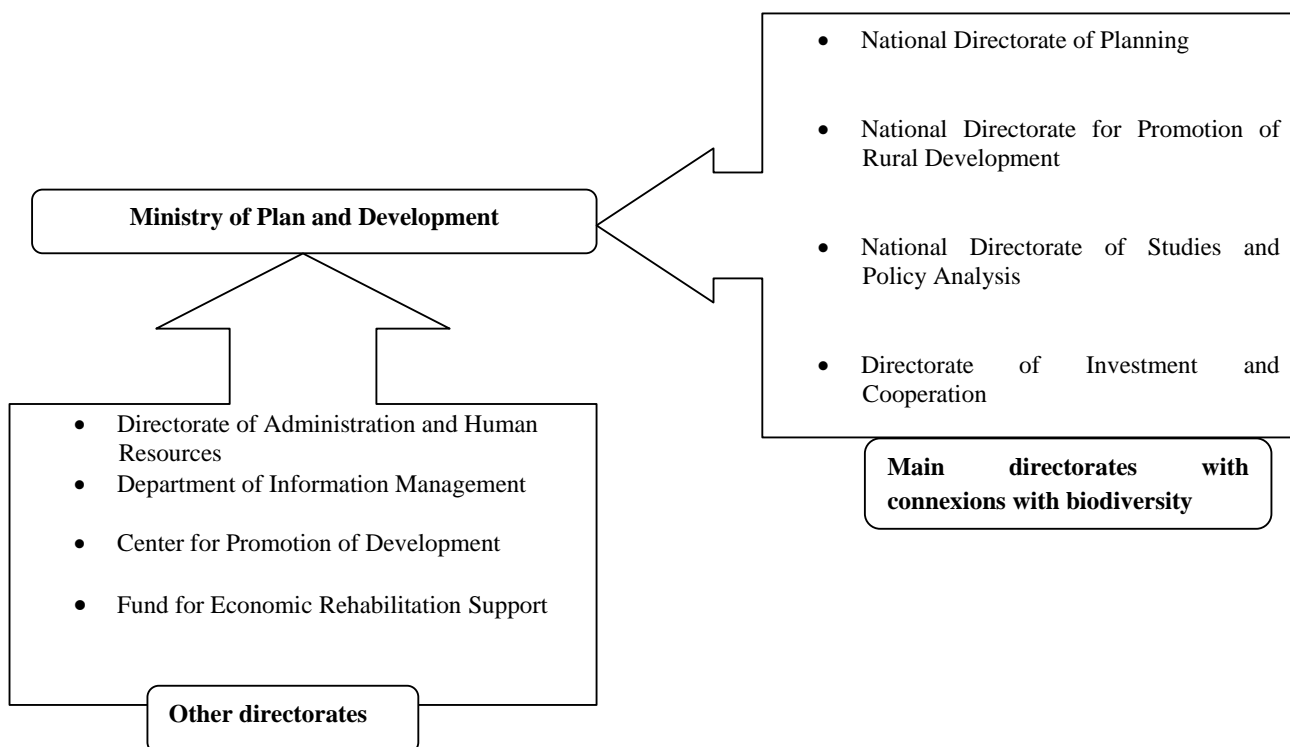
10. Ministry of Industry and Trade



Main functions related with biodiversity/environment:

- Introduction of options for cleaner production in enterprises;
- Adoption of conservation measures and energy efficiency;
- Mobilization of green funds through public-private partnerships to support the industry and develop trade;
- Establishment of industrial eco- parks to take advantage of synergies resulting for the development of clean industries;
- Dissemination of quality standards and environment to overcome trade barriers caused by the non-certification of national production;
- Adoption of MSDS (Sheets safe handling of products) for products with potential to contaminate the environment or affect public health;
- Implementation of Environmental Management Systems by the ISO 14000 standards;
- Management of packs with potentially dangerous products;
- Management of the product cycle;
- Explore opportunities for re-use or recycling of products.

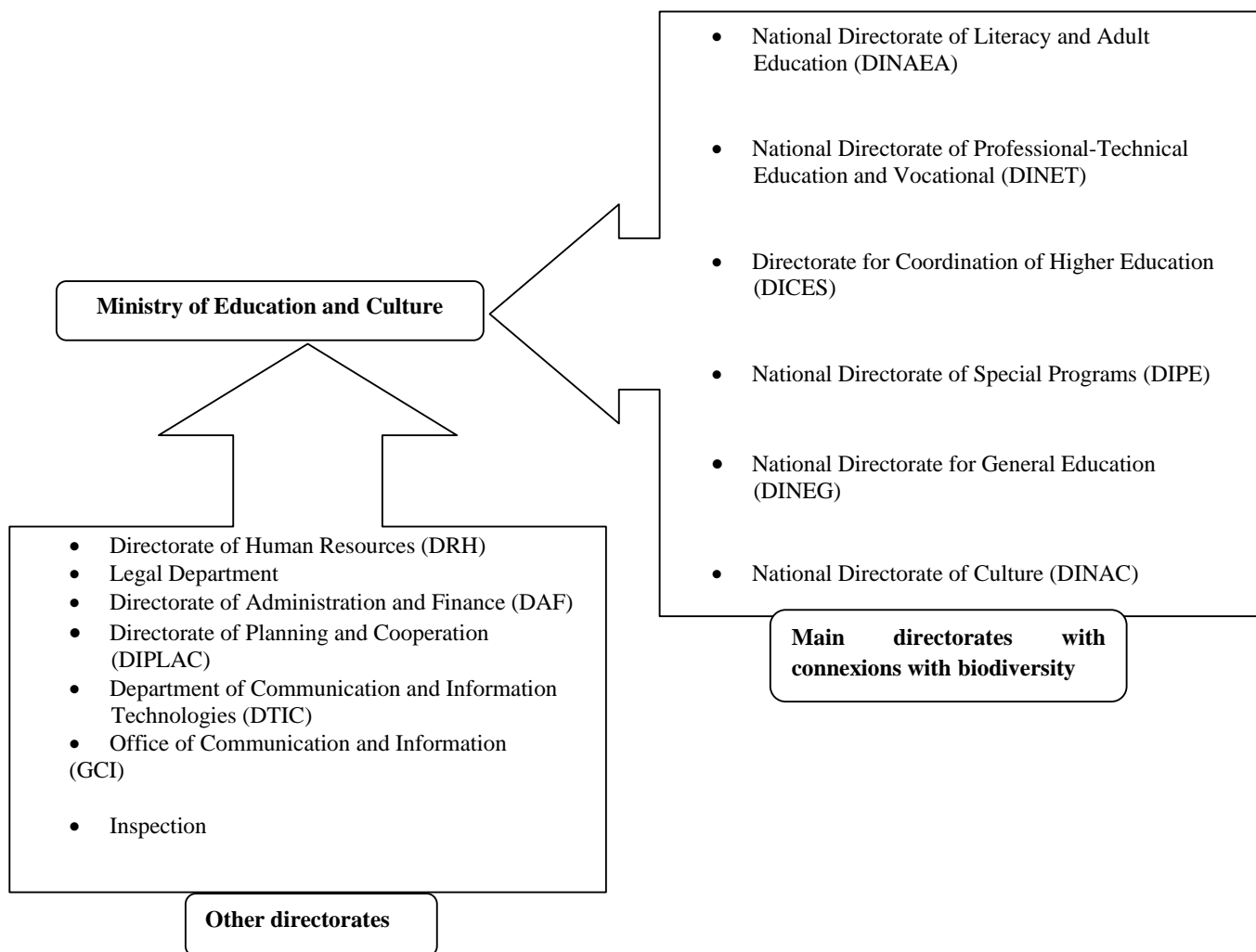
11. Ministry of Plan and Development



Main functions related with biodiversity/environment:

- Assistance in the planning district as a way of supporting the decentralization process;
- Initiatives to promote private investment within the plans and programs set by the government;
- Promotion of actions to integrated rural development through the rational use of available natural resources;
- Coordination of inter-sectorial actions to rural development;
- Promote and encourage community participation in identification, formulation, implementation and evaluation of local development initiatives;
- Participate in studies and in formulating policies and strategies for rural development.

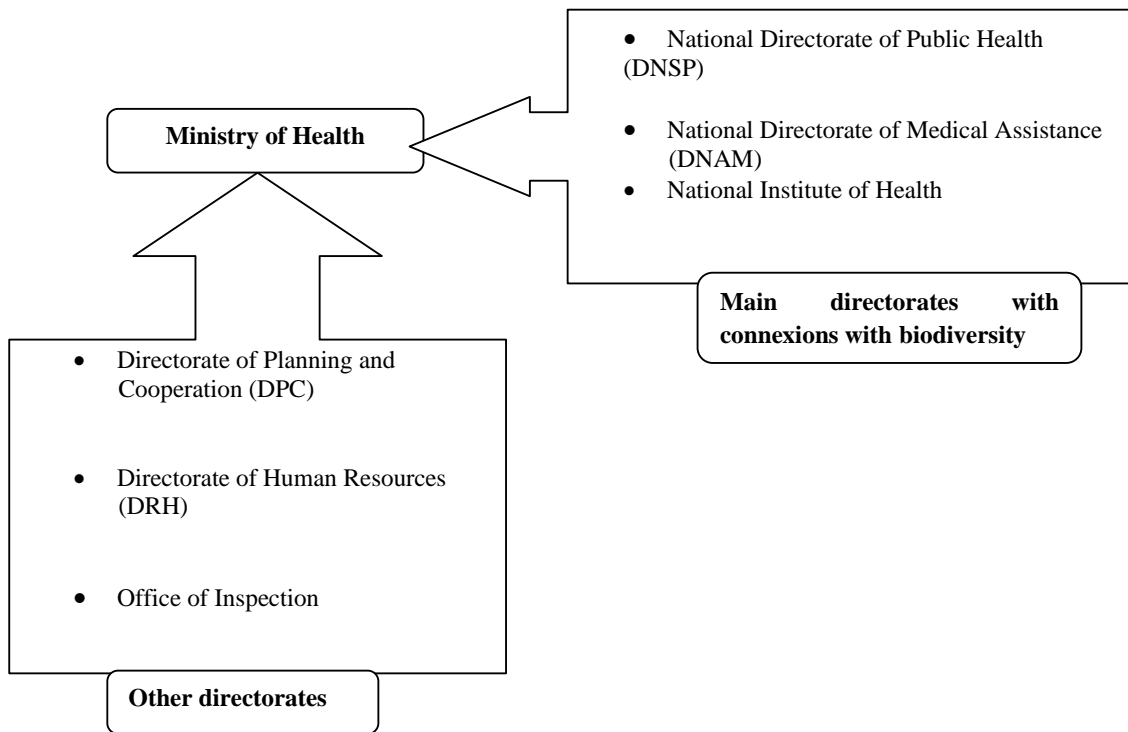
12. Ministry of Education and Culture



Main functions related with biodiversity/environment:

- Ensure the inclusion in the educational curriculum programs of environment subjects and intensify training and retraining of teachers in this subject;
- Updating and introduction of environmental subjects in the programs and school books;
- Update the programs of IMAP (Instituto de Magistério Primário) to take account of environmental issues in the teachers training;
- Dissemination of sustainable practices of use of natural resources and eco-efficiency.

13. Ministry of Health



Main functions related with biodiversity/environment:

- Ensure the control of substances that endanger public health for a greater role in management of plant drugs, general waste and hospitality and casual aspects of endemic diseases like malaria and cholera;
- Capacity strengthening of centers of Environmental Hygiene and Medical Examination (CHAEM);
- Monitoring of water quality;
- Adoption of methods of bio-safety in health units;
- Adoption of innovative methods for treatment and management of hospital waste;
- Strengthening the sanitation and education campaigns to prevent malaria, cholera and other endemic;
- Improvement of public health programs and management of hospital waste;
- Strengthening coordination with the environmental sector for the management of obsolete and other drugs with the potential to affect public health.

Biodiversity Legal Instruments

The legal instruments for biodiversity can be divided in national, regional and global. We present below the global, regional and national legal instruments most relevant to the approach and protection of biodiversity in Mozambique.

Table 19. Main global instruments for diversity, ratified by Mozambique.

	Description	Subsidiary Law	Description of the subsidiary law	Date of ratification and signature
<p>Convention on Biological Diversity (1992) CBD</p>	<ul style="list-style-type: none"> ▪ Conservation of Biodiversity ▪ <i>In-situ</i> and <i>ex-situ</i> conservation ▪ Protected Areas 	<p>Jakarta Mandate (1995)</p> <p>Addis Ababa Principles (2004)</p>	<ul style="list-style-type: none"> ▪ Marine biological diversity. ▪ Integrated Coastal Management ▪ Govern uses of biodiversity for sustainable use. ▪ Operational guidelines for the biodiversity sustainable use. 	<p>MZ: 28/08/1995</p>
<p>Convention on Migratory Species (1979) CMS</p>	<ul style="list-style-type: none"> • Protection of migratory species • Importance of international. Agreements between Range States – guidelines. • Maintenance of a network of suitable habitats. 	<p>African-Eurasian Migratory Waterbirds (1995)</p> <p>Conservation and Management of Marine Turtles and their Habitats of</p>	<ul style="list-style-type: none"> ▪ Protection of water birds and wetlands. ▪ Creation of Protected Areas ▪ Some very good guide lines for practice. ▪ Conserve marine turtles and their habitats with 	<p>MZ: x</p>

		IOSEA (2001) IOSEA Conservation and Management Plan (2001)	socio-economic activities. <ul style="list-style-type: none"> ▪ Some operational challenges ▪ Indicates the establishment of Trans boundary marine protected areas. 	
Ramsar Convention (1971)	<ul style="list-style-type: none"> ▪ Conservation of wetlands and its flora and fauna. ▪ Instigates creation of protected areas. 	VIII.4 VIII.25	<ul style="list-style-type: none"> ▪ About Integrated Coastal Zone Management, and coastal population dependence. ▪ Strong human dimension. ▪ Refers that coastal wetland types are still under-represented in the Ramsar List. ▪ Ramsar Strategic Plan for 2003-2008. ▪ Priority to marine and coastal sites, appointing MPAs. ▪ Many guideline documents appointed – great focus on information and exchange of knowledge. 	MZ: sign:3/08/2004
		VIII.32	<ul style="list-style-type: none"> ▪ Conservation and management of mangroves. 	
		VIII. 44	<ul style="list-style-type: none"> ▪ New Partnership for Africa's Development and implementation of Ramsar in Africa. ▪ Refers specific attention to transboundary elements. 	
Ramsar Protocol (1982)	Protocol to Amend the Convention in Wetlands of International importance			

	especially as Waterfowl Habit			
Convention on International Trade in Endangered Species of Wild Fauna and Flora (1979) CITES	Protection of certain species against international trade.			MZ: 25/03/1981
Convention Concerning the Protection of the World Cultural and Natural Heritage	<ul style="list-style-type: none"> ▪ Establishment of an effective system of collective protection of the cultural and natural heritage of outstanding universal value. ▪ Joint management committees for transboundary properties. 			MZ: 27/11/1982
Kyoto Protocol (1997)	<ul style="list-style-type: none"> ▪ Measures for achieving quantified emission limitation and reduction commitments. 			MZ: 18/01/2005
The Convention for Combating Desertification and Drought	Improving the management of fragile ecosystems associated with more arid climates, the degradation of land in semi-arid regions including the coastal zone.			MZ: 7/6/1984

Table 20. Main regional instruments relevant for diversity and ratified by Mozambique.

Title	Description	Date Ratified and signature
African convention on the Conservation Nature and Natural Resources	To enlance environmental protection to foster the conservation and sustainable use of natural resources and to harmonize and coordinate in this fields with a view to achieving ecologically rational. (subsidiary legislation is the Marine Pollution Protocol)	Moz Ratif:28/02/0981 sign:04/02/2004
Nairobi Convention, November 1996	Convention on protection, management of Eastern Africa marine and coastal region. Emphasis also n land based issues that can affect the coastal waters	Moz sign: 04/03/1999
Protocol Concerning protected Areas and Wild Fauna and Flora in the Eastern African Region (1985)	To provide protection of threaned an endangered species of flora and fauna, and important natural habitats.	Moz: 4/03/1999

Treaty of Southern African Development Community (SADC 1992)	Common approaches to the conservation and sustainable use of wildlife resources.	Moz: sig: 18/08/1999
Protocol on Wildlife Conservation and law Enforcement (1999)		Moz: sig:18/08/1999 Ratif:06/06/2002
SADC Fisheries Protocol (2001)	Southern African Development community Protocol on fisheries	Moç: sig:14/08/2001 Ratif:29/08/2002
Western Indian Ocean Tuna Organization Convention (1991)	with unanimous approval of parties, any independent coastal State bordering the Western Indian Ocean whose territory is situated principally in the Western Indian Ocean region, having a common interest with parties in the conservation, management and optimum utilization of the highly migratory tuna and tuna-like species of the region occurring within and beyond its exclusive economic zone.	
SADC Revised watercourses Protocol 2000	Southern African Development Community Protocol on Shared Watercourses	Moz: sig:07/08/2000 Ratif:12/11/2001
Agreement on Cooperative Enforcement Operations directed at Illegal Trade in Wild Fauna and Flora 1994	To establish close cooperation between certain Africa countries with a view to reducing and ultimately eliminating trading wild fauna and flora	Moz-x
Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region	The Contracting Parties shall take all appropriate measures to maintain essential ecological processes and life support systems, to preserve genetic diversity, and to ensure the sustainable utilization of harvested natural resources under their jurisdiction. In particular, the Contracting Parties shall endeavour to protect and preserve rare or fragile ecosystems as well as rare, depleted, threatened or endangered species of wild fauna and flora and their habitats in the Eastern African region.	

Table 21. Main legal Mozambican instruments relevant for biodiversity.

Title	Description	Subsidiary legislation
Environmental law No 20/97 31 st July 1997	Defines the legal basis for correct use and management of environment and its components, towards sustainable development.	Decree N° 45/2004 29th September (Regulation of Assessment of Environment Impact) Regulation of pesticides Regulation of Environmental inspection (draft) Regulation of residues management (draft)
The Constitution of the Republic of Mozambique (16 th November 2004)	The state and local autarchies, in collaboration with associations for defense of environment, should adopt policies for defending the environment and or rational use of all natural resources.	
Law of local State	Establish the principles and norms of	Ministerial Decree N° 11/2005 of 10th

Organs (LOLE) 9 th of April of 2003)	organization, competences, and functioning of state local organs at levels o province, district, and administrative post and locality. Article 39 states that competence the district government to approve the proposals of territorial pans, comprising ecological zones and other areas of protection, approve programs for protection activities or recovering of environmental conditions.	June of 2005 (Regulation of Law of local state organs)
Law of Fisheries 26 the of September (1990)	It defines the judicial framework related to the planning and management of fisheries.	Regulation of recreational and sporting fishing (13 th of Nov 2001) Geral Regulation of aquaculture 23 rd of April 2002 Interdiction of th exploitation of coral and ornamental fish 2003 Geral Regulation of Maritime Fisheries) of s f January 2004
Law of Sea (1995)	It defines the jurisdiction right on he sea along the Mozambican coast and regulation of maritime activities in the country. It introduces the maritime policy, defines maritime zones (territorial sea economic zones, continental shelf, maritime public domain), activities in the sea, competences of maritime authorities	
Law of forest and fauna (1999)	Set the principle and basic norms of sustainable use and conservation of natural resources	Decree N° 11/2003 of 26th of March (Regulation of forest and fauna)
Policy and strategy of forest and fauna development (1997)	This policy, recommends participative management of conservation areas in order to ensure the achievement of the ecologic, social and economic objectives. The same policy refers that management of those resources may be delegated to the private sector or to other entities that deem that are capable of fulfilling the conservation designs.	Resolution N° 8/97 of 1st of April
Law of land (1997)	Set the principle and basics norms of land use and conservation	Decree N 1/2003 of 18 th February of 2003 Regulation of Law land
National policies of land and implementation Strategy respective (1995)	The National Land Policy Resolution seeks to achieve a balance between land use, environmental protection and the equitable and sustainable use of natural resources. A policy whereby the rights of use and access to the land are established in parallel with the need of protection of the environment, creation of protection zones, principle of public interest amongst	
National Environmental Policy	This policy, recommends sustainable and optimized use of natural resources with the State being responsible for creating incentives through concrete actions. This policy introduced principals and objectives of the Government in the management framework and establishment of an healthy environment, harmonizing with the foreseen principals of the Republic Constitution and in the several International Agreements, Treaties and Conventions to which Mozambique is signatory. It promotes sustainable development through an acceptable and realistic compromise	

	<p>between socio-economic progress and environmental protection. One of the finalities of this policy is to protect the ecosystems and essential ecological processes.</p> <p>It was this policy that for the first time introduced the need of integration of the environmental issues in the economic planning; the role of the communities in the environmental management, the environmental monitoring,</p>	
Strategy and Policy for National Tourism	<p>Under this environment strategy / policy will ensure that tourism and environment mutually supportive, developing a proactive approach from all stakeholders to promote and manage the sector in a responsible manner and integrated; prioritize the preservation of the quality and sustainability of biodiversity, contribute to the rehabilitation, conservation and protection of ecosystems and natural heritage, promote the development of natural resources, especially those with historical and ecological value in their parts recreational, aesthetic and socio-cultural.</p>	
Rural Development Strategy	<p>This strategy as the basis for the process of improving living conditions, work, leisure, and welfare of people living in rural areas. This strategy will create favorable conditions for moving on to new stages and challenges, for the transformation of rural areas in spaces attractive, economically competitive, healthy and pleasant for the welfare of the people who inhabit rural areas.</p>	
Environmental Strategy for Sustainable Development	<p>Intend to create a common vision for a wise environmental management, leading to sustainable development that contributes to eradicating poverty and other ills that afflict the Mozambican society, based on the postulates and principles established by the Plan of Implementation of Agenda 21 and the NEPAD.</p>	<p>Aproved at the IX Session of the Council of Ministers on 24th of July of 2007.</p>
Regulation on Access and Sharing of Genetic Resources and Associated Traditional Knowledge	<p>It aims to establish rules for the access component of genetic resources, their protection as well as the associated traditional knowledge, relevant to biodiversity conservation, sustainable use, including fair and equitable sharing of benefits arising from their use and exploitation.</p>	<p>Decree N° 19/2007 of 9th of August</p>
Law of Territorial Ordination	<p>Its key objective, the rational and sustainable exploitation of natural resources, preserving the environmental balance, the promotion of national cohesion, the promotion of individual potential of each region, the promotion of quality of life, the balance between the quality of living in rural and urban areas, the improvement of housing, infrastructure and urban systems, the security of vulnerable populations caused by natural disasters or</p>	<p>Published in 1^a serie of BR, of 18th of July of 2007</p>

	intended.	
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Mechanisms that promote mainstreaming happening in Mozambique

Existing mechanisms that promotes sectorial and cross-sectorial happening in Mozambique encompass (i) government adopted programmes such as MDG, PARPA II, (ii) existing formal communication mechanism for mainstreaming such as CONDES (National Council for Sustainable Development), (iii) government funding mechanisms incentives for environmental/biodiversity issues (FUNAB, FNI), (iv) NGO and CBO that engage on mainstreaming biodiversity (v) existing research initiatives at research institutes dealing with biodiversity and (vi) Adoption of the vision of the ecosystem in the integration intra-and inter-institutional (mainstreaming) of biodiversity and EIA.

This report also provides mainstreaming outputs and good examples for each of the mechanism listed.

(i) Government adopted programmes

The Government of Mozambique has adopted, at the higher level the following main strategies to tackle mainstreaming in biodiversity and environment: Strategic Plan for Poverty Reduction (PARPA), New Partnership for the Development of Africa (NEPAD); Millenium Development Goal (MDG).

The Action Plan for the Reduction of Absolute Poverty for 2006-2009 (PARPA II) of the Government of Mozambique is to achieve the objective of reducing the incidence of poverty from 54% in 2003 to 45% in 2009. This successor to PARPA I, 2001-2005, maintaining the common areas of the priorities in development of human capital in education and health, improvement in governance, development of basic infrastructure and agriculture, rural development, and improvement in macro-economic management and financial.

The factors determining the success of the implementation of PARPA are:

- Apropriation/participation of different factors
- Political leadership
- Coordination among sectors, included transversal issues
- Government's position on the assistance of partners in cooperation

The PARPA is different from the previous to include in its priorities the further integration of national economy and increase productivity. In particular, the attention focuses on the development of the district level, in creating an environment conducive to the growth of national productive sector, improving the financial system, the flourishing of small and medium enterprise framed within formal sector, and develops both the collection of internal revenue and the allocation of budgetary resources. The PARPA is a flexible instrument, adjusted and updated annually through the Medium Term Fiscal Scenario of Economic and Social Plan and the State Budget, which are instruments to operationalize the program of the government.

The PARPA II focuses attention on ways of solving the low standard of living of the poorest sections, which now corresponds to the level of absolute poverty. The PARPA II is presented

through the pillars of governance, human capital and economic development. In the long term, the consensus objective of Mozambican society is to improve the living standards and welfare of its citizens. In short, they are also long-range goals of time: **(i)** the balanced economic and social development; **(ii)** the reduction of absolute poverty; **(iii)** the consolidation of peace, national unity, and democracy; **(iv)** the widespread application of justice; **(v)** improving education and health; **(vi)** encouragement and practice of labor effort, honesty, zeal and enthusiasm; **(vii)** the guarantee of individual freedoms and social harmony; **(viii)** the imposition of laws against criminal acts; **(ix)** ensuring the sovereignty and the strengthening of international cooperation.

The PARPA II identifies eight cross issues, including: The gender, HIV/AIDS, environment, safety and nutrition, science and technology, rural development, disaster, demining.

Under the environment component, most of the Mozambican population depends on the exploration of natural resources for their livelihood and income generation. The scope of the objectives depends on how natural resources are managed and conserved and the relationship between its use and exploitation and benefits for the poor. There is a strong link between poverty and environment. The unplanned growth of population density contributes to a more accelerated environmental degradation. Poor households depend for their daily subsistence, activities which directly affect the environment such as:

- Habitation and cultivation in areas prone to erosion;
- Permanent use of plant material for construction, preparation of food and production of household utensils;
- Inadequate sanitation and drainage;
- Use of fire for clearing areas of cultivation;
- Incorrect management and disposal of solid and organic waste.

In urban areas, improvement of conditions of environmental degradation is through proper planning measures, or urban regeneration, including **(i)** elaboration of the cadastre and land arrangement, **(ii)** the provision of proper infrastructure for access, drainage and water supply.

An integrated development of the area may contain the proliferation of informal settlements on the outskirts of urban centers, which represent a serious attack on public health, welfare and biodiversity

The major environmental priorities in Mozambique focus on following areas: **(i)** sanitation of the environment; **(ii)** territorial planning; **(iii)** prevention of land degradation; **(iv)** management of natural resources, including control of fires; **(v)** legal and institutional aspects, or environmental education, enforcement of legislation and institutional capacity; **(vi)** reduction of air pollution, water and soil, and; **(vii)** prevention and reduction of the effects of natural disasters.

The most visible aspects in the environmental sector in the PARPA II components include:

1. Continuous development of plans of territorial ordenance specially in emerging areas for economic development and tourism;

2. Management of natural resources especially the level of conservation in Situ and increasing their area;
3. Environmental education especially in population centers.

NEPAD has a philosophy want to stop the marginalization of Africa in the globalization process and promote the role of women in all activities. Its overall objective is to promote a new impetus to the development of Africa, reducing the gap between the African continent and the developed countries. Long-term goal is to eradicate poverty in Africa and place African countries individually and collectively, on the path of sustainable growth and development and stop this way, the marginalization of Africa is that the objects in the process of globalization and promote the role of women in all activities.

The environmental initiative of NEPAD recognizes that a healthy and productive environment is a prerequisite for the *New Partnership for Africa's Development*. It is also recognized that the range of issues necessary to nurture this environmental base is vast and complex, and that a systematic combination of initiatives to develop a coherent environmental program. It is also recognized that a key objective of the Environment Initiative must be to fight poverty and contributing to socio-economic development in Africa. The Environment Initiative has identified eight priority actions to be referred to as: **(i)** desertification; **(ii)** conservation of wetlands; **(iii)** invasive alien species; **(iv)** coastal management; **(v)** global warming; **(vi)** Transfrontier conservation areas **(vii)** environmental administration and **(viii)** security requirements of legal, planning, training and capacity building.

Millenium Development Goal (MDG) preconize eight objectivs namely: **(i)** combating hunger and poverty; **(ii)** combat infant mortality; **(iii)** environmental sustainability; **(iv)** universal primary education; **(v)** maternal health; **(vi)** partnership for development; **(vii)** gender equality; **(viii)** HIV/AIDS and malaria.

In environmental components, especially MDG advocates the integration of the principles of sustainable development into country national policies and programs and reverse the loss of environmental resources, a goal suspected unlikely to reach soon.

Table 22. Good examples at the level of PARPA II, NEPAD e MDG in Mozambique

Programme	Good examples with positive results for the biodiversity	Constraints	Existing incentives
PARPA II	<ol style="list-style-type: none"> 1. Decentralization to the district. Recognition of the district as a pole of development 2. Integration of environmental aspects in district development plans. Training at the PES and the environmental tax plan. 3. Existence of the reflection group on the environment brings together the institutions of CONDES and 	<ol style="list-style-type: none"> 1. Few human resources at the district level; <ol style="list-style-type: none"> 1.1. The OIIL did not include the funding for the environment / biodiversity; 2. Need for continuation of this training 	<ol style="list-style-type: none"> 1. Financing of District (Budget for Investment and local Initiative-OIIL)

	discusses the environmental component of the PARPA.		
NEPAD	The national environmental management - MEAS initiative, show synergy between the 3 conventions; design of single model of producing a single report for the 3 conventions.	Although not adopted as a legal instrument, defined only the format of the report, limited funding.	Belgian and Norwegian funding
MDG	<ol style="list-style-type: none"> 1. Increase in areas of conservation; 2. Regulation of EIA; 3. Emergence of the policy debate of environmental conservation; 4. Start new discussions of environmental management; 5. Initiatives to create independent management unit 6. Re-classification of Transfrontier conservation areas (Limpopo, Chimanmani, Libombos). 	<ol style="list-style-type: none"> 1. Increase in area does not always mean an increase of effective protection, increased capacity to make effective protected areas, connectivity and sustainability of the areas of protection; weak supervisory capacity in protected areas; 3. Not yet approved 	<p>-Creation of specific government investment and support of the international community.</p> <p>-Statistics and evaluation of objectives, monitoring of actions to achieve the objectives (Report of the National Assessment of Implementation of the MDGs)</p>

(ii) Existing formal communication mechanism for mainstreaming

The National Council for Sustainable Development (CONDES), established under Article 6 of Law 20/97 of the Law on the Environment, is an advisory body of the Council of Ministers and the public hearing on environmental issues, ensuring effective and proper coordination and integration of the principles and activities of environmental management in the development of the country. Therefore CONDES is one of the principal instruments integrating sectoral and inter-sectoral and mainstreaming. It is competence of CONDES the following:

- Opinions on the sectoral policies related to natural resources management;
- Give its opinion on proposed legislation supplementary to this Act, including the proposed creation or revision of sectoral legislation related to management of natural resources of the country;
- Opinions on the proposed ratification of international conventions on the environment;
- Develop proposals for the creation of financial incentives or otherwise to promote the economic to the adoption of environmentally sound in the everyday use of the resources of the country;

- Propose mechanisms for simplifying and streamlining the process of licensing of activities related to the use of natural resources;
- Make recommendations to the ministers of the various areas of natural resource management on aspects of their areas;
- Serve as a forum for resolving disputes related to the institutional use and management of natural resources;
- Carry out other duties assigned to him by this law and other environmental legislation.

(iii) Government Funding mechanisms for environment

Mozambique has two major government funding schemes for environment and biodiversity issues viz. The National Fund for Environment (FUNAB) and National Research Fund (FNI).

The National Fund of Environment (FUNAB) created with the aim of promoting activities and promoting environmental management and serves as background for contingencies in case of accidents or environmental damage. The FUNAB leads the country in promoting a healthy environment, in achieving a high quality of life and a social development, environmental and economic balance.

The FUNAB is managed by the Environment Minister for Coordination of Environmental Action, and is administered by the Board of Directors composed of representatives of several ministries such as Ministry for Coordination of Environmental Action, Ministry of Finance, Ministry of Agriculture, Ministry of Industry and Trade, Ministry of Tourism, Ministry of Mineral Resources and Ministry of Fisheries.

Responsibilities of FUNAB:

- Support activities of management of natural resources that contribute to a more healthy environment at the local level, including the fight against erosion and desertification;
- Contribute to the promotion of activities related to the management of areas of environmental protection or sensitive, rehabilitation or restoration of degraded areas;
- Support the implementation of technical-scientific activities for the introduction of technologies and best practices for sustainable development;
- Promotion of activities related to environmental impact assessment and other activities related to assessment of environmental impacts resulting from actions or development activities.
- Contribute to the achievement of economic enterprises wishing to use the technology and environmentally sound production processes;
- Propose the adoption of fees for maintaining the environment.

Since its creation, the FUNAB, with the support of its partners, has developed various activities in order to successfully fulfill their statutory duties. Several projects in the areas of awareness and environmental education, combating erosion and uncontrolled fires, the open fecalism, planting trees, among other activities, has to be financed by FUNAB all over the country, with emphasis on the support provided in the provinces of:

i. Maputo, which gave financial support to projects in the Forestry of Mahubo ward, in the district of Boane, planting of trees in the School of Mumemo and neighborhoods, in the district of Marracuene; planting of trees in the ward 3rd of February, in the district of Manhiça, which included environmental education and campaigns to support the celebrations of World Environment day and the Afforestation of Neighborhood Mathemele;

ii. Inhambane, which supported the reforestation of areas affected by cyclone Delfina and

Japhet and Rehabilitation Project of the Monument Tofinho, the Draft Statement of Green Zones and Integrated Solid Waste Management in Municipalities of Inhambane and Maxixe;

iii. Sofala, which supported the Draft Recovery of the river bed Ndengo in the district of Dondo;

iv. Zambézia, where the projects were funded from the Training of Community Radio Reporters Tumbene-Milange; Planned Community Education on the main environmental problems and the radio programs of community education in the districts of Ile and Morrumbala; and

v. Nampula, which supported the anti-erosion project in High School and community of Napipine

The FUNAB was also responsible for managing the first phase of the Greater Maputo Preparatory Project, funded by DANIDA which resulted in the construction of the wall of Trash Hulene, Consolidation of Peace Garden in the city of Maputo; Management of sea-side (margina), which consisted of a study on the situation of erosion in the marginal zone of Maputo city; Training of community associations for the maintenance of drainage ditches and sanitation of the environment in Maputo City, conduct a study for the location of a trash and improve the urban services in the town of Boane; Rehabilitation of the garden of Boane village and Production of Video-clip for environmental education.

Recently, in partnership with the Municipal Council of Maputo and the Ministry for Coordination of Environmental Action, the FUNAB promoted and financed the completion of a training course targeted to 29 activists of environmental, awareness from various community-based organizations (OCBs). This project covered the Districts of Polana Caniço A, Somerschild 2, B and C Central District, Alto Maé and Polana Cimento B.

National Research Fund (FNI), under Ministry for Science and Technology was created few years ago and currently have been funding research and innovation in various parts of Mozambique as well as funding regional research involving Mozambique and South African scientists

(iv) NGO and CBO that engage on mainstreaming biodiversity

Role of Private sector NGOs and Community in Promoting biodiversity

The role of the private sector includes:

- Promotion of natural resources conservation and research;
- Collaboration with national and international research institutions;
- Involvement of community intervention;
- Socio-economic development;
- Tourism development;

- Involvement in the policies of economic and social development and the preservation of biodiversity, with the aim of achieving sustainable development in this for future generations;
- Participation in the management, conservation and exploitation of forest and faunal resources, to give greater added value, and improve development for local communities.

The role of the NGOs includes:

- Promotion of natural resources conservation and research;
- Colaboration with national and international research institutions;
- Involvement of community intervention;
- Socio-economic development.

The role of local communities includes:

- Conservation of natural resources and the environment by recognizing and valorization the traditions and knowledge of local communities;
- Management and conservation of forest and faunal resources through the exchange of experiences and environmental education;
- Participation in the elaboration of policies and legislation on the management of natural resources of the country, as well as the development of implementation of the National Program for Environmental Management;
- They are responsible to help the Government in protecting and enhancing the environmental heritage and cultural history in particular;
- Participation in environmental management through programs and mechanisms for formal and informal environmental education;
- Involvement in the policies of economic and social development and the preservation of biodiversity, with the aim of achieving sustainable development for future generations.

Table 23. Stakeholders with biodiversity especially in the private sector, NGOs and Community in Mozambique

Province	Private Sector	NGOs	CBO	Community Sector
Cabo Delgado	Maulane	Agha Khan, WWF,		
Niassa	Chibatu-Chetu	ASSANTE; VAPA; ARO MOÇAMBIQUE; AJON; ASAACA; AFINAL; APROAJE; LEMO; A.C. E.M; A.R.D.M.A.C; ANAME; AMAPA; ACODENIA;		

		MUKHALELO		
Nampula	SIMA	Agha Khan?; CCM,		
Zambézia	AGRIMO, PRODEZA	IUCN, RADEZA,	AZADER	
Tete		ASA, TCHUMA-TCHATO		
Sofala		ADEL, AMACO, CADM, JUVELBE, KULIMA		
Manica		ADEM	MCDR	
Inhambane		FOPROI; GMD		KHENSANI
Gaza	ADCR	WWF; APROS; FONGA		Fazenda do bravio de Mahel
Maputo	CTA, FEMA, AIMO	ADEL, KULIMA		UNAC
Maputo city/National	FDC, JA, CTV, AICMO	JA, CTV, FNP/EWT WWF	FECIV	Clube Ornitológico Moç, , Grupo Universal, Grupo LHUVUKO, NEPA

Other strategies include:

The Small Grant Programme (SGP), is a corporate program founded by the Global Environment Facility (GEF). Launched in 1992 in response to the commitments of the Rio Conference, supports activities of non-governmental organizations and community-based in developing countries. It is implemented by UNDP and executed by UNOPS.

The areas of focus of the SGP are biodiversity, climate change, international waters, degradation of land, persistent organic pollutants and adaptations to climate change. SPG portfolio comprises 60% of global resources for biodiversity, 20% for climate change, 6% for international waters and 14% for multi-focal areas.

As a beneficiary country, Mozambique was chosen for its well positioned geographical niche of eco-regions, allowing to increase the scope and impact of the program. Thus the program allows the training of community groups, exchange of knowledge and experience, replication of best practices and promote reform in the policies related to the environment. Its thematic approach allowed the promotion of environmental awareness in target communities, which began to adopt innovative management towards sustainable use of natural resources. These target groups, improved their alternatives for subsistence and income level of their households.

In the last round of this program, between 2007-2008, the projects submitted and approved the program covered the various types of ecosystems: coastal marine ecosystems, forest, arid, coastal and estuarine ecosystems, and freshwater lakes, afro-montains and multi-focal areas.

The SGP continues to invest in Mozambique that the target beneficiaries of their activities are local communities. These communities are actually the owners of natural resources. Under their custody, endemic flora, birds, medicinal plants, forest resources, turtles and coral, which are currently threatened will be recovered. Why SGP focused on approaches to improve community management of water, soil, forests, wildlife resources. Ensuring that the exploitation of firewood and charcoal is made to sustainable levels and that negative impacts of these practices are mitigated.

Similar programs such as the SGP are being implemented in Mozambique by other institutions such as UNEP, MICOA, UNIDO, FUNAB, IUCN and BP. A technical coordination and approaches would be beneficial and the impact could be even greater. This is the great challenge for the future not only of the SGP central to all initiatives in improving the environment in Mozambique.

WIOLab project (UNEP). The main program under the aegis by UNEP is the incitaiva WIOLab (cross or common framework based on the land that affect the immediate coastal zone and marine) in the context of the Nairobi Convention which calls for cooperation between the countries of East Africa to overcome marine and coastal issues that can not resolved by each country individually. The project WIOLab-UNEP has 4 main components namely: **(i)** Physical changes and degradation of habitats; **(ii)** pollution /alteration of water quality; **(iii)** environmental changes due to changes in the amount of water especially on the rivers and estuaries; e **(iv)** issues of environmental governance. The focal point of the WIOlab project is MICOA. The most visible product of this project started in 2005 was the Demostration Project implemented by Lumb by Mozambican NGOs, Environmental Working Group (GTA) in which they work to recover degraded mangrove, aquaculture programs, and promotion of livelihood activities of the population as horticulture and beekeeping. More activities should be implemented in Mozambique in scope depending WIOLab-UNEP however the commitment of the focal point of this project in Mozambique and their interconnection with the various environmental stakeholders in Mozambique and eastern states region.

A WWF (Worldwide Fund for Nature) have substantial involvement in the activities of monitoring and sustainable use of marine resources, with emphasis on the Quirimbas National Park, the National Park of the Bazaruto Archipelago and environmental initiatives with the Primeiras and Segundas islands. The WWF also has research activities geared towards the terrestrial environment like fauna management and floristic studies.

WWF's program in Mozambique supports various initiatives in the conservation of the marine environment, forests, water, environmental education and training, environmental journalism, community involvement and endangered species. This group of species includes the African elephant, the turtles, the dugong, whale sharks, whales, dolphins, corals, among others. WWF also has activities in the Lake Niassa, in the Zambezi Delta, in Parks (National Park of the Bazaruto Archipelago and Quirimbas National Park) and the Sofala Bank (dealing with fishing for shrimp). Among the various activities, include the introduction of TED (Turtle Excluder Devices), marking turtles (tags), supporting projects CBNRM (community management of natural resources) and training for game and forestry conservation in Gorongosa National Park special School, and the national management of coral reefs. The WWF is also supporting the process of declaration of a protected area in the Archipelagos of Primeiras and Segundas islands.

Other institutions involved in activities in support of research development and management of biological resources include the IUCN, FUNAB, UNIDO.

United Nations Industrial Development (UNIDO), to assist developing countries and economies in transition in their fight against marginalization. The UNIDO mobilizes knowledge, skills, information and technology to promote productive employment, a

competitive economy and a healthy environment. Additionally, the organization emphasizes cooperation at global, regional, national and sectoral level.

The UNIDO is assisting in improving the living conditions of people and in promoting overall prosperity offering solutions to measure, for the sustainable industrial development of developing countries and countries in transition. It cooperates with governments, business associations and private industry to develop industrial capacity that can meet the challenges and bring the benefits of globalization to the industry.

The UNIDO focuses on three inter-related priority themes:

- Development of Business Capacity
- Poverty Reduction through Productive Activities
- Energy and Environment

To improve standards of living through industries that are internationally competitive and environmentally sustainable, the organization has created a wide range of projects related to development of trade capacity in the UN system. The main emphasis is on promoting growth of the sectors of small and medium enterprises - the central generator of wealth in most developing countries.

The UNITED occupies a special place in the UN system since it is the only organization that promotes the creation of wealth and deals with poverty alleviation through the development of private industry.

Mozambique is a member of UNIDO since December 1983 and, as such, has, since then, assistance by way of projects of technical and institutional capacity building, focusing on the sectors of energy, development of small and medium businesses in key areas of the main industry, science and technology, human resource development, among others.

Some projects worth mentioning in the context of cooperation Mozambique/UNIDO include improving the business environment and trade facilitation, promotion of gender equality, development of skills and employment for young people, assistance and transfer of information and communication technologies (TIC).

Mozambique enjoys the benefits of UNIDO in the context of food security, as a country that suffers from cyclical shortages of food following a disaster whose effects are detrimental to agricultural production and productivity.

The actions of UNIDO as a specialized UN agency dedicated to promoting sustainable industrial growth accelerated in developing countries, is about providing support to partner countries in three priority areas, namely (i) poverty reduction through increased production, (ii) training and capacity building on trade, (iii) energy and environment.

(v) Existing research initiatives at research institutes dealing with biodiversity

The Eduardo Mondlane University (UEM) has recently developed two environmental projects financed by the UE and implemented by several European and African countries. (i)

TRANSMAP- dealing with technical and scientific parameters for establishing a coastal and marine park between Mozambique and Tanzania and between Mozambique and South Africa
(ii) PUMPSEA – to understand the role of the mangrove forests near the urban centers as potential biofilter of household waste in Maputo, Dar-Es-Salaam (Tanzania) and Mombasa (Kenya). Other existing research initiatives at UEM include those both marine and terrestrial resources covering all ranges of works such as elephants movements and behavior, drought resistant crops, indigenous wild fruits, and on conservation areas plant and animal resources. Open Fund (Fundo Aberto) from UEM is an existing minor funding scheme for various research initiatives including those on environment/biodiversity for university students and staff. The **Centre for Sustainable Development of the Coastal Zones (CDS-ZC)** has been implemented various initiatives for coastal zone resource description and research as well on coastal zone management for the provinces located in the southern Mozambique (Maputo, Gaza and Inhambane).

(VI) Ecosystem adoption approach and EIA regulation

Adoption of the vision of the ecosystem in the mainstreaming of biodiversity is used in Mozambique

The regulation on the process of environmental impact assessment requires that the activities located in or related areas and ecosystems with special status of protection in both the national and international legislation, are subject to studies of environmental impact assessment. These areas and ecosystems include: barriers of coral reefs, mangroves, native forests, small islands, areas of conservation and protection, wetlands, areas containing animal species and/or plants, habitats and ecosystems in the extinction requiring special attention, areas containing resources of value such as medicinal plants and aquatic resources (Article 3).

Additionally they are also subjected to studies of environmental impact assessment activities involving the clearing, fragmentation and exploitation of native vegetation in an area exceeding 100 ha, all activities of deforestation over 50 ha and afforestation and reforestation of over 250 ha , Introduction of new crops and exotic species, creation of national parks, reserves, hunting, management of wildlife areas and buffer areas, exploitation of natural fauna and flora, introduction of exotic species of fauna and flora.

The assessment of environmental feasibility of the proposed activity is made among other criteria by the type of ecosystems, plants and animals affected, the affected area, probability, nature, duration, intensity and significance of impacts; direct, indirect, potential, and cumulative total of impact and reversibility and irreversibility of the impact (Article 8 paragraph 1).

Chapter IV - Conclusions: Progress towards the 2010 Target and Implementation of the Strategic Plan

Table 24. Progress towards the 2010 in implementation of the NBSAP (1=poor, 2=substandard, 3=fair, 4= good, 5=very good)

Goals and targets	Progress towards the Target		
	Corresponding National Target	Assessment toward 2010	Rate (1-5)*
Protect the components of biodiversity			
<i>Goal 1. Promote the conservation of the biological diversity of ecosystems, habitats and biomes</i>			
Target 1.1: At least 10% of each of the world's ecological regions effectively conserved.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.1, 1.2, 1.4, 1.5 and 1.7 of NBSAP	Mozambique as surpassed this target by increasing the area und protection from 11% to 16% (new parks: QNP, LNP, area increase of PNAB). Needed reinforcement of NP management New draft policies for conservation and implementation strategy (PCEI) with new criteria for reclassification and creation on new of CA.	4
Target 1.2: Areas of particular importance to biodiversity protected	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.1, 1.2, 1.4, 1.5 and 1.7 of NBSAP.	Several conservation areas created or expanded mainly related with faunal diversity (mammals and dugong) and protection of afro-mountain habitat	5
<i>Goal 2. Promote the conservation of species diversity</i>			
Target 2.1: Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.2, 1.4, 1.5 and 1.7 of NBSAP.	Creation of Chimanimani TFCA. reinforcement needed	3
Target 2.2: Status of threatened species improved.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.2, 1.4, 1.5 and 1.7 of NBSAP.	Red List of plants for Mozambique published in 2002. Adopted an international red list for terrestrial fauna & marine organisms. A Mozambican list need to be updated and published for fauna and flora	3
<i>Goal 3. Promote the conservation of genetic diversity</i>			
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.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.3, 1.5, 2.1 and 2.2 of NBSAP.	Recent creation of Chobela research institute devoted to livestock. Continuing collecting for the national gene bank. Wildlife reintroduced in CA. More information needed for crops, trees, marine/aquatic resources	3
Promote sustainable use			
<i>Goal 4. Promote sustainable use and consumption.</i>			
Target 4.1: Biodiversity-based products derived from sources that are sustainably managed, and production areas managed consistent with the conservation of biodiversity.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 2.1 e 2.4 of NBSAP	Few initiatives on cultivation of medicinal plants for localized people's consuption	2
Target 4.2. Unsustainable consumption, of biological resources, or that impacts upon biodiversity, reduced.	National targets and indicators not defined in NBSAP	Reinforcement of resources allocated within Conservation areas. More needed for in-situ conservation and propoagation	2

<i>Goals and targets</i>	<i>Progress towards the Target</i>		
	<i>Corresponding National Target</i>	<i>Assessment toward 2010</i>	<i>Rate (1-5)*</i>
Target 4.3: No species of wild flora or fauna endangered by international trade.	National targets and indicators not defined in NBSAP	Dissemination of Plant Red List. Some dissemination of animal species with restriction of international trade. Reinforcement in border posts still needed.	2
Address threats to biodiversity			
<i>Goal 5. Pressures from habitat loss, land use change and degradation, and unsustainable water use, reduced.</i>			
Target 5.1. Rate of loss and degradation of natural habitats decreased.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.7 of NBSAP	Decrease observed only in conservation areas	3
<i>Goal 6. Control threats from invasive alien species</i>			
Target 6.1. Pathways for major potential alien invasive species controlled.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.8 of NBSAP	Invasive or alien plants documented. Regulation on control of alien invasive approved (decree 25/2008). Reenforcement needed.	3
Target 6.2. Management plans in place for major alien species that threaten ecosystems, habitats or species.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.8 of NBSAP	General management plans exists for only the conservation areas	3
<i>Goal 7. Address challenges to biodiversity from climate change, and pollution</i>			
Target 7.1. Maintain and enhance resilience of the components of biodiversity to adapt to climate change.	National targets and indicators not defined in NBSAP	Few assessment carried out to understand biodiversity and climate change	2
Target 7.2. Reduce pollution and its impacts on biodiversity.	National targets and indicators not defined in NBSAP	Pollution aspects addressed in habitats such as marine	2
Maintain goods and services from biodiversity to support human well-being			
<i>Goal 8. Maintain capacity of ecosystems to deliver goods and services and support livelihoods</i>			
Target 8.1. Capacity of ecosystems to deliver goods and services maintained.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.8, 2.1, 2.3 and 2.4, of NBSAP	Mostly in conservation areas	3
Target 8.2. Biological resources that support sustainable livelihoods, local food security and health care, especially of poor people maintained.		National targets and indicators not defined for marine trophic index in NBSAP	Coastal marine resources banned for harvesting by industrial/semi-industrial fisheries. Customary practices of conservation and sustainability sometime promoted
Protect traditional knowledge, innovations and practices			
<i>Goal 9 Maintain socio-cultural diversity of indigenous and local communities</i>			
Target 9.1. Protect traditional knowledge, innovations and practices.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 2.1, 2.3 and 2.6 of NBSAP	<i>Interest on document major traditional practices with and the resources used with special focus on medicinal plants.</i>	3
Target 9.2. Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit-sharing.		<i>20% of tourism entry fee are sent to local communities in Conservation areas.</i> <i>Regulation on benefit sharing of genetic resources and traditional knowledge (decree 19/2007)</i> <i>More needed for the protection of the traditional knowledge</i>	3

Goals and targets	Progress towards the Target		
	Corresponding National Target	Assessment toward 2010	Rate (1-5)*
Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources			
<i>Goal 10. Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources</i>			
Target 10.1. All access to genetic resources is in line with the Convention on Biological Diversity and its relevant provisions.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.8, 2.1, 2.3 and 2.4 of NBSAP	<i>Crop plants targeted by Mozambique dept on genetic resources</i>	2
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		<i>Not implemented</i>	1
Ensure provision of adequate resources			
<i>Goal 11: Parties have improved financial, human, scientific, technical and technological capacity to implement the Convention</i>			
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.	National targets and indicators not defined in NBSAP	Do not exist or nor visible	1
Target 11.2. Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph 4.	National targets and indicators not defined in NBSAP	Access to technology bounded by the <i>regulation on benefit sharing of genetic resources and traditional knowledge (decree 19/2007)</i> No data known on technology transfer, its impacts. Effective implementation needed	2

1=poor, 2=substandard, 3=fair, 4= good, 5=very good

The mobilization towards 2010 can be summarized into the following major actions that Mozambique has been undertaken:

- Increased amount of people having formal education in biodiversity and resources management
- Publication of activities such as census of fauna; national forestry inventory and reports for conservation areas
- Several studies published as university thesis.
- Increasing number of conservation areas (up 16% legally under protection).
- New conservation areas proposed or to be proposed for conservation. This covering both terrestrial and marine environments as well as TFCA (Trans-frontier conservation areas)
- Development of strategies such as those for desertification and climate change
- Habitat rehabilitation: emphasis to mangrove rehabilitation initiatives, emphasis to Lumbo (Nampula), UNEP-WIoLab initiative.
- Strategies for invasive plants.
- Initiatives under MCT e.g. on biotechnology, medicinal plants research.
- Extensive programmes implemented by international NGO. WWF has a strong presence in national parks and on implementation of EAME (East Africa Marine Ecoregion) vision. IUCN has been strongly involved in environmental conscientiousness, in project funding and implementation in quite all provinces of Mozambique, involving also various stakeholders and institutions.

Major constraints encountered in this 2010 preparation were:

- Activities are not always coordinated under CBD. Some were implemented as part of the strategies of various institutions, NGO, etc.
- Mozambique has limited financial resources and funding of biodiversity protection in the ground may have been neglected.
- Lack of insufficient coordination at inter-sectorial level.
- Lack of qualified people to undertake various specific work of biodiversity assessment and protection.
- The country has several strategies and regulations but effects on the ground has so far been limited due sometimes to lack of funds for reinforcements and recruitment of qualified people.

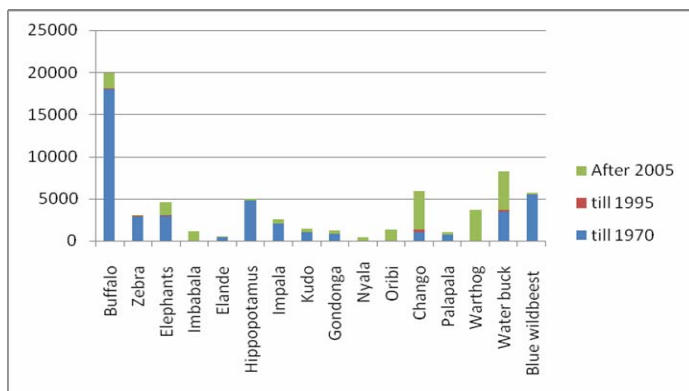
Overall assessment of the implementation of the Convention had an impact on improving conservation and sustainable use of biodiversity. Areas for further interventions are increasing mainstreaming, capacity building, policies for ex-situ conservation, need for data-basing and data publishing. Mozambique needs also to fill the gape between the existing quite robust strong instruments and institutional mandates with the reality on the ground where reinforcement is strongly need. There is also a great need to tackle emerging issues such as uncontrolled fires, climate change and human-animal conflicts. The progress towards the Goals and Objectives of the Strategic Plan of the Convention has been visible and significant in Mozambique

Furthermore, it is desired that, in future, Mozambique embraces environmental objectives, goals and deadlines that will ensure effective and timely implementation of environmental and biodiversity targets. Suggestion a revision of the NBSAP to include indicators for environmental policy for education, conservation, sustainable use, industrialization and information technology mainly.

Gorongosa National Park: cases study of successful biodiversity recovery

Gorongosa National Park is located in central Mozambique and includes the southern part of the Rift Valley. It was declared conservation area in 1960, currently occupying a total area of approximately 3.770 km². In the 1960's and 1970's, Gorongosa was one of the most famous game parks in Africa. The park had a number of endemic plants and large populations of wildlife, some of the most emblematic species of the park being buffalos and rhinos. Avifauna in the park was rich, and included resident, migrant and endemic species, such as the dappled-mountain robin (*Modulatrix orosthrutus*) and the whitebreasted alethe (*Allete fuerlleborni*) (Hatton et al., 2001). However, with the outbreak of the civil war in the mid 1970's the situation changed drastically. During the war the park was successively occupied and used as military base of antagonist armies. These occupations forced the staff working in the conservation area to flee, and the park was abandoned during the civil war. Militaries from both armies killed many animals for food and trophies, rhinoceros horn and ivory for exportation. Also militaries from South Africa and Zimbabwe (supporters of antagonistic armies respectively) were reported to get into conservation areas (Gorongosa included) and hunt for horns and ivory. Lions and other great predators were killed for sport or died of starvation when their preys disappeared (Hatton et al., 2001). After the end of the war in 1992 the raised aim to give back to Gorongosa its status of Area of Outstanding Biological Value was limited by the lack of financial and human resources and the numerous land mines placed inside the reserve and in its surroundings (Hatton et al., 2001). However, a number of private and governmental initiatives, which also included the participation of local communities that had, in the mean time, moved back to their former lands, allowed a slow but steady recovery of the park and its wildlife. Gorongosa Park was considered one of the major areas of great biodiversity and wildlife in Mozambique (Ministério da Agricultura, 2008). These included rehabilitation programs of the African Development Bank, the European Union, the [International Union for the Conservation of Nature](#) (IUCN), Carr Foundation, and others. The rehabilitation of the park passed through recovery of destroyed infrastructures, recruitment of specialized staff and re-introduction of some species.

Table 1: Wildlife population variation (number of species) at GNP. Adapted from Hatton et al., 2001 and <http://gorongosa.blogspot.com>.



¹ – Buffalo re-introduced from Kruger National Park after 1995

² – Most elephants re-introduced from the Limpopo area after 1995

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

A. Reporting Party

Contracting Party	Republic of Mozambique
NATIONAL FOCAL POINT	
Full name of the institution	Ministério para a Coordenação da Acção Ambiental Direcção Nacional de Gestão Ambiental
Name and title of the contract officer	<i>Anselmina L. Liphola,</i> Head of Dept of Conservation and Natural Resources and CDB Focal Point
Mailing address	<i>Av. Acordos de Lusaka, 2115, Caixa Postal 2020</i> Maputo – Moçambique
Telephone	+ 258 21 466244/465299
Fax	+ 258 21 465849
E-mail	minaliphola@yahoo.com.br or anselmina.liphola@micoa.gov.mz
CONTACT OFFICER FOR NATIONAL REPORT (IF DIFFERENT FROM ABOVE)	
Full name of the institution	Universidade Eduardo Mondlane
Name and title of the contract officer	Salomão O. Bandeira, Associate Professor and Head of Botanical Section, Universidade Eduardo Mondlane
Mailling address	PO Box 257, Maputo, Mozambique
Telephone	+258 21491223
Fax	+258 21 49 2277
E-mail	sband@zebra.uem.mz
SUBMISSÃO	
Assinatura do funcionário responsável para a submissão do relatório nacional	<i>Anselmina L. Liphola,</i> Direcção Nacional de Gestão Ambiental <i>Ministério para a Coordenação da Acção Ambiental</i>
Data de submissão	<i>June 2009</i>

B. Process of preparation of national report

This report was accomplished using the following main procedures:

1. Extensive consultation of literature including government files and previous CBD reports produced for Mozambique. Focus given to description of current knowledge on biodiversity and analysis of biodiversity value, root cause analysis for biodiversity degradation, its impacts and future scenarios on biodiversity management.
2. Consultation of Mozambican websites (e.g. on instruments and institutions, on national statistics and on conservation areas).
3. Organization of two workshops to discuss all chapters of the 4th National Report on CBD. Major stakeholders (e.g. government entities, research institutions and NGOs) were involved in these workshops. The workshop provided additional comments on issues such as analysis of NBSAP, mainstreaming biodiversity and progress towards 2010 target and implementation of the strategic plan of CBD.
4. Close liaison with CBD focal point in Mozambique.
5. Workshop on Least Developed Countries on 4th National Report on CBD, 4-8 November, Addis Ababa, Ethiopia. This workshop helped bringing further analysis into the role played by insect pollinators in crop production; standard reporting procedure for Chapter IV and analysis of Mozambique rating performance on mobilization for 2010 CBD goals.

Appendix II: Main source of information

Main Literature and reports used:

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Appendix III - Progress towards Targets of the Global Strategy for Plant Conservation and the Programme of Work on Protected Areas

A. Progress towards Targets of the Global Strategy for Plant Conservation

Table 1. Analysis on targets, action, outcomes and obstacles encountered for global strategy for plant conservation (1=poor, 2=substandard, 3=fair, 4= good, 5=very good)

Targets	Corresponding national target	Action taken to achieve these targets	Outcomes/results for these actions	Rate (1-5)	Challenges encountered
Target 1: A widely accessible working list of known plant species, as a step towards a complete world flora	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.1, 1.2, 1.4, 1.5, 1.7 and 1.8 of NBSAP.	Maintenance of existing herbarium Publication of Regional flora (Flora Zambesiaca-FZ) . Training in plant studies. Vegetation studies in NParks & Reserves	Two main herbaria well kept. Publications of FZ . Reports on vegetation studies from NP & reserves. Still few qualified people	2	Need of training, qualified personnel and resources for Herbarium & fieldwork. Need to revitalize research towards the publication of Flora de Moçambique
Target 2: A preliminary assessment of the conservation status of all known plant species, at national, regional and international levels	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.1, 1.2, 1.4, 1.5, 1.7 and 1.8 of NBSAP.	Production of Red Data List for Mozambique plants. Vegetation surveys in NP and areas suspected having species of special concern	Plant RDL published in 2002. Vegetation reports for NP (highlight to GNP, QNP & vegetation studies for QNP, REM	3	Need of expertise and resources. New updating of this RDL is recommended.
Target 3: Development of models with protocols for plant conservation and sustainable use, based on research and practical experience	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.2, 1.4, 1.5 of NBSAP.	Models based on systematic conservation planning developed for two transboundaries areas	Covering plant resources for Matutuine and Maputo Special Reserve and marine resources in Quirimbas Archipelago	2	Need of expertise and resources
Target 4: At least 10 per cent of each of the world's ecological regions effectively conserved	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.1, 1.2, 1.4, 1.5, 1.6, 1.7 and 1.8 of NBSAP.	Conservation areas in Mozambique have historically targeted fauna (less on flora)	Major ecological regions are conserved. But percentage evaluation is still needed	3	More need for protection of coastal forest and inselbergs archipelago/mountains. Expertise and resources needed
Target 5: Protection of 50 per cent of the most important areas for plant diversity assured	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.1, 1.2, 1.4, 1.5, 1.7 and 1.8 of NBSAP.	Increasing areas of conservation as NP, reserves of TFCA, declaration of a 1 st RAMSAR site.	Creation TFCAs (Maputaland, Chimanimani, Limpopo), QNP. LNP. Marromeu reserve proclaimed as RAMSAR site. 50% not yet assured	3	Need to evaluate again areas of plant diversity. Reinforcement needed. Need to cover coastal forests and mountains.
Target 6: At least 30 per cent of production lands managed consistently with the conservation of plant diversity	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.1, 1.2, 1.7, 2.1, 2.2, 2.5, 2.6 and 2.9 of NBSAP.	Only a regulation on territory ordenance approved (decree 23/2008)	Not known	2	Need of expertise and resources and framework for discussion and decision making
Target 7: 60 per cent of the world's threatened species conserved in situ.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.2, 1.3, 1.4, 1.5, 1.6 and 1.7 of NBSAP.	Not known	Not known	1	Analysis and strategy needed. Need to update again the Mozambique RDL. Publish one for fauna.
Target 8: 60 per cent of threatened plant species in accessible <i>ex situ</i> collections, preferably in the country of origin, and 10 per cent of them included in recovery and restoration programmes	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.2, 1.3, 1.4, 1.5, 1.6 and 1.7 of NBSAP.	Plans for ex-situ conservation of plants at national level needed. The University (UEM) has its own botanic gardens (JBU) devoted to conservation of special floral species	Over 200 species preserved at JBU, some being threatened, endemic and most used plant species.	2	Mozambique need strategy for ex-situ plant conservation. Need to establish regional botanical gardens. Need also restoration programs. resources and personal also lacking
Target 9: 70 per cent of the genetic diversity of crops and other major socio-economically	targets and indicators to fulfill this Goal are defined under the	Continuing development of the National Centre of Plant Resources (CNRG).	Still a long distance to achieve this target. The CNRG has limited	2	Upgrade CNRG. Need to cover other indigenous resources apart for crops.

valuable plant species conserved, and associated indigenous and local knowledge maintained	strategic objectives 1.6, 1.7, 1.8, 2.1, 2.2 and 2.8 of NBSAP.	Known field gene bank is that for cashew nut	capacity for both collection and storage of the plants genetic resources. .		Strategy for field genebank needed in Mozambique
Target 10: Management plans in place for at least 100 major alien species that threaten plants, plant communities and associated habitats and ecosystems	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.8, and 2.8 of NBSAP.	Regulation for control of invasive species approved.	Not yet knoww	2	Resources, research and network for information needed.
Target 11: No species of wild flora endangered by international trade	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.2 and 2.9 of NBSAP.	Centralized management authority for CITES exists.	Specimens for Institutions are well handled. But more infromaiton needed regarding other collection (e.g. medicinal plants, fauna)	3	CITES Species unknown at border posts. Need to bring an illustrated guide for the customs. Need planning on how to discourage collection of threatened plants/ animals at the source.
Target 12: 30 percent of plant-based products derived from sources that are sustainably managed	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 2.1, 2.2, 2.8 and 2.9 of NBSAP.	No strategy	No outcome	1	Strategy needed. Forum for initial discussion needed.
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.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.4, 1.5, 1.6, 1.7, 2.1, 2.2 and 2.9 of NBSAP.	Policy for the practice of traditional medicine approved Creation the Center for Research and Development in Ethnobotany(CIDE)	No vible results yet	2	Strategy needed. Resources and expertise needed.
Target 14: The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programs.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.1, 1.2, 1.6, 1.8, 2.2, 2.7, 2.8 and 2.9 of NBSAP.	Clear strategy unknown	Awareness via media. Some thought in schools	2	Strategy needed. Resources and expertise needed.
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.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 2.4, 2.6, 2.8 and 2.9 of NBSAP.	Several courses available in the country and abroad at various levels.	Some number of university graduates and post-graduates courses available	2	Incentives needed such as employment or dedicated research institutes to absorb the graduates and achieve the target
Target 16: Networks for plant conservation activities established or strengthened at national, regional and international levels	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.5, 1.6, 1.7 of NBSAP.	To adder to existing networks for herbaria and plant conservation	Outcomes not clear enough. Mozambique Herbaria are part of a SABONET, API (regional network).	2	SABONET is idle due to lack of funds. API aims at computerizing special herbarium plant material. More network desired

B. Progress towards Targets of the Programme of Work on Protected Areas

Table 1. Analysis on targets, action, outcomes and obstacles encountered for global strategy for protected areas (1=poor, 2=substandard, 3=fair, 4= good, 5=very good)

Goals	Target	Corresponding national target	Actions taken	Outcomes	Rate (1-5)	challenges
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 <u>1</u> / 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	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.4, 1.5, 1.6, 1.7, 2.1, 2.4, 2.6, 2.7 and 2.9 of NBSAP.	Creation of TFCA. Creation of new parks. Improve management of parks.	Limpopo & Chimanimani TFCAs created. Machangulo-Ponta De Ouro proposed, new parks: QNP, LNP. PNAG expanded. Management improved in many NP	4	Need for more Resources & expertise
1.2. To integrate protected areas into broader land- and seascapes and sectors, so as to maintain ecological structure and function.	By 2015, all protected areas and protected area systems are integrated into the wider land- and seascape, and relevant sectors, by applying the ecosystem approach and taking into account ecological connectivity <u>5</u> / and the concept, where appropriate, of ecological networks.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.4, 1.5, 1.6, 1.7, 2.6, 2.7 and 2.9 of NBSAP.	Systematic conservation planning research carried out for both terrestrial and marine areas of Mozambique bordering neighboring countries	Ponta d'Ouro-KZN (MZ-SA), Rovuma TFCA (MZ-TZ). Creation of Limpopo and Chimanini TFCAs	4	Need for more Resources & expertise
1.3. To establish and strengthen regional networks, transboundary protected areas (TBPAs) and collaboration between neighboring protected areas across national boundaries.	Establish and strengthen by 2010/2012 <u>6</u> / transboundary protected areas, other forms of collaboration between neighboring 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	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.4, 1.5, 1.6, 1.7, 2.6, 2.7 and 2.9 of NBSAP.	Planning and creation of TFCA/TBPAs	Ponta d'Ouro-KZN (MZ-SA), Rovuma TFCA. Creation of Limpopo and Chimanini TFCAs	4	Need for more Resources & expertise
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, drawing upon existing methodologies and a long-term management plan with active stakeholder involvement	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.1, 1.2, 1.4, 1.5, 1.6 and 1.8 of NBSAP.	Improve management of protected areas (PA). Increase research-based management in PA	Management and research increase in GNP, QNP, LNP, NR. Some on CNP, MER.	4	More planning and research needed in CA.
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.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.1, 1.2, 1.4, 1.5, 1.6, 1.7, 2.1, 2.2,	Forum for human-animal conflicts. Action for poaching reduction. Existing awareness for	People translocation plans for e.g. LNP. Creation of Marrupa Institute. Creation of zone categories on QNP. Sanctuaries	4	The issue of wildfires has not produced very visible

Goals	Target	Corresponding national target	Actions taken	Outcomes	Rate (1-5)	challenges
		2.8 and 2.9 of NBSAP.	wild fires	created. Threats reduced in some parks. GNP, LNP, QNP		outcomes
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	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.5, 2.1, 2.4, 2.6, 2.7, and 2.8 of NBSAP.	Community enrolment in conservation areas. 20% of tourism entry fee given to local communities	Good examples in QNP, GNP, PNAB, Inhaca	4	Need to solve unresolved existing conflicts with local communities
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 management of existing, and the establishment and management of new, protected areas	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.5, 1.6, 2.1, 2.3, 2.4, 2.6 and 2.7 of NBSAP.	All major conservation areas have liaison with communities.	Regular meetings with communities within or surroundings conservation areas. 20% of tourism entry fees in CA given to local communities	3	Still to reduce further the complains by 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.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.5, 1.6, 1.7, 2.1, 2.2, 2.3, 2.4, 2.6, 2.7 and 2.9 of NBSAP.	Policy for conservation and strategy for implementation		4	
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 institutional levels, and raise professional standards	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.1, 1.5, 1.7, 2.1, 2.2, 2.7 and 2.9 of NBSAP.	Creation and CONDES (National Council for Sustainable Development). Existence courses/training for various stakeholders dealing with CA.	function of CONDES. Improvement of PAs.	3	More capacity building needed both for planning and effective management of PAs.
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.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.5, 1.6, 1.7, 1.8, 2.6, 2.7 and 2.9 of NBSAP.	Most visible is the satellite tracking of elephants. GIS database for PAs	Increased management of PAs. Updated maps.	3	More use of technologies needed. Resources also needed.
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.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.5, 1.7, 1.8, 2.1, 2.2, 2.3, 2.6, 2.7 and 2.9 of NBSAP.	New proposed institutional framework for protected areas	To be approved by the government. This will ensure a Para - state status of Protected Areas	2	Approval and implemental needed
3.5. To strengthen communication,	By 2008 public awareness, understanding and appreciation of the	Some national targets and	Specif and non-specific programs	Awareness for	3	More needed in

Goals	Target	Corresponding national target	Actions taken	Outcomes	Rate (1-5)	challenges
education and public awareness.	importance and benefits of protected areas is significantly increased	indicators to fulfill this Goal are defined under the strategic objectives 1.5, 1.7, 1.8, 2.4, 2.6, 2.7 and 2.9 of NBSAP.	and projects created	wildfires. Site on legal and institutional framework on Environmental created. Environmental education using Media. Creation of a environmental education group (under MICOA)		environmental education
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.	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.2, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4, 2.7, 2.8 and 2.9 of NBSAP.	Minimum standards exist such as: related to number of people inside PAs, reduction of root cause actions that affect biodiversity (wild fires, poaching, etc.)	Increase of fauna in nearly all national PAs	4	More Resources needed
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	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.2, 1.4, 1.5, 1.7, 2.1, 2.2, 2.3, 2.6, 2.7 and 2.9 of NBSAP.	Policy for conservation & strategic for implementation of CA designed (PCEI). This establishes new criteria for new CA and reclassification of existing ones in Mozambique	Unknown	3	Need of additional baseline data. Need of resources. Implementation on once approved policy.
4.3. To assess and monitor protected area status and trends.	By 2010, national and regional 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	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.2, 1.4, 1.5, 1.7, 2.6, 2.7 of NBSAP.	Existing reports for national parks and reserves on mainly fauna.	Reports from the following main CAs: PNG, PNL, PNAB, PNQ, RN, REM.	4	more need for flora. Baseline data still needed
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	Some national targets and indicators to fulfill this Goal are defined under the strategic objectives 1.1, 1.2, 1.4, 1.5, 1.6, 2.7 and 2.9 of NBSAP.	Systematic conservation planning technique applied from northern and southern Mozambique. Data available for reshaping existing or new CAs.	Proposed new CA: RNRovuma/Palm a, Manchangulo-Ponta de Ouro new CA.	3	Resources needed