Republic of Angola
Ministry of Environment

FRAMEOWRK REPORT ON ANGOLA'S BIODIVERSITY

By:

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EXECUTIVE SUMMARY

Angola's biological diversity is one of the richest ones in Africa; this is due to various factors, whereby the main ones are: the country's surface; geographical location; ecosystem diversity (land, marine and coastal) and the fact that Angola has been a refugee zone over the last glacial period.

The land ecosystems are represented by four biomes. The most important one in terms of surface is the Zambezian biomes, which covers more than 85% of the national territory surface, while the Guinea-Congolese, though it represents only 10.7%, it contains the major wealth of the country. The Karoo-Namibe(2.6%) and the Afro-Upstream (0.5%) host equally a huge diversity of species, whereby the Afro-upstream is considered as a hotspot of water fauna in Africa with a high number of endemic species.

The knowledge available about the biological diversity in this biomes in most cases is limited to big animals, i.e. the fantastic fauna e and big trees. There are little information about the small and medium animals and trees without immediate economic interest.

In general, the land biodiversity situation is promising. Notwithstanding the situation of flora which is different from the flora's and that some biomes are under a major atrophic pressure than others.

The situation of guinea-Congolese biomes is of major concern since it does not have any type of protection. It is worth to underscore the efforts by the Ministry of Environment to protect the Maiombe Forest which represents almost 90% of the Guinea-Congo biomes in Angola by establishing a Trans-frontier Conservation Area in partnership with the Republic of Congo and the Democratic Republic of Congo.

The Conservation Areas represent 6.6% of the country's surface area, majorly divided in Zambezian biomes. These areas include National Parks, Regional Parks, Integral Reserves and Partial Reserves. Most part of these areas has been abandoned during the war time, whereas the current situation is that of recovery of the National Parks.

The abandoned infrastructures of the three National Parks have already been recovered and their administrations re-installed, namely the National Parks of Kissama (Bengo), Cangandala (Malanje) and Bicuar (Huila).

A re-assessment study on the situation of the National parks of Mupa, Iona and Cameia is underway.

Major part of the National Parks, if not all, had been occupied by the surrounding communities during the war. Today the impact resulting from human activities is notable in all parks. The Ministry of Environment considering this situation has thought of drafting plans for the management of each National Park or Conservation Area in order to enable sustainable use of resources by the populations in the areas.

The updating of Laws and Regulations governing the functioning of Conservation Areas in light of current knowledge is a one of the concerns of the Ministry of Environment, considering that the current laws date from the colonial period.

The inclusion of the communities in the management of the Conservation areas deserve a special attention of the Ministry of Environment, as great deal number of forestry guards deployed in National Parks are indigenous people of the surrounding communities.

The National Biodiversity Strategy and Action Plan (NBSAP) has enabled the identification of key sectors for the knowledge and conservation of Angolan Biodiversity. Eight Strategic Areas have been identified to be implemented between 2007 -2012, each one with various objectives and actions. Though the implementation is not effective (only 5% of the foreseen action have been realized), some outcomes have been achieved which helped in deepening the knowledge on the country's biodiversity, and attain some Millennium Development Goals enshrined in the Convention on Biodiversity (CBD).

With an extent of about 1650km of coast, characterized by Benguela Current (cold waters) and warm waters coming from the North, the Angolan coastal zone is abundant in species from phytoplankton to osseous fishes .Recent studies indicate more than eight (8) different habitats along the coast. More than 420 fish species have been identified and 655 crustaceous species have been found in Angolan waters. Some cruises made enabled the observation of whales and dolphins in the marine zone. The presence of sea turtles on the Angolan coasts (Luanda, Soyo and Cabinda) makes evidence the existence of this wealth.

Human pressure is mainly felt on the coast; therefore the animals moving in these areas are always under a huge anthropogenic pressure.

The National Biodiversity Strategy and Action Plans (NBSAP) have enabled to identify the key sectors for the knowledge and conservation of the Angolan biodiversity. Eight Strategic areas have been identified to guide its implementation from 2007 to 2012, each one with various objectives and actions. Two years after its approval by the Council of Ministers, its execution is estimated only at 5% of the foreseen actions, due to various reasons.

The Ministry of Environment is working in order to include, apart from its natural partners, (Ministry of Agriculture, Ministry of Fisheries, and State Secretariat for Waters, Science Faculty, Natural History Museum, Luanda Herbarium and the Centre for Phytogenetic Resources) other partners such as the Ministry of Defense, Ministry of Home Affairs and the Ministry of Finances (Customs) and private universities.

At sub-regional and Regional levels, the Government of Angola, through the Ministry of Environment, is involved in projects towards the establishment of four Transboundary Conservation Areas. Angola joined various Sub-regional and Regional commissions, and

is endeavoring others such as GRASP (Convention on Gorillas) and the COMIFAC (Central African Forest Commission).

At international level, the Government of Angola acceded to various International Instruments such as the CBD (Convention on Biodiversity), the CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), and is engaged in acceding to other Conventions.

INTRODUCTION

Angola is situated on the Western coast of the African continent in the South of Equator Line, between parallels 4º22 and 18º02 and the meridians 11º41' and 24º05 eastward. The Atlantic coast extends from Cabinda province down to the Province of Namibe, almost 1650km wide, and it has boundaries in the North with the Republic of Congo Brazaville; Democratic Republic and the Republic of Zambia in the East, in South with the Republic of Zambia and the Atlantic Ocean in West. The total surface area of its territory is 1,246.700km2.

Angola hosts a very rich biodiversity, resulting in a diversity of ecosystems ranging from Namibe desert in the southwest, going through Okavango and Zambezi basin in Southeast to the tropical forest in the Congo basin in Northeast. The main biomes are: Guinea-congolese in the North, Zambezi (which entails more than 80% of the country's territory) Afromontano, and Karro-Namib in the South. 14 Eco-regions have been identified, the highest number on the African continent.

The Phytogenetic chart of Angola (Barbosa, 1970) describes 32 units of vegetation, that may be clustered in following categories: sempervirent dense forests, savannahs with high grasses, xerophytes savannahs, intermingles, xerophytes, grasslands, steeps, riverside vegetation and mangroves.

According to IUCN (2002), about 75% of animals and plants are listed in red list as being vulnerable, endangered, critically endangered or of which there are no available data, including three species of insects, 37 bird species, 90 mammals, 7 species of reptiles, 10 species of gastropods and 29 magnoliopsidics. The species critically endangered include in particular *Hipportragus niger varini* (Palanca Negra gigante), *Dicerus bicornis minor (*Black Rhino), *Pan troglodytes (*Chipanze), *Gorilla gorilla, Dendromus vernayi (esquilo) Trichechus senegalensis (* African Manatin) *Dermochelys coriacea (* marine turtle) and various other species and sub-species known in Angola. This is also the situation of many species of birds in unique habitats along the coast. The most famous endemic species is Palanca negra gigante, which has become a national symbol. This animal is considered as a special antelope all over the world.

Information about Angolan biodiversity is scarce, while major part of studies were conducted before the national independence, therefore there is an urgent need for collecting data on the spot in order to get information on the current status of the country's biodiversity.
However, in 1976 it was estimated that mammals, on the account of main species, counted Elephants (30.000 elements), Buffalos (20,000 elements) Zebras (35,000 elements) Nunces (70,000 elements), Hippopotamus (15,000 elements) and antelopes 200,000 elements).

In the framework of protection and conservation of these and other species 13 conservation areas have been created, occupying a surface area equivalent to 6.6% of the national territory, namely six (6) National Parks occupying 4% and Four (4) Natural Reserves, and two (2) Integral natural reserves, and one regional Park, besides the four (4) game parks.

Regarding marine and coastal biodiversity, there are available information, though yet insufficient. The majority of studies date from colonial period. These information need to be disseminated and includes works conducted at national level, as well as under regional and sub-regional projects.

In 1992, the Heads of State and Government of the Globe, including that of Angola, met in Rio do Janeiro (Brazil) in a summit entitled "United Nations Conference on Environment and Development".

This conference adopted various documents that currently govern, at global level, the protection and preservation of environment and the sustainable use of its resources. It is also at that occasion when the Convention on Biological Biodiversity was signed.

Angola became party to the Convention in 1998, after the ratification in 1997.

The Convention on Biological Biodiversity aims at:

- Conservation of Biological Biodiversity;
- Sustainable use of its components; and
- Fair and equitable sharing of the benefits arising out of the use of genetic resources, through adequate access to the said resources and the transfer of appropriate and relevant technology.

In order to achieve these goals and ascertain that Parties comply with their obligation in the implementation of the principles and rules contained in the Convention, the Party Conference, through its decision-making and directive bodies, took several measures, amongst which the obligations of each State Party to develop reports in a periodicity to be set by herself. It is under this context that three (3) national reports have already been produced.

The fourth report has the following objectives:

- Assess the performance of the State Parties in the implementation of the Convention;
- Determine the measures taken by the Parties to achieve the 2010 objectives; and
- Gather data for the development of the 3rd Global Report on the Situation of Biodiversity globally.

In order to make easy the summary and compilation of the data provided by the parties in their national reports, the Secretariat of the Convention developed directives that were followed in the compilation of this 4th National Report, made up of four (4) chapters:

Chapter 1: - Current Situation of Angolan biodiversity, trends and threats;
Chapter 2: - Implementation of National Biodiversity Strategy and Action Plan;
Chapter 3: - Social and inter-sectoral integration of considerations on biodiversity, and
Chapter 4: - Conclusions.

CHAPTER 1: - GENERAL SITUATION OF BIOLOGICAL DIVERSITY TRENDS AND THREATS

1.1 – ANGOLA'S BIOLOGICAL WEALTH

Angola is one of the richest countries in biodiversity on the African continent. This exceptional wealth has to do with the combination of certain number of factors such as: the vast country's extension; its inter-tropical geographic location – being a refuge for species over the last glacial era; the variation of altitude and the high number of eco-regions. The climatic diversity, combined with the ecological variability and that of soils, contribute to the formation of bioclimatic zones that entail from dense tropical forests to the absence of vegetation in the desert. These different habitats provide room for a high level of biological diversity (NSBAP 2006).

Despite the fact that data on Angolan biological diversity are scarce, the IUCN (1992) estimated that there were in the country about 8.000 species of plants, out of which 1,260 were endemic, 275 species of mammals, 915 species of fouls great deal of which were endemic, 78 species of amphibious, 19 of which were endemic, and 227 species of reptiles.
The richness of the mammals fauna is characterized by a the so-called Palanca Negra Gigante (*Hyppotragus niger variani),* the buffalo (*Sincerus caffer nanus),* Black buffalo (*S.c. caffer),* and the savannah and forest elephants (*Loxodonta africana africana* e *Loxodonta Africana ciclotis)* the Gorilla(*Gorilla gorilla).*

Angola is a hotspot of fowls, including the various species of international interest. The escarpa zone of Angola is particularly rich in endemic species such as: Atacador-de-poupa-da-Gabela (*Prionops gabela),* Tordito da Gabela (*Sheppardia gabela), Shrike* Monteiri (*Malaconotus monteiri),* Pultizer Sparrow (*Macrosphenus pultizeri)* and the Andua-de-crista-vermelha, *Tauraco erythropophus (* Picture 1), underscoring mainly the forests of Moco mountain, with more than 30 species.

Fig.1.- Red-crest-Andua

The diversity of humid zones along the Angolan coast and inland has been favouring the diversity of habitats that host migratory or seasonal aquatic fowls (pic.2). The existing species are scattered in various categories, whereby the most important are the Pelecaniforms (*Pelecanus onocrotalus; Pelecanos refescens, Morus capensis)* Ciconiforms (*Ardea cinerae, Ardea purpurea, Ardea goliath, Egretta ardesiaca, Mycteria ibis,Platalea alba)* Falconiforms (*Gyphorierax angolensis, Haliaeetus vocifer)* and Charadriforms (*Haematopus ostralegus, Charadrius hiaticula).*

Mossulo Bay hosts a great variety of aquatic, migratory and seasonal fowls in the form of Pink Flamingo (*Phoenicopterus roseus*). This bay is used by many tourist as a Bird-watching space, but human pressure threatens with degradation and destruction of place, despite the existence of an Integral Reserve on the bay (bird's isle).

bbFoto de Miguel Xavier

Fig.2.- Fowls of Mussulo bay

With regard to Herpetofauna, studies conducted in Capanda region (Malanje Province) enabled to enumerate species in Crocodylia, Chelonia and Squamata Oders. Branch (1998) reported the existence of Nile Crocodile (*Crocodylus nilocticus*) and Nile turtle (*Trionyx triunguis*) on Cunene River. Observations made on Mossulo Bay refer to migratory species of marine turtles (*Caretta carreta, Chelonia myda, Dermochelys cariacea, Erethmochelys mydas e Lepidochelys olivacea***).** It is possible that the number of reptile species in Angola is major than the one reported by the UICN (1992).

Though there is no recent information on amphibious diversity (Fig.3), preliminary studies (Pedro Vaz Pinto, personal presentation), mainly the ones conducted in Cangandala Park indicate that it overtake the 78 species indicated by IUCN (1992).

Foto de Pedro Vaz Pinto

The amphibious living in Cangandala National Park are not well known, but according Pedro Vaz Pinto (personal presentation), there are in the Park a great variety of amphibious at the image of *Hyperolius angolensis*.

Fig.3 Amphibious from Cangandala National Park

The Entomological diversity is barely known; some collections that are part of this diversity are found in Dundo Museum, with almost 23,000 samples of insects, in Huambo Faculty of Agrarian Sciences, holding valuable data on insects (not yet published) at Didactical Museum of Sciences faculty, in the Museum of Natural History and in the Laboratory for Entomology of the National Centre for Scientific Research (CNIC).

1.2.- LAND BIODIVERSITY

1.2.1.- Flora

Angola is very rich in terms of flora. The Phytogeografic Chart of Angola (Barbosa, 1970) describes 32 units of vegetation. Table 1 illustrates the importance of each unit and it may be noted that the predominant units are medium or high intermingle (13,3%), Savannahs and Ongota (11,1%) and a group of herbal savannahs with deciduous trees (9,6%). The picture 5 presents the location of each unit on the national territory

Table 1.-Distribution and importance of natural vegetation units (phytogeographic Chart of Angola, 1970)

Type of vegetation o	Area (Km^2)	% of total vegetation area	Trend
1.- Foggy wet forest, sempervirent, poliestrata, of low altitude of guinea	-	-	↓
2.- Humid, semi- caducous, poliestrata, low altitude and peri-guinea forest	-	-	↓
3.- Foggy wet and semi-deciduous, poliestrata, guinea-zambeze, meso-platoon forest: Seconded coffee forest.	-	-	-
4.- Dry, dense and sempervirent forest	280	0,2	↓

Type of vegetation o	Area (Km^2)	% of total vegetation area	Trend
5.- Wet, semi-caducuous, predominantly plateau-like and sub-plateau forest	280	0,0	-
6. relinquish, dry, resin-full, Montana forest (without representation)	0	0,0	-
7.- Peri-guinese Mosaic with dense forest stain (Pachy) and savannah of low altitude	13,138	1,1	-
8.- Mosaic of: dense and riverside forest, ´´Muxito, peri-guinese, Zambezi-guinese in alluviums, bushes and savannahs.	82, 392	6,6	-
9.-Mosaic of Zambezi savannah and coffee forests	27.797	2,2	-
10.- Mosaic of mixed forest in firm lands (or aguish) and sub-coastal savannah.	11.247	0.0	
11.- Mosaic of dry forest, predominantly deciduous, digitata and altitude savannah	14.379	1,2	
12.- Mosaic of rubber chanas, sufrutescent, arid, savannah and ´´Muxitos´´ of medium altitude	46.546	3,7	
13.- Mosaic of balcedos and savannahs	27.397	2,2	
14.- Mosaic of mesoplakton on and sub-coastal balcedos and savannahs,	12.176	1,0	
14ª.- Grassy or shrubby Mangroves	280	0,0	
14B.- Steeps, balcedos and coastal savannahs	80	0,0	
14C .-Steep vehetations	1.390	0,1	
15.- Bushes and high balcedos, deciduous of medium altitudes	17.543	1,4	
16.-´Intermingle ´, savannahs and ongota	138.428	11,1	
17A.- ´Intermingle´´ medium and high, of 10 or 20(25m)	165.144	13,3	
17B.- Medium Intermingle	57,717	4,6	
18A.- Intermingle ´´ flimsy and savannah of mesoplantoon slopes	40.855	3,3	
18B.- Intermingle ´´ flimsy and savannah of mesoplankton slopes	32.694	2,6	
19.- Medium intermingle of continental plateau	5.648	0,5	
20.- Dry bush, deciduous and mosaic of savannah and steep.	66.538	5,4	
21.-Dry bush, short and dwarf, and ripiculuous vegetation	8.011	0,6	
22.-Bush and savannah of short trees, shrubs and high grass	27.968	2,3	
23.—Mosaic of savannah, steeps and xerophytes balcedos, with or without disperse trees, sub-coastal	21.229	1,7	
24.- Mosaic of grassy savannah, or with shrubs, and dry bush and semi-deciduous.	119.161	9,6	
25.- Mosaic of savannah, with or without trees and shrubs, and dry bushes, semi-deciduous	141.432	1,4	
26.- Mosaic of savannah and spots of high bushes and tropical forests	24.053	1,9	
27.- Steep formation, sub-coastal, shrubby and grassy	34.964	2,8	
28.- Steep formation, coastal, flimsy, discontinuous, of ephemeral vegetal cycle	10.695	0,9	
29.- Desert vegetation, and sporadically steady	3.765	0,3	
30.- Shrubby grasslands	1.283	0,1	
31.- Grasslands of sandy plateaus, with deficient drain	50.388	4,1	
32.-Altitude grassland or high anharas	12.258	1,0	
Total	**1.242.576**	**100**	

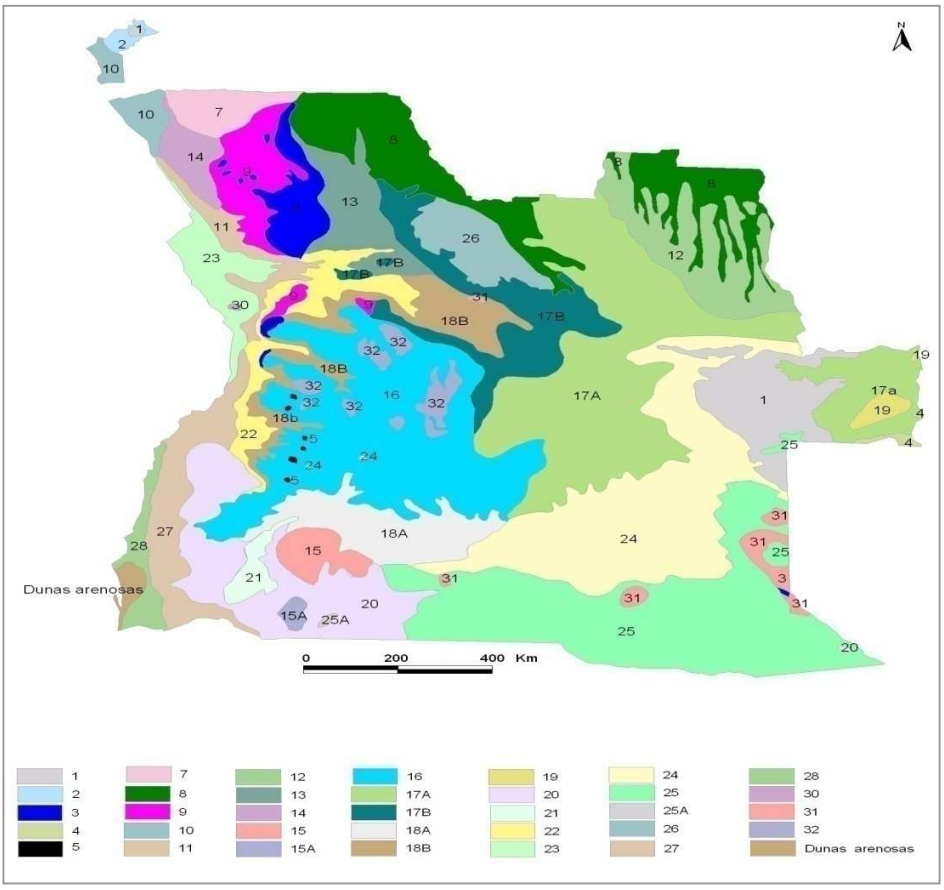

Fig.-5 Main units of Angolan vegetation

The different units may be grouped in eight (8) main types of vegetation as follows:

- Dense undeciduous forest;
- Savanas de capim;
- Xerophite savannahs;
- Intermingles;
- grasslands;
- steepes;
- Riverside vegetation
- Mangroves

Dense undeciduous forest concentrated mainly in Cabinda Provinces are the most threatened as they host tree species of commercial interest, though only occupy 2%, i.e 2,4 million hectares. But despite that the exploitation of timber is the major danger to the existence of undeciduous forests, poverty of its soils is equally a degradation factor, since the local populations are obliged to dismantle regularly various hectares to practice agriculture, though for subsistence.

1.2.2.- Fauna

The biological history of Angola, its width (1.246.700 km^2), its climate and other factors such as hydrology, geology and the soils, as well as the diversity of habitats render

Angola in one of the African richest countries in biodiversity. Nevertheless, the disturbance experienced by Angolan ecosystems over the last thirty years has a huge burden on fauna (Fig.4). Big herds buffalos that used to live in the Region of Kissama National Park, for instance, no longer exist.

One has also to mention that notwithstanding its notable character in Africa, the Angolan fauna is poorly known. Few recent studies have been conducted in the fields of Malacology, Entomology, and Herpetology and even in the area of ichthyology. The majority of studies that are known they were conducted in the colonial period.

This situation has to do with the lack of financial, technical resources and mainly experts in the matters as a consequence of lack of scientific research policy in the fundamental realms of life's science.

The black buffalo (*Syncerus caffer caffer*) previously abundant in Bicuar National Park, currently their population is in a very reduced number.

Fig.4.- Black Buffalo in Bicuar National Park

The mostly known fauna is that of big mammals. The populations were affected by political and military instability which the country experienced, many of them, with great mobility capacity, have left the affected areas. The current situation is less promising, though there is no accurate available data. Areas previously abandoned are being recovered as well as the migration routes are being retaken.

The African elephant (*Loxodonta africana*) resumed its routes of migration in Angola, after having forsaken them during the war time. Currently a great presence of big elephant herds is noted both in the North and the South of the country.

The population of Palanca negra gigante (*Hhypotragus níger variani*) has decreased in Cangandala National park and Integral Natural Reserve of Luando, which are their natural habitats. 8 females and no any male have been found in Cangandala National Park. In colonial period, this population was estimated at 250 individuals (Huntley,

1972). The lack of male in the Park lead the females to intercourse with red Palanca (*Hypotragus equinus*), producing thus hybrid infertile animals.

In order to save the Population of Cangandala, a male was transferred from the Natural Reserve of Luando to Cangandala National Park where is located in a fenced area of 400 hectares with 9 females.

In the two zones which the natural habitat of the Palanca negra gigante, special protection measures are on the verge of being implemented. The population of the Natural Integral Reserve is estimated at 100 animals (PEDRO VAZ PINTO, personal presentation)

The location of the Palanca negra gigante in Cangandala National Park and Luando Integral Natural Reserve was one of the major events for the Angolan biodiversity.

In fact, the last the animal was seen was in the 1970s; its existence became dubious and the pessimist even affirmed its extinction. Fortunately, thanks to the implementation of a project whose objective was to protect Palanca negra gigante, we managed to locate the animal and earmark some herds. This project, coordinated by the Centre for Studies and Scientific Research of the Angolan Catholic University, is being implemented in the framework of a Memorandum of Understanding between the Ministry of Environment, the Government of Malanje Province and the Angolan Catholic University.

The National Park of Cangandala and the Natural Integral Park of Luando, habitat of *Hyppotragus niger variani*, does not only host this animal, but there are many more species, such as boars, warthog**,** and birds of prey.

The population growth observed in Cangandala national Park can be noted in other National Parks such as the ones of Bicuar and Iona, but also in Chimavela Regional Park in Benguela Province whereby a resurgence and growth of Angolan springbok population (*Antidorcas marsupialis angolensis*), and other various primate species.

The gorilla of low altitude (*Gorilla gorilla*) and the Chimpanzee (*Pan troglodytes*) from Maiombe forest are currently suffering less pressure, so over the last moments one can speak of stability of these two species, as a consequence of intense mobilization unleashed since 2004 directed to local population in order to fight poaching of these primates.

Table 2 demonstrates the evolution of the main mammal groups whereby in most cases an increase is noted in the populations and general trend. Efforts should be made in order to determine the situation of some important groups such as Felidae, Viveridae and other primates.

The current situation of avifauna is not yet well-known, but recent information indicates that the pressure on this group is not so important if compared to the mammal fauna. However, the trade in live specimen of some pet birds such as the grey parrot (*Psittacus*) is a considerable pressure that may result in the extinction of the exploited species. There are also some fears as to the degradation of habitats of migratory birds – wet zones.

Table 2.- Current status and trends of mammal fauna

Family	Current Status	Trend
Cercopithecidae	Unknown	─
Canidae	Good	↑
Viverridae	Desonhecido	─
Hyaenidae	Acceptable	↑
Protelidae	Unknown	─
Mustelidae	Unknown	─
Felidae	Acceptable	─
Tubulidentata	Unknown	─
Proboscidae	Acceptable	↑
Sirenia	Bad	↓
Rhinocerotidae	Acceptable	↑
Equidae	Acceptable	↑
Hippotamidae	Acceptable	↑
Suidae	Good	↑
Giraffidae	Bad	↓
Bovidae	Better	↑

Legenda ─ : Unknown; ↑ : Aumento populacional; ↓ : Diminuição populacional

1.2.3.- Fresh Water biodiversity

The ichthyologic family of Angola is very rich, some species of which being endemic. This fauna is distributed through the broad network of permanent rivers, lakes, lagoons and marshy lands covering about 2000 km^2, Poll (1967) who studied the ichthyologic fauna of Angola mentioning the 267 species distributed in 18 families, whereby the main ones are: Kneridae, Mormyridae, Citharinidae, Cyprinidae, Bragridae, Clariidae, Mochocidae, Amphillidae, Oyprinodontidae e Cichlidae. It is notable that in this study 30 species of fishes have been identified on the River Kwanza. But in a most recent, Silva and Swart (2008) have identified 54 species distributed in 14 families in this important river. (tab. 3).. Nevertheless, one should add to the results of Poll (opcit.) at least 24 species of fish.

Table 3.- Fish biodiversity existing on the River Kwanza

Family	Number of species
CYPRINIDAE	20
CICHLIDAE	9
CHARACIDAE	2
HEPSETIDAE	1
CLARIIDAE	7
MOCHOKIDAE	3
CLAROTEIDAE	1
BAGRIDAE	3
SCHILBEIDAE	1
MASTACEMBELIDAE	1
POECILIDAE	2
CLUPEIDAE	2
KNERIIDAE	1

MORMYRIDAE	4
Total: 14 families	**54 Species**

Aquaculture is developed for food purposes in those zones with potential of animal proteins production. The most cultivated species and that of major trade value in Angola are the various species of Mekerel (Cichlidae family), Bagre (Bagridae family) Cabuenha (Cyprinidae family)-name given to specie of small fishes from Cassay Region, which includes the following species: *Barbus viviparus, B. puellus, Aplocheilichthys gohnstonii* e *Pelmatocromis ruweti*.

However, such as the case of land fauna, there are few recent studies on the Icthyo-fauna of fresh water.

As a matter of conclusion and considering the scarcity of scientific data that enables to have a full assessment of current situation of land ecosystems, it is deemed necessary:

- To study the biome in order to evaluate its real status of conservation and identify sensitive ecosystems as way to preserve the species therein contained.;
- To promote studies on Maiombe forest in all its territory as well as on the main timber species of economic interest
- To implement a recovery programme of mangroves along all the coast, namely in the estuaries of the rivers Chiloango, Mbridje and the whole coast of L Luanda;
- Provide to both animal and vegetal species funding for development of projects in order to identify the number of endangered species as well as the extent of the threat.

1.2.4.- Biodiversity in Conservation Areas

The Conservation Areas in Angola have all been proclaimed in colonial era with the purpose of, at a first stage, giving income to hunting and provide food to farmers in some regions (game reserves), before transforming into National Parks aiming to protect mainly a certain fauna, or in some cases, as of Cangandala National Park, to protect one specie – the Palanca negra gigante.

The creation of these areas did not concern over the protection of ecosystems and its elements; this situation leads to the fact that big deal of existing Conservation Areas are located on Zambezi biomes, whereby the Guinea-Congolese and Afromontane do not have any protection system.

The Conservation Areas occupy 6,6% of the national territory, and in this report only the situation National Parks representing 4% of the national territory is described.

Table 3 indicates the location of each National Park, its management objective, surface area as well as the year of creation and evolution trend. From this table one can note that the National Parks of Iona and Cameia are the biggest with an area 15 150 and 14 450 $km^{2,}$ respectively, whilst that of Cangandala is the smallest with only 630 km^2 (Fig.6).

Table 3.–National Parks of Angola

National Park	Province	Area (Km^2)	Ano de criação	Tendência	Conservation Objective
Mupa	Cunene	6600	1964	↓	Protection and conservation of the Angolan sub-specie Giraffe
Bicuar	Huíla	7900	1964	↑	Protection and conservation of big mammals species
Cameia	Moxico	14 450	1957	─	Protection and conservation of big mammals species
Iona	Namibe	15 150	1957	─	Protection and conservation of typical species of arid biomes in the Southeast of the country.
Cangandala	Malanje	630	1970	↑	Protection and conservation of the Palanca negra gigante
Kissama	Bengo	9960	1957	↑	Protection and conservation of big mammals species

Legend: ─ : Unknown; ↑: Betteria; ↓: Degradation

All National Parks have been successive victims of the war that hit the country, decreasing largely the capacity of protection and conservation of the ecosystems therein.

During this period, the National parks have almost been abandoned and their infrastructures destroyed.

Having the war ended, the Government of Angola is making efforts to recover the National Parks, both through infrastructure renovation and resettlement of animals and the training of managers and guards.

With regard to the training of managers and forest guards, Angola is benefiting of assistance by Mweka School (Tanzânia) and Wildlife College of South Africa trainers. In 2008 and 2009, eight National Parks managers and 100 Forest guards have been trained, thanks the collaboration between the Ministry of Environment and the Ministry of Assistance and Social Reintegration, through the Institute for Reintegration of Ex-militaries. These actions were funded by German Cooperation (GTZ).

The training sessions take place at Catalangombe training School situated in Kissama National Park, which was recently renovated with the funds of GTZ.

With regard to the animal resettlement, we are aiming at the National Park of Kissama from northern zones of the country where big herds of Buffalos and Elephants are seen, and for Iona National Park from the neighboring Republic of Namibia.

The management infrastructures of the National Parks of Bicuar, Cangandala and Kissama have already been refurbished, whereas tourist infrastructures have been erected on National Park of Kissama.

1.2.4.1 Bicuar National Park

The Park is dominated by Psamo-feralics and purple soils, covering more than 85% of its surface area. The flash of the Park is marked by smooth undulations; the Park does not have any important clay system, being Cunene the only important river. Two important marshy zones are seen that are the water drinking locations for the animals.(Fig.9).

Fig. 9.- Marshy zone of Bicuar National Park

The Bicuar National park is situated on Zambezian Phytogeographic region, dominated mainly by a gender of *Acacia*, *Sterculia*, *adansonia* and *Commiphora*. Two phytogeographic units are distinguished (Barbosa, 1970):

- Dry deciduous bush
- Bushses, savannahs and steppes

The fauna of Bicuar National Park is relatively rich. In fact, 62 species of mammal, 23 amphibious, 27 reptile, but 6 species of birds are known. Thanks the funding of Deutch Bank, the management infrastructures of this Park were rehabilitated in 2008.

1.2.4.2 Cameia National Park

The soils of the Park originate from Kalahari sands, where psamo-hydromorfic soils that are more or less regularly soaked. The average annual precipitation is around 1145 mm, and the Zambezi is the most important river on the Park, though the existence of other rivers such as Luena and Luangueje. The Park is equally characterized by existence plateaus of seasonal inundation.

The vegetation in National Park of Cameia corresponds to type 31 as per the Classification by Barbosa (1970). The grasslands abounding in it, in general, present a medium or short height, and amongst them abounds the specie *Loudetia simplex*. In it one can see stains of higher grassplots and rattling sub-shrubs: *Parinari punila*, *Syzygium* e *Magnistipula eglandulosa*. Esporadically, there appears trees that are more or less spinal-deformed blocks and big colonies of *Polygonium panigerum*. Besides the *Loudetia*, in these grassplots one can see species of *Monocymbium, Eragrostis, Aristida* e *Tristachyos* genders.

The biodiversity of the National Park of Cameia is not well known. Only eleven species of large mammals are known, as is the case of gnu (fig.12).

Gnu (*Connochaetes taurinus*) is one of the most abundant animals at the National Park of Cameia.

Fig.12 Gnu

1.2.4.3 Cangandala National Park

The National Park of Cangandala soils are of ferraltic type, generally poor in mineral nutrients and have low fertility content. The river network comprises several rivers, notably Cuíje, Maúbi, Ombe, and Cuque.

The Park vegetation corresponds to an open "intermingle" forest (Fig.3), dominated by *Brachystegia wangermeeana* (Mussamaba) and *Brachystegia boehmii*, corresponding to type 18b of Barbosa's classification (1970). The presence of other species, such as *Uapaca benguelensis*, *Erythrina abyssinica*, and *Dyospiros sp.* is notable. In addition to those species, there are also *Piliostygma ssp.*, *Burkeassp.*, *Strychnos ssp.*, and *Dombeya ssp.*

Fig.13.- National Park of Cangandala's Vegetation

The Park's vegetation is very rich. In addition to the "Palanca Negra Gigante" (Giant Sable Antelope), the Park's emblematic species, 15 other species of large mammals are known, 12 species of birds, 3 species of reptiles and one species of amphibians.
As mentioned above, management infrastructures of this Park have been rehabilitated recently (Fig.14).

Fig. 14.- Inauguration of the Administrative Complex of Cangandala National Park, 2006 (Photo by Marta Zumbo) National Park of Iona

1.2.4.4 Iona National Park

The National Park of Iona has a predominance of tropical dark-grey barren soils and tropical fersiliatic soils. The topography of the Park is characterised by wild dunes (Fig.15), vast plains, and rough and cliffy mountains. Annual average precipitation is approximately 18mmm. In terms of rivers, the National Park of Iona is very poor, having only one permanent river, that is Cunene, and one intermittent river, which is Curoca. However, there are big lagoons on the Curoca River and marshy areas at the mouth of Cunere River.

Fig. 10 Namib Desert dunes within the National Park of Iona

There are three types of vegetation at the National Park of Iona:

- Sub-coastal steppes with woody and herbaceous components (Barbosa's Type 27, 1970). This type of vegetation is a sub-coastal African steppe-like formation dominated by *Acacia, Commiphora, Colophosphormum, Aristida, Schmidita,* and *Staria* species.
- Discontinued coastal steppes (Barbosa's Type 28, 1970), which corresponds to sub-desert-like vegetation. This type of vegetation is dominated by *Aristida, Cissus, Salvadora,* and *Welwitschia* species (Fig.11).
- Desert with moving dunes (Barbosa's type 29, 1970). This type of vegetation is dominated by *Odyssea and Sporobulus* species.

The *Welvitschia mirabilis* plant is characteristic of the National Park of Iona. It is endemic of the Kalahari Desert and can live up to 1,000 years.

Fig.11.- ***Welvitschia mirabilis at the National Park of Iona***

National Park of Iona's fauna is not well known because the political instability in the country did not allow an inventory of its biodiversity. Only 15 species of mammals are known and the populations of some of them have been growing.
Moreover, since its establishment, this National Park houses a large human population of nomads, whose main activity is stock-raising.

1.2.4.5 Kissama National Park

The National Park of Kissama is dominated by sandy platforms of Oxisols and Ultisols types. Close to the rivers there are barely developed soils from fluvial deposits having several textures. The banks of Kwanza and Longa rivers have a characteristic feature for comprising materials of medium textures mixed with fine materials, all of alluvial nature.

The Park's river network is made up of Kwanza and Longa rivers, but there are other lake systems along the flooding plains of these rivers. There are also underground waters feeding Kwanza and Longa rivers.
The National Park of Kissama is located in the Zambeziac phytogeographic area.
The southern part of the Park, with precipitations ranging between 150-500mm per year, is dominated by the genera *Acacia*, *Sterculia*, *Adansonia*, and *Commiphora*. The vast inner plain has better conditions of humidity with three or four months of rains (900 - 1500mm/year). This area is dominated by the genera *Brachestegia*, and *Julbernadia*.

In accordance with Barbosa (1970), there are at the National Park of Kissama three (3) phytogeographic units:

- Dry wood in a savannah-type mosaic
- Marshy lake areas
- Mangroves

The National Park of Kissama's fauna has suffered a strong decline, whereby some species have been extinguished and others have become endangered. The Noah's Arch Project enabled the repopulating of the Park with already extinguished animals or endangered animals within the Park.

Nevertheless, 44 species of Mammals, 5 of Birds, 66 of Reptiles, and 22 of Amphibians are still known from this Park.

1.2.4.6 National Park of Mupa

The National Park of Mupa's soil is essentially homogeneous and is made up of greyish Oxpsamic soils and Cromopsamic soils in the driest areas. The Park is under the influence of two river basins, namely those of Cunene and Cuvelai Rivers. Permanent lake systems of greater importance are nonexistent within the Park.

The Park is located in the Zambeziac phytogeographic area and is dominated by *Brachestegia* and *Julbernardia* genera *(Fig.7)*

Looking at Angola's phytogeographic map (1970), four phytogeographic units are predominant at the Park:

- Deciduous and Dry Wood;
- Woods, Savannahs, and Steppes with the predominance of *Brachestegia* and *Julbernardia;*
- Woods, Savannahs, and Steppes with predominance on the Kalahari sands;
- Woods, Savannahs, and Steppes where *Colophospermum mopane* are abundant.

Fig.7.- Vegetation of the National Park of Mupa

Sixty-six (66) species of Mammals, which enjoy a legal status of protection, were identified at the National Park of Mupa, the most spectacular ones being Giraffe (Fig.8), Impala, and Leopard.

Avifauna (bird fauna) is unknown, and only two species have been identified. Although of no immediate economic interest, the Batrachia fauna of the Park is relatively known, with 24 identified species. In its turn, the Herpeto fauna (reptile fauna) has 29 identified species.

The National Park of Mupa was established in order to protect the Giraffe (*Giraffa camelopardalis angolensis*). Currently, the population of this species is very small.

Fig.8.- Giraffes at the National Park of Mupa

In order to enhance the country's biodiversity protection and conservation capacity, new Conservation Areas are to be established based on new criteria, such as floristic and faunistic wealth, while conservation areas that do not meet internationally-established current criteria will be restructured.
The establishment of new Conservation Areas will cover the whole country's biomes, especially the Guinea-congolese biome. Note that most of the existing National Parks were established in 1937 as game reserves, as a way of controlling faunistic exploitation, which justifies their location in a single biome.

1.3.- MARINE AND COASTAL BIODIVERSITY

Marine biodiversity is the variability between live organisms of marine origin and their marine ecossystems, as well as the ecological complexes of which they form part. This includes the diversity within families, between the species and the ecossystems.

The Angolan coastal area is 1,650km long (BIANCHI 1986) and is chiefly characterised by the interaction between hot waters (Angola's Current flowing southwards) and cold waters (Benguela Current, which northwards). At the meeting point of both currents there is a formation of a thermal front known as "Angola – Benguela". Generally, this can be found between 14º and 17º S (SHANNON *et al*. 1987).

Compared with the sea area, the marine environment of shallow and intertidal waters has the richest specific diversity. This coastal area (Fig.14) is more exposed to anthropogenic threats, namely: uncontrolled recreational activities, exploitation of living and non-living resources, construction, and pollution. The open sea area is subject to the exploitation of living resources (semi-industrial and industrial fishing); non-living (petroleum, gas, and minerals).

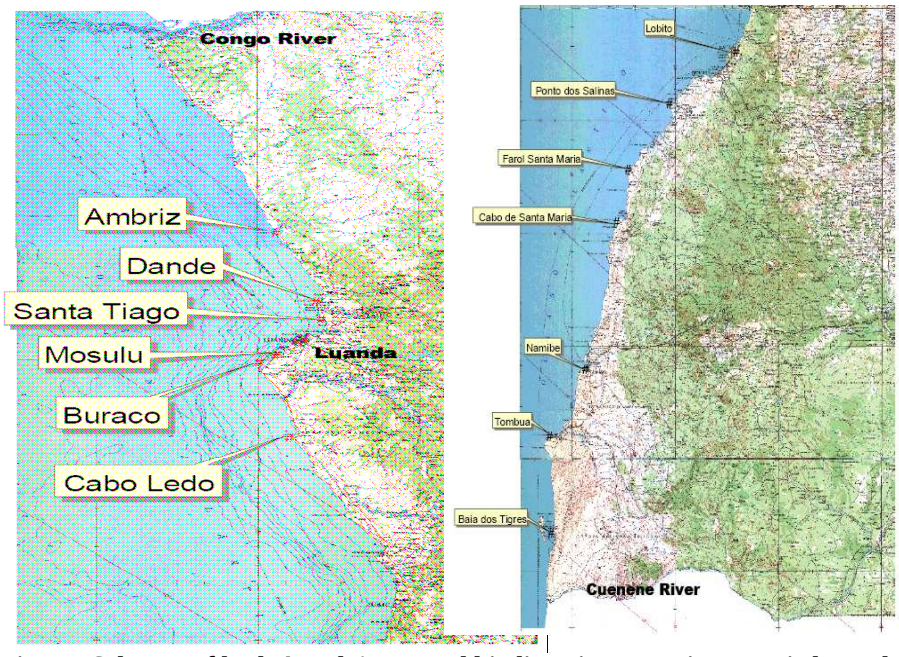

Fig.14.- Schemes of both Angola's coastal biodiversity campaigns carried out along the Angolan coast.

1.3.1.- Intertidal Area Biodiversity (sandy beach)

Samples collected along the coast from 16 locations show the presence of 87 fish species representing 18 families. The analysis of the multiple variety indicated a biogeographic structuring of the ichthyologic fauna pertaining to the intertidal area along the Angolan coast, where the Baía dos Tigres' fauna is different from the other areas due to the high densities of grey mullet (*Lisa richardsonii*) and sparid (*Diplodus sargus sp*). In general, it was noted that the north and centre presented the largest number of species compared to the south of Angola.

1.3.2.- Marine biodiversity (deep waters)

Angola's deep waters marine biodiversity has its own particularities due to the hydrographic changes occurring on the continental shelf. This is caused by a typically tropical system in the north and temperate in the south (Fig. 15).

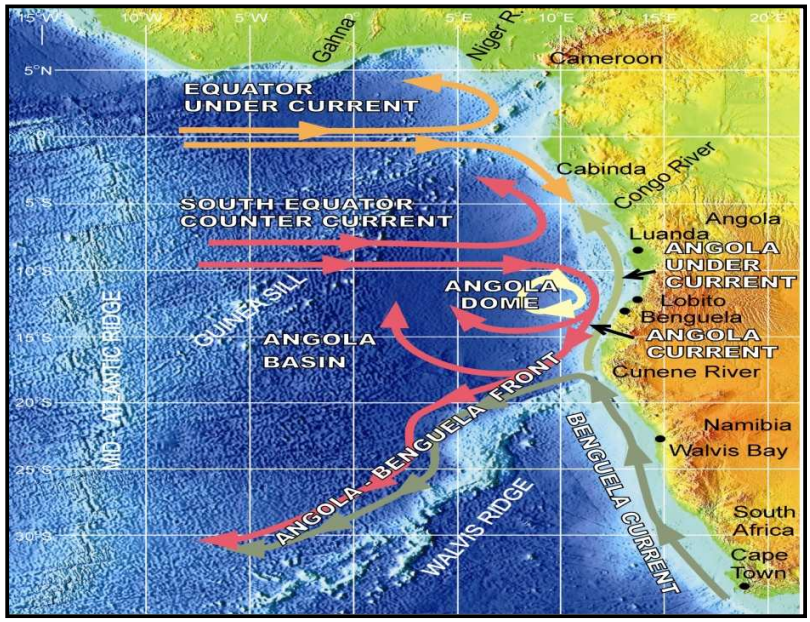

Fig. 15.- Map of the Atlantic Ocean from the Gulf of Guinea to Southern Africa

Research indicates that there is a zoo-geographic boundary along the Angolan coast between the ecosystems of the Guinea current and that of the Benguela current, which separate the tropical fauna influenced by the hot current of Guinea and the temperate fauna influenced by the cold current of Benguela. As a result of this oceanographic structure, species are distributed within eight (8) different habitats along the Angolan coast. Table 4 indicates the occurrence of the different taxonomic groups:

Table 4.- Taxonomic groups of marine organisms occurring along the Angolan coast

Taxonomic Groups	Total number of species
Fish (osseous and cartilaginous)	421
Crustacea	65
Molluscs	535
Mammals	12
Mangroves	5
Sea birds	65
Phytoplankton	501
Zooplankton	105
Benthic beings	166
Turtles	5

1.3.3.- Fish biodiversity

In accordance with the hydrogeographic features of the Angolan coast, there are eight (89 different habitats (BIANCHI 19929, which characterise the distribution of fish resources:

1. **Coastal shallow waters under the influence of equatorial waters**.

   Species found in hot and muddy **waters** above the thermocline and associated with river mouths can tolerate low salinity. There are the following species: *Pseudotholithus senegalensis* and *Pteroscion pelli* (corvinas), *Stromateus fiatola*, *Galeoides decadactylus*, *Penaeus notialis* (shrimps). The pelagic species associated with some demersals occurring in the water column (floated line) are *Sardinella maderensis* (reed), *Ilisha africana*, *Chloroscombrus chrysurus* and a high density of *Brachydeteurus auritus* (toothfish) and *Trichurus lepturus* (swordfish). In the slightly deeper and coldest waters, there are *Sphyraena guachancho* (barracuda), *Selene dorsalis, and Nematopalaemon hastatus* (shrimp).

2. **Communities above the thermocline from Luanda to Benguela**, there are species, such as: *Brachydeuterus auritus* (marionga) and *Trichurus lepturus* (swordfish) dominating this area due to their ability to resist to different water levels. *Sphyraena guachancho* (barracuda) and *Balistes capriscus*, *Selene dorsalis* (Atlantic John Dory), *Pagellus bellottii* (crown sparrow), *Trachurus trecae* (horse mackerel) and *Pomadasys incisus* (grunt).

3. **Coastal waters above the thermocline, mainly rough and sandy depths**. There is a small concentration of *Sparus caeruleostictus*, *Epinephelus aenus* (grouper), *Brachydeuterus auritus* (toothfish) and *Trichurus lepturus* (swordfish). Sparidae dominate the area below the thermocline.

4. **North of Benguela in the areas of sandy depths**: These areas are dominated by Sparidae, *Trachurus trecae* (horse mackerel).

5. **Communities in the area below the thermocline**: *Synagrops microlepis*, *Trichurus lepturus* (swordfish), *Trachurus trecae* (horse mackerel), *Dentex angolensis* (porgy), *Brotula barbata* (cod), *Ilex coindetii* (squids) and *Parapenaeus longirostris* (shrimps).

6. **Low thermocline communities between Tômbwa and Cunene River mouth:** This region is characterised by a continued levelling and is host of *Dentex macrophthalmus* (large-eyed dentex), *Trachurus trecae* (hosre mackerel), *Atractoscion aequidens* (corvine)), *Loligo vulgaris* (squids), *Synagrops microlepis*, and others.

7. **In the Top slope** represents a high concentration of *Synagrops microlepis*, followed by *Merluccius polli*, *Chlorophthalmus atlanticus*, *Pterothrissus belloci*, *Illex coindetii*, and *Parapenaeus longirostris*.

8. **In Lower slope** we find *Merluccius polli* (hake), *Nematocarcinus africanus*, *Aristeus varidens* (Alistado), and *Plesiopenaeus edwardsianus*.

1.3.4.- Phytoplankton Biodiversity

Hasle (1995) stated that the predominant phytoplankton classes along the Angolan coast are Bacillariophyceae (diatoms), Dinophyceas (dinoflagellates), Prymnesiophyceae (coccolithophorids), Clorophyceae, and Crisophyceae (silicoflagellates).

Recent studies (Silva, 2003; Rangel, 2003) indicate the existence of eight (8) classes, namely Diatomaphyceae, Dinophyceas (Dinoflagellates), Prymnesio-phyceae (coccolithophorids), Cyanophyceae, Raphidophyceae, Dictyocho-phyceae, Euglenophyceae, and Crisophyceae (silicoflagellates).

Data reported in this summary was compiled from a phytoplankton review in the Angolan waters as reported in studies performed from 1953 to 2004, as well as from a compilation of data existing at INIP, from 2000 to 2008 (See Table 4).

Table 5. Synthesis of phytoplankton biodiversity

Kingdom	Phylum	Class	Nr of species
Protoctista	Heterokontophyta	Bacillariophyceae	196
	Dinophyta	Dinophyceae	112
	Chromophyta	Dictyochophyceae	7
		Ebrtiidea	1

1.3.5. - Zooplankton Biodiversity

Data reported in this summary on zooplankton was compiled from a zooplankton review in Angolan deep waters as reported in studies performed from 1953 to 2004.

A total of 160 species were identified, distributed as follows: Cnidarian, Ctenophora, Annelida, Arthropoda, Molusca, Chaetognatha e Chordata (See Table 6).

Table 6.- Taxonomy of zooplankton species identified along the Angolan coast

Phylum	Sub-phylum	Class	Sub-class	Order	Sub-order	Super-family	Nr of species	Author	Year
Cnidarian		Hydrozoa			Leptomedusae		2	Neto e tal.	1966
					Trachymedusae		2		
					Narcomedusae		1		
				Sifphonofora			3		
Ctenofora		Tentaculata		Cydippida			1		
Annelida		Polychaeta		Errantia			1		
				Sedentaria			2		
Arthropoda	Crustacea	Branchiopoda			Cladocera		3		
		Ostracopoda		Myodocopida			3		
			Copepoda	Calanoida			74	Marques	1953
				Cycopoida			28		1957
				Harpacticoida			8		1958
				Euphausiacea			2	Marques e tal.	1966
		Malacostraca		Decopoda			1		
Molusca		Gastropoda				Heteropoda	2		
				Pteropoda			6		
Chaetognata							18	Neto	1961
Chordata		Thalacea		Salpida			1	Neto e tal.	1966
				Doliolida			2		
						TOTAL	**160**		

1.4.- PRESSURE ON THE ANGOLAN BIODIVERSITY

1.4.1.- Loss and degradation of habitats

Loss and degradation of habitats are some of the major problems facing the Angolan biodiversity. Although there is no accurate data as to the extent of the phenomenon, experts agree that this problem tends to worsen for several reasons, amongst which human pressure is regarded as the main cause.

The guinea-congolese biome, one of the four biomes in Angola, is constantly losing its habitat. This biome occupies 10.7% of the national territory and covers the provinces of Cabinda, Zaire, Uíge, Kwanza Norte, and Kwanza Sul. By their characteristics, and also due to war, these forests were saved to a certain extent (Fig.16).

Fig.16 Mayombe Forest in Cabinda (Photo by Miguel Xavier)

In every province that it covers, the rainy wet forest is currently under huge anthropic pressure. In Cabinda, logging has been reduced to less than 24,000 m^3, per year (IDF, 2005). Post-war trend is not only characterized by the awarding of new licenses for timber harvesting, but there is also a forestry activity by the population returning to formerly abandoned areas. Loss of habitat in Mayombe forest is also due to the fragmentation of the forest as a result of road construction and urbanization of the area. A typical example of this is the construction of a road linking the city of Cabinda with the northern part of the province, up to Belize. The fragmentation of the forest is causing the degradation of mangroves at the mouth of the Chiloango River (Fig.17).

In the other four provinces covered by the guinea-congolese forest, there is an illegal forestry activity characterised by indiscriminate tree felling.

The opening of the road accelerated the fragmentation of the marshy zone formerly linking Chiloango River with the sea. Once fragmented, the mangroves on the seaside suffered disequilibrium in the salinity rate, which increased at levels above the tolerated level for their survival, thus leading to their death.

Fig.17 Chiloango River's degraded mangroves (Photo by Mendes Mota)

The Zambeziac biome, the main Angolan biome per its area, with more than 80% of the national territory, covers 17 of the 18 provinces of the country. It is also under severe pressure due to its easier exploitation. As is the case of the guinea-congolese biome, the opening of roads is also a major threat to the loss of habitats.

Degradation and loss of habitats in this biome can be illustrated by the status of the four National Parks located in this area.

The National Park of Kissama, the third largest park with 9,960 km^2, is under great pressure translated in the disorderly occupation by the population and their activities, as well as fragmentation due to the construction of two national roads, Luanda-Sul Road and Muxima Road (Fig.18).

Fig.18 Fragmentation of the National Park of Kissama, Muxima Road (Photo by Maria lôa)

The National Park of Mupa, with an area of 6,600km^2, is currently occupied by the population and farmers. The last diagnosis of the status of this park refers to the endangering of several species living in the park, if the current situation is not reversed.

The situation of the National Park of Cameia is not different from that of other National Parks. There is a degradation of the habitat resulting from the disorderly occupation by human population.

The Afromontane biome, with 0.5% of the national territory, has no updated data. The relief of this biome makes its preservation easy.

Karoo-namib biome, accounting for 2.6% of the national territory and characterised by the Namib Desert, suffers less pressure from human population. However, the National Park of Iona, which is located in this biome, is degraded by the disorderly human occupation and local police authorities.

Angolan coast ecosystems suffer a very quick loss and degradation. Although decree Nr 4/01, of February, makes it illegal to build any type of infrastructure at a distance less than 500m from the coast, there is evident proliferation of construction in the area, in disrespect of the law. This adds on to the drainage and discharge of wastes into the sea. The non-fulfilment of this law supports the extinction of the coastal vegetation and the associated fauna (Fig.19).

While the disappearance of mangroves from the Lobito Bay due to the degradation of the environment, as a result of the city's expansion, led to the disappearance of flamingos using that bay as maternity, in Luanda the disorderly occupation of the coastal area has been leading to the drastic disappearance of mangroves, which are reproduction banks of fish and birds' shelters.

Mangais da Baía do Mussulo (Foto de Mendes Mota)

Fig.19.- Disappearance of mangroves from Mussulo Bay

Today, there is a huge pressure on wet areas. These habitats, homes of migratory birds and several other species of the Animal Kingdom are disappearing more and more, putting at risk the survival of the species associated with this particular type of habitats.

1.4.2.- Hunting

Hunting should be considered in two ways: authorised hunting and poaching. Authorized hunting is still governed by hunting law of 1957, and takes place outside the conservation areas under the conditions set forth by the Ministry of Agriculture, while poaching is illegal and takes place within the Conservation Areas, targeting mainly protected species. When this on hunting was developed, hunting was meant mainly for subsistence; however, over the last years, hunting has become a commercial activity. Scientifically, the impact of hunting is still unknown, but it is believed that it contributes to the decline of the population of hunted animals.

Hunting of gorillas and chimpanzees in Mayombe forest is a clear example of how hunting could negatively impact on biodiversity. For many years, people have been hunting these two primates for their consumption and business purpose, which has resulted in a strong decline of their population.

1.4.3.- Hybridisation

When densities of species are reduced to the extent of exceeding the low threshold allowing reproduction, there is a phenomenon called hybridisation. The situation of more than thirty years of war should contribute to the hybridisation of several species and sub-species. However, due to

lack of facilities and specialists (zoologists, geneticists, and taxonomists), no accurate data is available on this issue. What is worrying more now is the hybridisation of the Palanca Negra Gigante (*Hyppotragus niger variani*) at the National Park of Cangandala. The survival of this species is jeopardised by the cross-breeding of its females with males of Palanca Vermelha (*Hyppotragus equinus*).

1.4.4.- Agriculture

Agricultural activity carried out in Angola is mainly itinerant. It is the main source of food and income for rural communities. As indicated in Fig.20, it is estimated that most of the agricultural production comes from peasants and small farmers.

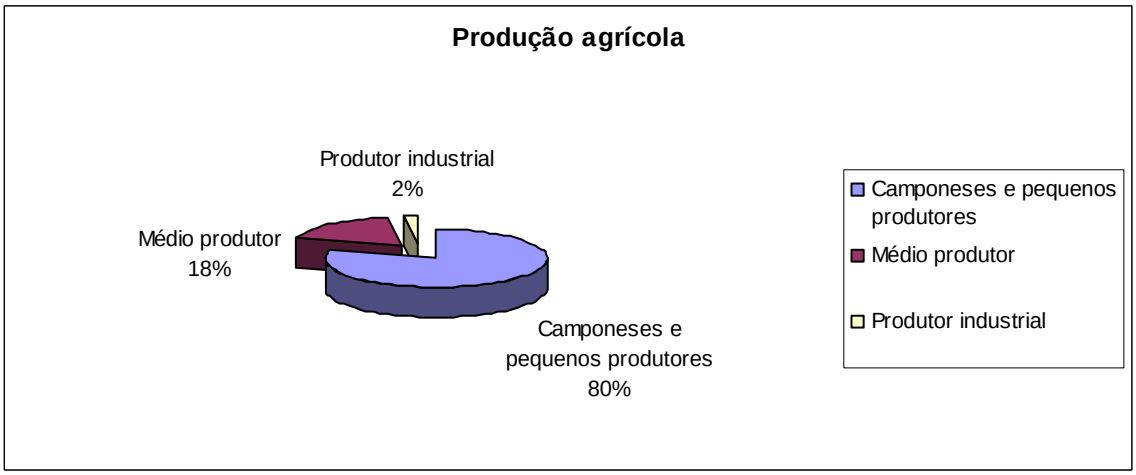

Fig. 20 Agricultural production (Ministry of Agriculture, personal communication)

Farming by peasants is the one that has the strongest negative impact on the Angolan biodiversity, both in terms of its importance and the methods used. Burning of land in order to prepare it for farming and lack of crop rotation, as well as lack of crop variation are some of the prime causes of this pressure on biodiversity.

During the farming season of 2005/2006, manual preparation of land accounted for 77.2% of the total land prepared, while animal draught accounted for 22.3% and only 1% of land was prepared mechanically.

Seasonally, peasants prepare for land that they leave after one or two crops. The reported case of Mayombe Forest is the most worrying one. In essence, the soil of Mayombe Forest is poor. However, due to lack of alternatives, the population cleans several hectares in order to prepare for the next crops.

In order to reverse the situation, the Ministry of Agriculture is envisaging actions that would encourage peasants and other agricultural producers to change their methods. Such actions include the following:

- Modernising traditional farming by stimulating the use of animal draught;
- Applying, consistently, polyculture and an adequate crop rotation that would not only enrich the soil, but also preserve biodiversity, as well as a strong promotion of crop intercalation;
- Applying an adequate policy regarding crop varieties, which would include the acquisition of varieties resistant to biotic and abiotic stress, the acquisition of quality seeds, and safe use of biotechnological results;
- Introducing agroforestry, silvoculture, and other methods combining agricultural production, soil conservation and fertility, as well as increase of plant coverage;

- Supporting conservation in the agricultural fields, agro-biodiversity (crop variability and varieties consistent with local conditions and autochthon races of domestic animals).

1.4.5.- Forest Exploitation

a.- Timber harvesting and trading

The volume of harvesting allowed in Angola is estimated at 326,000m^3/year, while deforestation rate is estimated at 0.4% per year (Ministry of Agriculture, 2004).
Currently, the exploited quantity is below the authorized volume, and authorized logging in Mayombe forest is the most significant in the country, in terms of timber harvesting, which is below 20,000m^3/year (Ministry of Agriculture).

Today, there is lack of a systematic control of this activity, as well as the absence of urgent measures to reforest the exploited areas. In some provinces, IDF has no control over timber harvesting, and the type of species and their conservation status are unknown.

b.- Use of firewood and charcoal

It is estimated that nearly 80% of the Angolan population depends on biomass to meet their energy needs. Firewood is mostly used in rural areas, while charcoal is used in the peripheries of the cities.

The excessive and growing demand for this raw-material has a strong negative impact on biodiversity. FAO (2004) estimates that firewood consumption in Angola amounts to 5 million cubic meters per year, against 7.2 million of cubic meters of charcoal.

Charcoal and firewood consumption is likely to increase over time. In 2005, licensed entities reported a total production of 360,000 tons of charcoal and 58,208 tons of firewood, which represents an increase of 595% over 2004 charcoal production (See Fig. 21, 22, and 23).

The largest charcoal consumer is the city of Luanda, with a per capita consumption of around 100kg/year, or 400,000 tons. Taking into account that in order to produce one ton of charcoal, one needs seven tons of wood, charcoal production per year requires approximately 130,000 hectares of forest.

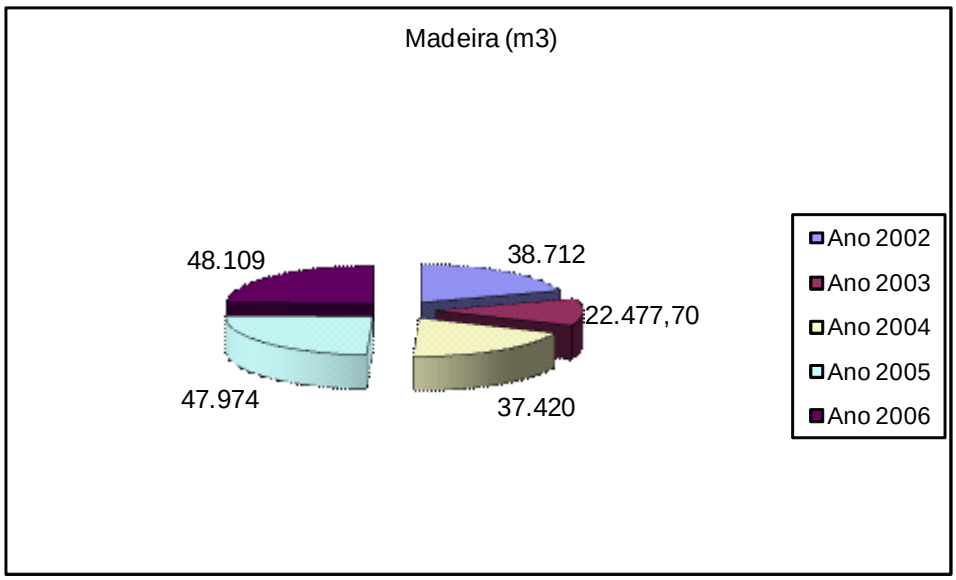

Fig.21 Timber harvested for firewood and charcoal production (Ministry of Agriculture, personal communication)

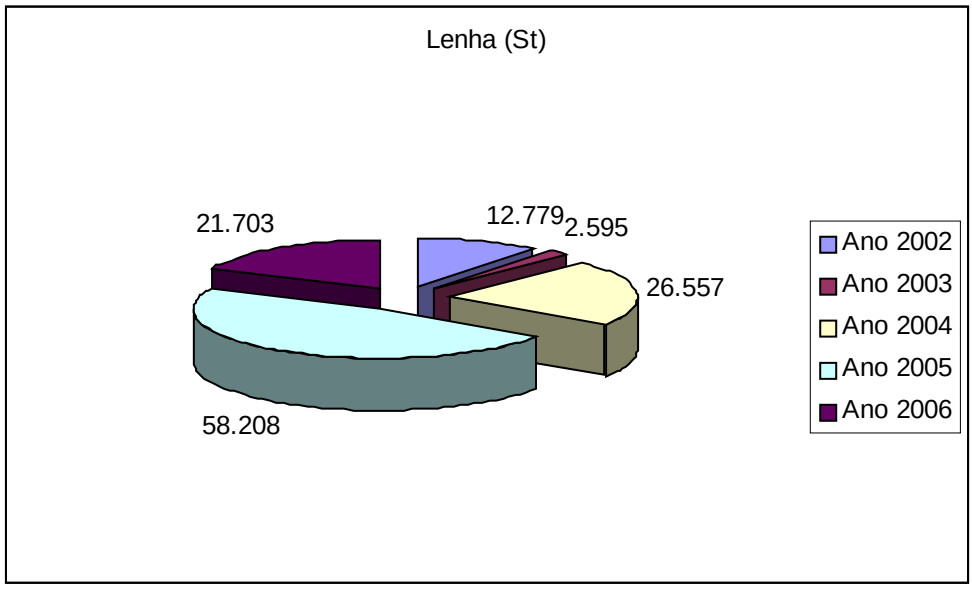

Fig.22- Firewood production during 5 years (Ministry of Agriculture, personal communication)

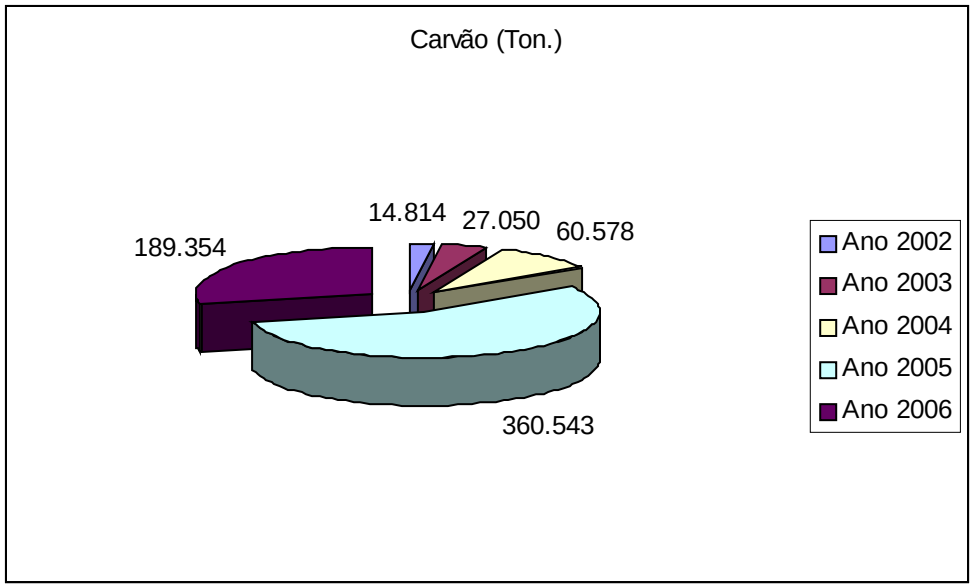

Fig. 23- Charcoal production during 5 years (Ministry of Agriculture, personal communication)

1.4.6.- Invasive Species

There is still no accurate data on the invasive species found in Angola. The years of colonial rule enabled the entrance of several alien species that proved to be invasive. The absence of control facilities and experts has enabled a daily entrance of new invasive species into the country, very often through legal import.

Although there is no inventory of invasive species, the Preliminary Report on Invasive Species in Angola (2009) indicates that there 14 species of plants deemed as invasive (Se Table 6).

Table 7.– List of invasive plant species

	Common Name	**Scientific Name**	**Distribution**
Plantas	Water hyacinth	*Eichhnornia crassipes*	Countrywide, chiefly along the Kwanza River.
	Eucalyptus	*Eucalyptus sp.*	Countrywide, chiefly in the South.
	Acacia palida	*Leucaena leucocephala*	Not well known
	Chorão de praias	*Carpobrutus edulis*	Not well known
	Sea lettuce	*Pistacia estratotes*	Not well known
	Latifolia aquática		Not well known
	Bamboos	*Bambusa sp*	Countrywide, especially in the guinea-congolese forest
	Hypnea	Hypnea muciformis	Not well known
	Cantoa	*Panicum repens*	Not well known
		Lygodium microphylum	Not well known
	Pasto Buffel	*Pennisetum ciliare*	Not well known
	Capim camalota	*Rottboelia cochinchinesins*	Not well known
	Trapada natans		Not well known
	Sida (local designation in Cabinda)	*Chromolaena odorata*	Not well known

1.4.7.- Petroleum activity

The petroleum sector is one of the most economically-profitable sectors in Angola. Activities undertaken in order to produce this resource put some pressure on marine biodiversity due to constant oil spills and use of dispersants. Both affect negatively the biodiversity, although their actual impacts are yet to be known.

However, measures are being adopted in order to preserve marine ecosystems wherever petroleum activity takes place. The most important is to design strategies for the exploitation of this resource, and keep on encouraging operators to improve their environmental protection and preservation practices, by giving priority to the control of oil spill and operational discharge-based pollution, as well as to reduction, recycling, removal, and adequate disposal of waste.

1.4.8.- Marine and inland fishing

Over-fishing is one of the pressures exerted on marine and sweet water biodiversity. Fishing practices and methods used have contributed to the decline of the populations of exploited species.

In order to maintain those populations, there is need to delimit marine conservation areas with a view to protecting species in the reproduction phase or those endangered. The obtaining legislation should be reviewed and stock management measures be adopted, so that fishing is carried out efficiently, without causing damage or negative impacts on the ecosystem.

The following management measures should be implemented:

- Establishment of a database that would survey the accurate number of fishermen in the country;
- Compulsory registration of fishermen;
- Registration of all fishing boats;
- Establishment of a red book including all endangered species and establishment of protected species status;

In addition to fishing, major threats to marine and coastal biodiversity include:

- Unplanned fast urbanization of the coast;
- Offshore oil production;
- Extinction of mangroves;
- Industrial pollution;
- Absence of Marine Conservation Areas;
- Development of tourism;
- Introduction of alien species.

1.5.- MEASURES UNDERTAKEN IN ORDER TO PROTECT BIODIVERSITY IN ANGOLA

Article 13/1 of Law Base on Environment (Law Nr 05/98, of June 19), adopted in 1998, prohibits any activities deemed harmful against biodiversity or conservation, reproduction, quality or quantity of biological resources of actual or potential use or value, especially endangered species. The same article further states that the Government should adopt adequate measures for a special protection of endangered plant species or isolated or group botanical samples, which, per their genetic potential, region, age, rarity, scientific or cultural value so require (Art. 13/2ª); maintenance and regeneration of animal species, restoration of damaged habitats and control of activities or use of substances that are likely to harm fauna species and their habitats (Art. 13/2b).

In order to ensure that environmental elements are protected and preserved, and recognised ecological and socioeconomic value ecosystems are maintained and improved, the Law Base states that the Government should put in place a network of Conservation Areas (Art.14/a); such areas should be subject to classification, conservation, and control measures, which should always take into account the need for biodiversity preservation, as well as social, economic, cultural, scientific, and landscape values (Art. 14/3).

In view of the observed threats, the Government has adopted a series of measures aiming the preservation, conservation, protection, and sustainable use of biological resources.

a) Agriculture and its practices

In Angola, 80% of agricultural production is generated by peasants and small farmers who practice itinerant agriculture and forest fires.

In order to reverse the situation, which is the cause of biodiversity degradation, the Ministry of Agriculture is implementing an agricultural mechanisation programme. In conjunction with the Ministry of Environment and Provincial Governments, an awareness-raising programme has been initiated, with a view to sensitising rural communities on the danger of forest fires (destruction of vegetation, progressive decline in soil nutrients, animal habitat degradation).

b) Preservation of agricultural biodiversity

There is, in Angola, a very high potential of varieties of agricultural species. To ensure their preservation, 33,000 varieties cultivated locally were collected from 65% of the country's municipalities, and kept ex-situ.

In order to protect those varieties, decree Nr 92/04, of December 14, prohibits the import, entrance, use, and eventual production of genetically-modified organisms (GMO).

c) Forestry exploitation

Forest exploitation is one of forest destruction factors. In some provinces, the reduced number of supervisors does not allow an effective and systematic control over those activities.

Enhancing the intervention capacity of the institution charged with the control and supervision of forestry activities, adopting a stricter legislation, and establishing a supervisory career are measures adopted to minimise the negative impact of forest exploitation on the country's biodiversity.

d) Mining

In the mining areas, opening of quarries or open-cast mines leads to the loss of some forest or farming areas and is a potential source of accidents for animals. In most case, such quarries or open-cast mines remain inappropriate for agriculture and biodiversity development once their reserves are depleted and restored to their original state. Land and the various watercourses are contaminated by heavy metals resulting from mineral washing and are disseminated onto the environment through water and air. This pollution has adverse effects on several animal and plant species.

Currently, mining activity is focussed on the exploitation of diamonds, ornamental rocks, and aggregates.

The commonly used method in diamond extraction is the deviation of watercourses and rivers and, in some instances, the use of trenches and big holes for a better exploitation. Once reserves are depleted, the extraction sites, as well as the watercourses, are left in a state of abandonment. As a result of this situation, many species have disappeared.

In the urban areas, as it is the specific case of Luanda, sand and gravel exploitation has become very current and profitable over the last years. This intensive practice results in serious erosions, which are noticeable in the outskirts of Luanda.

The Law on Geological and Mining Activities, approved of in 1992, establishes that protection of nature and the environment is an obligation of entities holding mining rights, who have the extracting powers, perform mineral processing operations and sell those minerals, and whose activity modifies the natural configuration of soil, subsoil, and the continental shelf.

These activities are subject to inspection and supervision by the appropriate State body, and the specific monitoring and supervisory norms are set forth in the Executive Decree Nr 38/92, of August 21.

Practical measures to be implemented include the following:

1. Establishment of a supervisory framework, which is likely to minimise the impacts of mineral resource exploitation on biodiversity and the restoration of the environment.
2. Development and implementation of ecologically-sustainable mining practices (such as site restoration with mineral residues, recycling of residues, soil decontamination, etc.).

Complementary measures to be adopted in ensuring sustainable mining development include:

- Strengthening of the environmental supervisory framework relating to mineral deposits;
- Assessing the impact of mining activities on biodiversity, including the identification and implementation in conjunction with mining companies, of measures aimed at minimising the impacts of their operations on biodiversity;
- Strengthening the supervision, control, and evaluation of the adverse effects of mining activities on biodiversity;
- Designing and disseminating an information programme on the protection and preservation of ecosystems;
- Assessing the impact of watercourse deviation on aquatic biodiversity;

- Making it compulsory for quarrymen to restore ore beds and watercourses, in view of the need for their use for other projects relating to agriculture, pisciculture, as well as the preservation of biodiversity;
- Causing the State to approve of a Law making pollution and environmental degradation a crime, including the adoption of varied sanctions.

Furthermore, take care for the protection and conservation of nature and the environment by observing environmental standards especially designed for mining activities, while rationally utilising mineral resources pursuant to the following legislation:

- Law Base on the Environment;
- Decree on Environmental Impact Assessment;
- Law of Biological and Aquatic Resources;
- Law of Water.

This adds on to international instruments governing the environment and the preservation of biodiversity resources.
For abandoned mines, there is a need for the State to establish mechanisms for controlling and preventing damage likely to be caused by non-rehabilitated mines, and to arrange for the restoration of deposits and watercourses.

e) Marine and inland fishing

Article 8 of Law 6-A/04, of October 8 on Aquatic Biological Resources states that fishing regulation aims at:

- Ensuring a rational and sustainable use of aquatic biological, coastal environment, and riparian resources and the integrated management thereof;
- Contributing to quality assurance, diversity, and availability of biological and aquatic genetic resources, as well as the right to a healthy diet

In article 78 and following, the said law refers to the protection of aquatic flora, and describes the objectives and types of Aquatic Conservation Areas, while imposing prohibitions or restrictions to human activity in those areas. Article 19 refers to the principle of Total Allowable Catch (TAC) in fisheries.
Furthermore, Articles 104 and 105 of the Law prohibits the use of explosives, toxic substances, fishing by electrocution and radiant sources.
With regard to the craft and methods, the law prohibits trawling (trawling to land, in bays, estuaries, and harbours) (Art.108/a, b c).

f) Oil production

Paragraph 1 of Article 24 of Law Nr 10&04, of November 12 stipulates that in performing their activities, licensed companies, the national Concessionaire and their associates should take the necessary precautionary measures in view of the environmental protection, so as to ensure its preservation, notably with regard to health, water, soil and subsoil, air, preservation of biological diversity, flora and fauna, ecosystems, landscape, the atmosphere, cultural, archeological and esthetic values.
The modalities for the implementation of Law Nr 10/04 of November 12 on oil activities are set forth in decrees on:

- Regulations of the Procedures on the Management, Removal, and Disposal of Waste (Executive decree nr 08/05, of January 5).
- Regulations on Oil Spill Notification Procedures (Executive decree nr 11/05, of January 12);
- Regulations on Operational Discharge Management during Oil Activities (Executive decree nr 12/05, of January 12).

The Council of Ministers also approved of the National Contingency Plan against Oil Spills, which deals with issues relating to the need to provide the country with a National Preparedness and Response System against Oil Spills and a data bank, where areas of high risk and environmental and socioeconomic sensitivity, as well as the inventory of equipment, would be identified.

g) Conservation Areas

The establishment of Conservation Areas is one of the measures adopted for the protection, conservation, and preservation of Biodiversity. Currently, Conservation Areas account for a mere 6.6% of the country's total area, and are related to only two of the four biomes recognised in Angola.

The ongoing programme for the establishment of Priority Conservation Areas aims to include all the biomes in the country's Conservation Area system, and to achieve at least 13% of the country. The new legislation to be approved provides for the existence of protected natural areas (for example, river springs and banks).

While establishing Priority Conservation Areas, forest areas in the north of the country should be taken as priority number one.

h) Environmental Impact Assessment.

The implementation of any Project (industrial, agricultural, forest exploitation, fishing, etc.) always causes some degradation of the environment where it is established.
Identifying likely impacts, minimising them and providing alternatives are the goal of the legislation on Environmental Impact Assessment. In many cases, the application of this legislation will allow to protect Biodiversity.

CHAPTER II.- IMPLEMENTATION OF NATIONAL BIODIVERITY STRATEGY AND ACTION PLAN (NBSAP)

2.1.- INTRODUCTION

Angola remained, at least for two decades, without conducting studies relating to biodiversity. The last studies on biodiversity of Angola were conducted around 1980. In the 1990s some studies were conducted whose the most important one was the IUCN Report on the Situation of Environment of Angola. Despite the fact of being a general report on the status of environment in Angola, the document presents some data about biodiversity.

Some unpublished works have been conducted by Science Faculty of Agostinho Neto University and the National Institute for Fisheries. In the framework of development of the National Biodiversity Strategy and Action Plan, an assessment of land and marine components of the Angolan biodiversity was undertaken.

The National Biodiversity Strategy and Action Plan (NBSAP), developed in compliance of directive from the Conference of the Parties to the Convention on Biological Diversity (CBD) permitted to evaluate the status of the country's biodiversity.

Its global objective is to streamline in their conservation and sustainable use of biological diversity, and the equitable and fair sharing of the advantages from the use of biological resources in development policies and programmes.

The National Biodiversity Strategy and Action Plan were developed according the needs of Angola. It is obvious that considering the lethargic status in which the country was, the document produced was very ambitious if we are to look at the financial and technical resources available.

The National Biodiversity Strategy and Action Plan cover a period of 5 years (2007-2012), after which a revision should be made in order to adapt them to the current needs.

The implementation of the actions provided in the NBSAP have not yet produced the expected outcomes because there was various actions of extreme importance that were undertaken due to the lack of funding and technical resources. Nevertheless, there are still several other cases of success in the implementation of the NBSAP.

2.2.- NBSAP STRATEGIC AREAS

The Strategic Areas of intervention in order to achieve the Global Objective of Strategy that have provided a framework for the Action Plan are:

a.- Information Research and publication

Information on biodiversity in Angola is scarce, therefore research is considered to be priority for the increment of knowledge that permits an effective management of biodiversity. In order to preserve this biodiversity, the decision by management bodies should be based on updated and detailed information. It is also necessary that collected information through research actions on biodiversity in Angola be largely available and be broadly published. Information exchange and

access should be strictly related with research so as to enable an adequate conservation of biodiversity.

b.- Education for Sustainable Development

Conservation of biodiversity resources in Angola requires understanding of the value of these resources and assistance of the Angolan citizens at all levels of society. For all Angolans to understand the economic, social and cultural importance of biodiversity resources it is important that educational activities are developed in formal, informal and non-formal set-ups. Thus, education processes for sustainable development are necessary to a broad participation and conscious involvement in conservation of biodiversity.

c.- Management of Biodiversity in Environmental Conservation Areas

The areas of environmental conservation cover approximately 6.6% of national territory of Angola, which corresponds to approximately 82.200km2. If the forestry reserves are included as environmental conservation areas, this figure increases considerably, as they cover 250.000km2 of the national territory. Due to the long period of instability in the past and the growing needs of the populations, the current protection measures have been less efficient or in some cases inexistence. The organization of an effective management of the existing environmental protection and the creation of other are the important strategic interventions to preserve the important component of Angolan biodiversity.

d.- Sustainable Use of Biodiversity Components

There are important biodiversity components of biodiversity in Angola that are out of environmental protection areas. These are more exposed to the action of economic activities by human beings. In this way, and in order to ensure a sustainable use of these components, economic activities such as agriculture, cattle grazing, forestry exploration, fishing, minerals exploration, civil construction and industry should incorporate measures to preserve biodiversity and an environmental management plan. The implementation of *ex situ* conservation projects and the monitoring Betteria out of environmental conservation areas are equally necessary.

e.- Role of the Communities in the Management of Biodiversity

Approximately 50 to 60% of Angolan population reside in rural areas, being dependent on the natural resources for their survival. Apart from being the most affected by natural phenomena, they are also the ones who know better the Angolan biodiversity, particularly in relation to its distribution. Therefore, local communities should play a key role in conservation and management of biodiversity which is strongly related to the conservation and management of biodiversity. The involvement of the community is important in the access and sharing of the benefits from biodiversity resources.

f.- Institutional Strengthening

A big diversity of actions need o be implemented to conserve biodiversity in Angola. The institutional capacity in Angola is often weak in terms of human and financial resources. The implementation of these actions depends of individual and institutional capacity building so that they may function effectively. Institutional capacity building has to include aspects the related to technical and professional training in several areas of environmental issues of relevance to the

conservation of biodiversity. The modernization of equipments and infra-structures, and a better intra-institutional coordination may ensure good results in the management of biodiversity.

g.- Legislation and its enforcement

Many of the proposed actions in this strategy should be supported by an appropriate legislation. Adoption and ratification of multilateral agreements as well as the implementation of other legal mechanisms will make possible an efficient conservation and management of biodiversity. In some cases, there will be a need for revision of the existing legislation. In many situations the legislation exists, but its enforcement is deficient, requiring to be duly corrected. The dissemination and publication of the existing legislation and its enforcement is also important component of this strategy.

2.3.- IMPLEMENTED ACTIONS

Despite that not all foreseen actions were conducted, in general, some actions with efficient results have been developed. These results are represented in table 7 and 13 in order to facilitate its analyses. Likewise some unsuccessful cases due to lack resources and trained personnel are also represented.

Out of the 8 operational strategic areas identified, 102 action are to be implemented in the period between 2007and 2012.

Two years after the adoption of the NBSAP by the Council of Ministers, it is noted that only 5% of planned actions in the NBSAP were conducted. The following tables indicate some the above-mentioned actions.

Table 9- Strategic Area A: Information Research and Publishing

Specific Objective	Result	Obstacle
Improvement of knowledge on biological resources and their status of conservation in Angola through research programmes duly coordinated and the conduction of regular inventories.	Studies conducted on Ecology and Biology of: - Palanca Negra Gigante - African Manatim - marine turtles - Agrobiodiversity	Lacking of funding and specialized technical personnel, no studies were conducted on current situation of gorillas and chimpanzees from Maiombe forest.
Identification activities that have impact on biodiversity in Angola through research programmes and other instruments for environment management.	Itinerary agriculture, non-selective fishing, forestry exploration, coal production, minerals exploration and poaching were identified as having impact on biological diversity of the country. National Plan on Conservation of Phytogenetic resources of local varieties of agricultural produce. In the framework of this Programme, 3.300 local varieties are conserved ex-situ, collected in 65% of municipalities of the country.	Lack of funding – no assessment with real data of impact thereof
Compile a data base and publicize in a broad manner information on Angola's biodiversity so as to contribute to its conservation.	The goals set has not yet been achieved, but efforts were made to publicize some scientific works, such as the compilation of database on marine biodiversity, preliminary data on manintim, Guide on Mammals of Angola, guide of endangered fauna in Angola.	Apart from lack of funding, the works to be publicized are very few.

Table 10- Strategic Area B: Education for sustainable development

Specific Objective	Result	Obstacle
Development of methodologies and approaches for sustainable development education so as to ensure a better sustainable conservation and use of Angola's biodiversity.	- Regular training of trainers on environmental education. - Media coverage of events related to biodiversity - Tv programmes aimed at publicizing the National Parks	Unavailability of necessary funds hinders development of actions for education of peoples residing in the surroundings of Conservation Areas.
Disseminate knowledge and information on biodiversity that may help Angolans to adopt sustainable attitudes and practices for sustainable conservation and use of natural resources.	- Production of brochures and cartoons to divulge environmental knowledge with the aim of achieving the lowest classes.	No necessary support of other partners for better dissemination was obtained.

Table 11- Strategic Area C: Biodiversity Management in Conservation Areas

Specific Objective	Result	Obstacle
Re-assess the status of the existing conservation areas and their infrastructures through studies and ecological inventaries.	- Foi elaborado um Modelo de Gestão dos Parques Nacionais; - Three national Parks renovated and two of them rehabilitated. Conservation Areas in Kuando-Kubango province were rehabilitated	Funding insufficiency did not allow the assessment of the three other National Parks,
Propose the creation of new Conservation Areas in order to include then ecosystems, habitats and important species and those of huge biological value, that are not being effectively protected.	- Interested Provinces identified and terms of reference developed.	The great problem will be how to fund this activity.

Tabela 12- Área Estratégica D: Utilização sustentável dos componentes da Biodiversidade

Specific Objective	Result	Obstacle
Promotion of conservation out of Conservation Areas through monitoring	- Training of Forestry guards by IDF	Insufficiency of financial resources to train personnel and difficulties of those trained in public service.
Ensure that the projects of industrial and mineral sectors include a study on environmental impact	• Adoption by the Government of a law on the conduction of studies of environmental impact for big projects that may impact the environment. • Incorporate specific legislation of environmental conservation component; • Creation of a specialized Office within the functional structure of the Ministry of Environment to assess studies environmental impact.	Lack of support legislation that provide for coercive measures those sectors which do not comply with the norms set.

Table 13- Strategic Area E: The Role of Local Communities

Specific Objective	Result	Obstacle
Strengthen the role of rural communities in the use of sustainable of biodiversity in Angola and decision making.	- Integration of some local individuals in monitoring of Kissama and Cangandal National Parks. - Evaluation of economic, social and ecological impact of the use of natural resources by local populations in Kissama National Parks - Support rural communities to conserve in-situ their local variety adapted and their genuine races of animals.	Lack of resources to fund programmes including the communities in sustainable management of Conservation Areas, mainly in National Parks.

Table 14- Strategic Area F: Institutional Strengthening

Specific Objective	Result	Obstacle
Development of professional training and capacity building actions of Angolan personnel in various areas of biodiversity.	- Training of various personnel from Customs, National Police and Armed Forces in issues of endangered species in Angola.	- the number of persons is insufficient to cover the whole national territory. -insufficient technical and financial resources to implement concrete actions aimed at preserving biodiversity.
Strengthening of institutional capacity activities at provincial and municipal levels in order to improve sustainable management in Angola and allow decentralization of environment management.	- Establishment in each municipality a Section responsible for local management of environment, including biodiversity. - Capacity building, through seminars, workshops directed to personnel dealing with environment issues at Provincial level.	Lack of sufficient resources in order to capacitate environment managers at municipal level.

Table 15- Strategic Area G: Legislation enforcement

Specific Objective	Result	Obstacle
Improve the legislation for a sustainable conservation and use of biological resources and strengthen mechanisms to ensure its enforcement.	-Produce of a law on aquatic biological resources and their regulations; - Elaboration of the law on Forests, Hunting and Conservation Areas and regulation thereof underway. Preparation of legislation on the access to genetic resources and the sharing of its profits.	Harmonization of careers of guards inside and outside of conservation areas.
Facilitate the processes of ratification of multilateral Agreements and improve contact mechanisms and process thereof.	- Accession and ratification to various sub-regional, regional and international conventions and agreements (SADC Protocol, and Alger e Ramsar Protocols).	Institutional difficulties. There are serious problems at the Ministry of Foreign Affairs in expediting the processes, and the Ministry of Finance in the payment of quotas.
Ensure Angola's active participation in regional and international initiatives dealing with nature conservation.	• Integration of Sabonet Project • Initiatioon of Project for the creation of Maiombe Transfrontier Area • Integration of the Project for the establishment of Namibia Transfrontier Conservation Area (Iona/Squeleton Coast) • Integration of Project aimed at creating Transfrontier Area with Zambia (LUIWA-PLAIN) • Integration of Project the establishment of a Transfrontier Area with Namíbia, Zambia, Bostwana and Zimbabwe (Kaza-TFCA). • Active participation in SADC Regional Network for the Conservation of Phytogenetic Resources (SADC Plant Genetic Resources Network, SPGRN)	The lack of translated texts of the conventions and memoranda into Portuguese represents a serious problem in their enforcement by the Angolan authorities. - Non-ratification of COMIFAC Treaty - Non-accession to GRASP project

CHAPTER III.- SECTORAL AND INTER-SECTORAL INTEGRATION CONSIDERATIONS ON BIODIVERSITY

3.1.- NATIONAL INTEGRATION

In Angola, the Ministry of Environment is the executive body of issues related biodiversity through the National Directorate of

Taking into account the complexity of this area of study, the Ministry of Environment has developed partnership with the Ministry of Education, Agriculture, Fisheries, Petroleum, Geology and Mines, Sciences and Technology, Familiy and Women Promotion, National Defense, Home Affairs, Transports and Finances in a view to protect and preserve biodiversity.

With regard to scientific research, the Ministry of Environment is working and has agreements with various research institutions, such as Agostinho Neto University, the Department of Biology of Sciences Faculty, the Angolan Catholic University, through the Centre for Studies and Research in the framework of the Project for Protection of Palanca Negra Gigante, the National Institute for Fisheries Research, National Centre for Phytogenentic Resources, the National Museum for Natural History, and the National Centre for Scientific Research and the National Technological Centre.

These relations and conventions are effected through information exchange and/or implementation of joint projects.

ACTIVITIES DEVELOPED

1. With the assistance of Border Guard Police in Cabinda, a mobilization campaign against the hunting of gorilla and chimpanzees was conducted, which resulted in the increase of these primates' population.
2. In the scope of the fight against sea pollution by hydrocarbons, a contingency plan was developed and adopted by the Council of Ministers, whose Implementation Committee is coordinated by the Ministry of Environment and includes the following bodies: Ministry of Petroleum, Ministry of National Defense, Ministry of Home Affairs, Fisheries, Transports and Finances as well as oil operators in Angola.
3. Inclusion of civil society in biodiversity protection and conservation activities.
4. Involvement of the Ministry of Environment through teaching and environmental education.

3.2.- SUB-REGIONAL AND REGIONAL INTEGRATION

The Government of Angola, through the Ministry of Environment is well integrated at Sub-regional and regional level in respect to environment and biodiversity issues.

At SADC level, Angola acceded to various projects on Biodiversity Conservation and sharing of information with other member states (See actions implemented within the Strategic Area G of NBSAP).

The same efforts are made towards central Africa, where Angola is part of the CAECS, and shares the rich basin of Congo with the two Congos, but unfortunately it has not yet acceded to the Commission on Lower Congo Forests (COMIFAC). Despite this situation there are some efforts towards the accession to the Commission as well as the Convention on Gorillas (GRASP). It is

noted that in this real of ideas, Angola was the first country of Congo Basin to start the project on the Establishment of a Maiombe Transfrontier Areas.

At sub-regional level, Angola has an agreement on the north with the Commission of Guinea Current. Angola assumes the coordination of issues relating to the management and fisheries research.

In the south, Angola is part of Benguela Current Commission. Within these programmes, a project on the management and conservation of marine and coastal biodiversity is in course with a focus in the transfrontier area between Angola and Namíbia (Iona/Skeleton Coast). The activities thereof include the development of a plan for the management of waters and how to identify land sources of marine pollution.

The will of integrating Angola lead the Government over the last years to facilitate the participation of delegates from the Ministry of environment in different meetings related to these issues.

Table 16 - Regional and Sub-regional Integration

Convention	Statues	
	Date of signature	**Date of ratification**
Gorilla Agreement (GRASP)*		
Abidjan Convention *	1981	
Alger Convention *		
Memorandum of the Agreement on the Conservation of Small African cetáceos e Manatim , and their habitats *****	2008	
Protocol On Fisheries (SADC)	14.08.2001	01.04.2003
Protocol on the Conservation of Fauna and Law enforcement (SADC) *****	18.08.1999	
Protocol on Forestry Activities *	03.10.2002	
Revised Protocol on Shared Rivers (SADC)	07.08.2000	
Protocol on Energy	24.08.1996	19.12.1997
Memorandum of Understanding on the Conservation of Phytogenetic Resources	1989	

* Ratification or accession process underway.

Table 17– Transfrontier Conservation Areas

ATFC	Countries included	Status
IONA/SKELETON COAST	ANGOLA e NAMÍBIA	Memorando assinado
KAZA	ANGOLA, BOTSHWANA, NAMÍBIA, ZÂMBIA e ZIMBABWÉ	Memorando assinado
LIUWA PLAIN/MUSSUMA	ANGOLA e ZÂMBIA	Em negociação
MAIOMBE	ANGOLA, RDC e CONGO	Memorando assinado

3.3.- INTERNATIONAL CONVENTIONS

Accession to International Conventions is part of the current Government Programme of Angola, through the Ministry of Environment. The process of signing and ratification of international instruments includes the Ministry of Foreign Affairs, the Council of Ministers and the National Assembly. This situation demonstrates the will of the Government of Angola to bring on board all stakeholders in the implementation of international conventions.

The ministry of Finance is equally associated to this process, as it is the one who pays the quotas of the different international conventions.

The Conventions to which Angola acceded or are in course are listed in table 7 indicating the status and the implementation body.

Table 16- Status of international Conventions.

Convention	Status		Órgão de implementação
	Date of ratification	Date of ratification	
International Convention on the Conservation of Red Atlantic		29.07.1976	Ministry of Fisheries
Convention on the Combat against Desertification in the countries affected by serious droughts or desertification, particularly in Africa. (CCD).	14.10.1994	03.06.1997	Ministry of Agriculture
Convention on Biological Diversity	12.06.1992	01.04.1998	Ministry of Environment
United Nations Framework Convention on Climate Changes (UNFCCC)	14.06.1992	17.05.2000	Ministry of Environment
Vienna Convention on Ozone Layer		17.05.2000	Ministry of Environment
Convention on the International Trade in Endangered Species (CITES) *			Ministry of Environment
Bonn Convention on Migratory Species of Wild Fauna(CMS)		15.04.2003	Ministry of Environment
Convention on the Law of the Sea	09.03.2001	20.12.2001	Ministry of Petroleum
International Convention of 1973 for the prevention of pollution by Ships and the Protocol of 1978 (MARPOL 73/78)		21.12.2001	Ministry of Petroleum
International Convention on civil responsibility and compensation from damages caused by pollution by novice and potentially dangerous in the sea. (HNS 96)		20.04.2001	Ministry of Petroleum
International Convention of the Establishment of an International Fund for the damages due to hydrocarbon pollutions (FUND 92)		20.04.2001	Ministry of Petroleum
International Convention on the Intervention onshore in case of accidents caused by Hydrocarbons. (INTERVENTION 92)		04.10.2001	Ministry of Petroleum
International convention on civil responsibility for damages caused by pollution of the sea by hydrocarbon (CLC PROT 92)		01.11.2001	Ministry of Petroleum
International Convention on Preparation, Fighting and Cooperation against Pollution of hydrocarbon (OPRC 90)		09.11.2001	Ministry of Petroleum
Pcartagenious Protocol on Biosafety		2005	Ministry of Environment
Stockholm Convention on Organic Persistent Pollutants (POPs)		2005	Ministry of Environment
International Treaty on Phytogenetic Resources for Food and Agriculture. (TIRFAA)		2005	Ministry of Agriculture and Agostinho Neto University

* underway

CHAPTER IV.- CONCLUSIONS

4.1. BIOLOGICAL WEALTH

The Biodiversity of Angola is characterized as one of the richest in Africa. But unfortunately this biological diversity is not yet well-known due to both the war which devastated the country over the last decades and the current lack of policy for scientific research in fundamental in domains of sciences and life and the lack of appropriate technical research to undertake systematic scientific studies. The study of biodiversity is often limited to the study of flora, mainly firewood plants, and the fauna of mammals and in certain cases the avifauna. The other species, both of Animal kingdom and those of Plantae kingdom, chiefly those of small and microscopic dimension and /or without evident socio-economic interest are not studied. Nevertheless, a particular effort was made with regard to marine biodiversity. In the framework of assessment of marine biological resources, the National Institute for Fisheries Research conducted various studies, but their results have never been published. Some studies conducted based on the previewed action of the NBSAP helped to gather information that enriched the knowledge available on these biodiversity. Unfortunately, these studies were based on mammals fauna.

From available data one may conclude that the situation of biodiverity, in general, is promising, though there are many species endangered by extinction or under extinction. As for the African Elephant (*Loxodonta africanus*) whose migration route in Angola were abandoned, was seen in several points of the country, reaching even to create a human-animal conflit. The pressure on gorilla and chimpanzee in Maiombe forest dicreased considerably and special measures were taken to protect the Palanca negra gigante.

The situation of flora is more promising; the four main biomes represented in the territory of Angola has a certain stability in its ecological functioning. It is true that the situation of guinea-congolese biomes is relatively concerning in relation to the other three biomes, due to the presence of trees of trade interest. This biomes, despite being the richest of Angola, is the less studied and does not have a protection system. Currently, its conservation is part of the concerns of the Government. The Ministry of Environment, in collaboration with the Ministry of Foreign Affairs developed with the Congos in order to create a Transfrontier Conservation Area in Maiombe Forest so as to preserve its biodiversity, mainly the primates.

The main threats to biodiversity are fisheries, habitats degradation, oil exploration, minerals exploration, itinerary agriculture, poaching, and the search for wood in order to produce charcoal. However, in order to minimize the impact of these activities on biodiversity, various measures have been taken, though they have not yet produced concrete effects, especially on sensitive ecosystems as forests and mountains.

The fauna, as stated above, mainly that of big dimension, is known and contemplated more by scientific studies and projects directed to protection and conservation. The NBSAP allowed conducting studies on those species whose anthropic pressure on them poses a risk to their survival on Angolan territory (African Manatim, marine turtles, including the Palanca negra gigante).

Table 17 – Anthropic Pressure and the evolution trend of ecosystems/biomes

Anthropic Pressure and threats							
Ecossistemas/Biomas		Degradation and loss habitats	Under-exploration	Pollution	Climate changes	Invading species	Economic growth
	Tropical Florest	3↑	2↑	1	1	1↑	3↑
	Savannah and prado	1↑	1↑	1	1	2↑	2↑
	Land fauna	2↑	1↓	1	1	1↑	3↑
	Land Flora	2↑	1↑	1	1	3↑	2↑
	Mangroves	4↑	4↑	2↑	-	-	4↑
	Inland waters	2↑	2↑	1	-	-	-
	Sea waters	2↑	-	3↑	-	1↑	3↑

Pressure:
-1: Weak
-2: Moderate
-3: Considerable
-4: High

Threats:
↑ : Increase
↓ : Decrease

4.2. PROTECTION OF BIOLOGICAL WEALTH

Biodiversity protection and sustainable use constitute priorities of the Government. The re-dynamization of the functioning of Conservation Areas illustrates this political will. It is worth noting that major part of the referred areas is situated on Zambezi biomes, only Iona National Park is situated on Karoo-Namibe biomes. In order to cover all biomes and attain the target of 13 to 15% of national territory under Conservation Areas, the creation of new Conservation Areas has been foreseen.

One of the main concerns of the Government is the integration of local communities in biodiversity management. In this regard, the guards for the conservation areas area almost recruited within the communities, due to both their knowledge of the areas and the need o integrate the population in biodiversity management. All guards deployed in National Parks are originally from the areas.

An important measure for the conservation of agro-biodiversity is the recognizance of the rights of family farmers is to continue using their local varieties and those of cattle grazers to produce their one families of indigenous animals.

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ANNEXURE

1. REPORTING PARTY

State Party: Republic of Angola
Name of Institution: Ministryof Environment
Postal Address: Ministry of Environment, Avenida 4 de Fevereiro nº 30 (Atlântico Building), Luanda, Angola Post office box 1056

2. METHODOLOGY USED

The methodology used in compiling this framework report was based on:

a) Bibliographic survey and interviews

Compilation of published and unpublished literature on Angolan biodiversity over the last four years.

b) Analyses and execution of the NBSAP
contacts with the authors quoted in the Document of National Biodiversity Strategy and Action Plan as well as with the Coordinating Unit of its implementation

c) Conduction of seminars on the current situation of Angolan biodiversity – trends and threats. Compiled data were presented and discussed in validation workshop attended by various experts, in order to gather inputs so as to improve the national report.

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