



THE REPUBLIC OF GUINEA-BISSAU  
THE STATE'S GENERAL OFFICE OF THE ENVIRONMENT



*Strategy and National Action Plan for the Biodiversity*

2015 - 2020



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## DATASHEET

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## List of acronyms and abbreviations

AA	Environmental evaluation
AAB	Associations and Groups of Base
AAAC	Authority of Competent Environmental Evaluation
ABS	Access and Benefit-Sharing
AD	Action for the Development
AIA	Assessment of Environmental Impacts
AMP	Protected Marine Area
AMPC-Urok	Protected Marine Area of Urok Community (Formosa, Nago and Chedeã)
AMP-I	Insular Marine Protected Areas
AP	Protected Area
B.O.	Official Bulletin
BAD	African Bank of Development
BCP	Biodiversity Conservation Project
BIOMAC	Marine and Coastal Biodiversity of West África
BM	World Bank
BP	Business Plan
CAIA	Assessment Cell of Environmental Impacts
CAN	National Council of Waters
CBD	Convention about the Biological Diversity
CBD-Habitat	Spanish Foundation for Conservation of the Biodiversity and Habitat
CEDEAO	Economic Community Of West African States
CG	Management Council
CHM	Clearing House Mechanism
CILSS	Committee Inter-States of Fighting against Drought in Sahel
CIMA	Inter-ministerial Council of Waters
CIPA	Applied Fishing Investigation Center
CITES	Convention on the International Trade of Flora and Wild Fauna Species
CMP	Fishing Monitoring Center
CMS	Convention on Migratory Species of Wild Animals
CNB	National Commission of the Biodiversity
COP	Conference of the Parties
CPDA	Letter of Policy of Agrarian Development
CQNUMC	Convention of the United Nations Addressing Climate Changes
DBT	Dulombi-Boé-Tchéché
DEA	Direction of Agricultural Statistics
DENARP	Document of National Strategy of Poverty Reduction
DGA	General Direction of Environment
DGDD	General Direction of Durable Development
DGFF	General Direction of Forest and Fauna
DGP	General Direction of Cattle Raising
DGT	General Direction of Tourism
EPANBD	Strategy and National Action Plan of Biodiversity
EVA	Environmental Verification School
FAO	United Nations for Food and Agriculture Organization
FBG	BioGuiné Foundation

FIBA	International Foundation of Arguin Bank
FISCAP	Fiscalization of Fishing Activities
FMA	Environment World Fund
GAECA	Supporting Group of Education and Environmental Communication
GEF	Global Environment Facility
GPC	Coastal Planning Office
GPS	Global Positioning System
GTP/IE	Work Group on the Petroleum and other Extractive Industries
HIPIC	Heavily Indebted Poor Countries
IBA	Important Bird Area
IBAP	Institute of Biodiversity and Protected Areas
ICMM	International Council on Mining and Metals
ICOMOS	The International Council on Monuments and Sites
IDA	International Association for the Development
IEO	Spanish Institute of Oceanography
IICT	Institute of Tropical Scientific Investigation of Portugal
IIEDD	Extractive Industry Initiative and Durable Development
ILAP	Quick inquiries on Poverty Assessment
INE	National Institute of Statistics
INEC	National Institute of Statistics and Census
INEP	National Institute of Studies and Researches
INITA	National Institute of Applied Technology
INPA	National Institute of Agrarian Research
ISPA	Academical Institute of Psychological, Social, and Life Science
IUU	Illegal, Undocumented and Unregulated
LA	Environmental Licensing
LBA	Basic Law of Environment
LDC	Least Developed Country
LQAP	The Main Law of AP's
MADR	Ministry of Agriculture and Rural Development
MARPOL	International convention for Prevention of Pollution by Ships
MERN	Ministry of Energy and of Natural Resources
NAMA	Nationally Appropriate Mitigation Measures
NAPA	National Adaptation Plan of Action
NBSAP	National Biodiversity Strategy and Action Plans
NEPAD	New Partnership for the Development of Africa
NNM	Medium Level of the Sea
ODM	Aims of the Development of Millennium
ODZH	Organization for Defense of Wet Zones
OMVG	Organization for Valorization of Rio Gambia
ONG	Non-Government Organization
OPEP	Organization of Producing Countries and Exporters of Petroleum
PACO	Program of Central and Western Africa
PACT-Biodiv.	Valorization of Cultural and Traditional Property for protection of the Biodiversity
PANA	Program of National Action of Adaptation/Fighting Against Desertification
PCMA	Common Policies for Improvement of Environment
PFNL	Non-woody forest products
PG	Management Plan
PGBZCGB	Project of Biodiversity Management of Coastal Zone of Guinea-Bissau
PGUB	Urban General Plan of Bissau city

PIB	Gross Domestic Product
PNB	National Park of Boé
PNC	National Park of Cantanhez
PND	National Park of Dulombi
PNGA	National Plan of Environmental Management
PNLC	Natural Park of Cufada Lakes
PNMJVP	Marine National Park João Vieira e Poilão
PNO	National Park of Orango
PNTC	Natural Park of Mangroves of Cacheu River
PNUD	United Nations Development Program
PoWPA	Program of Work on Protected Areas
PRCM	Regional Partnership for Coastal and Marine Conservation
PREE	Regional Programme of Environmental Education
PREMI	Poverty Reduction and Environment Management Initiative
PSA	Payment for Environmental Services
RABBB	Reserva de Biosfera do Arquipélago Bolama-Bijagós
RAMPAO	Rede das Áreas Marinhas Protegidas da África Ocidental
RAR	Rede de Alerta Rápida
RBABB	Reservation of Biosphere of Bolama-Bijagós Archipelago
REDD	Reduced Emissions from Deforestation and Degradation
RNAP	National Net of the Protected Areas
SEA	The State's General Office of the Environment
SEADD	The State's General Office of Environment and Durable Development
SEAT	The State's General Office of Environment and Tourism
SENEP	Endogenous Knowledge and Sociocultural Practices
SNAP	National System of Protected Areas
SNS	Sacred Natural Sites
UCF	Central Unit of Fiscalization
UEMOA	West African Economic and Monetary Union
UICN	World Union for the Nature
UNCCD	United Nations Convention to Combat Desertification
UNEP	United Nations Environment Program
UNESCO	United Nations Education Science and Culture Organization
VMS	Vessel Monitoring System
WAMER	West African Marine Ecoregion
WCMC	World Center of Conservation and Monitoring
WI	Wetlands International
WWF	World Wide Fund for Nature
ZEE	Exclusive Economic Zone
ZPR	Reserved Fishing Zone

## I. INTRODUCTION

With the objective of conserving its biodiversity, to guarantee the sustainable use of its elements and to promote the fair and equal share of the benefits and advantages that result from it, Guinea-Bissau, as an example of other countries of the world, signed, in 1992, and ratified, in October of 1995, the Convention about the Biological Diversity.

The participant countries are forced to take the necessary measures to reach the objectives, namely through strategies and national action plans of the biodiversity conservation. In case of Guinea-Bissau, the first version of this document was elaborated in 2002.

National strategies and Action Plans (NBSAPs of Biodiversity) are the principal instruments for the implementation of the Convention about the Biological Diversity (CBD) at the national level, as foreseen in the article 6<sup>th</sup> of the Convention.

During the 10<sup>th</sup> Conference of CBD Parties (COP10), which took place in Nagoya, a Strategic Plan for Biodiversity was adopted; it was revised and updated from 2011 to 2020. In the process of elaboration of this new Strategic Plan of Biodiversity, the Secretariat of the Convention suggested a new set of aims to be established in the form of long term objectives which were materialized in 20 proposals, all addressed for the reduction of biodiversity loss world wide. Denominated of Aichi Goals for Biodiversity, these goals are organized around five great Strategic Objectives: i) to address the main causes of biodiversity loss, making the concerns about biodiversity permeate the government and the society; ii) to reduce the direct pressures on biodiversity and to promote its sustainable use; iii) to improve the situation of biodiversity, protecting ecosystems, species and genetic diversity; iv) to increase the benefits of biodiversity and ecosystem services for all; v) to strengthen the implantation through communicative planning of knowledge management and training.

The parties agreed that for the two following years, this inclusive international aspect would become national strategies through the revision and updating of the respective action plans for biodiversity.

The COP11, accomplished in 2012 in Hyderabad (India), one of its resolutions invites the parties that had not done it yet to proceed with reexamination, updating and revision of their Strategies and Action Plans for Biodiversity, in consonance with the objectives of the New Strategic Plan 2011 – 2020, the Aichi Goals. The process of updating EPANBD from Guinea-Bissau, with the purpose of adjusting it to the new guidelines and national and global priorities, was recently launched.



## *Ecosystems Services and Economic Value of Guinean Biodiversity for the Human Well-being*

*Ecossistema costeiro e insular; Foto: JMPA*

**Picture 1: Coastal vegetable sequence of an island in Bijagós**

### **1. Value of biodiversity and services of the ecosystems in Guinea-Bissau and their contribution for the human well-being**

#### **1.1. State and tendencies for the main ecosystems of the country**

Guinea-Bissau territory has a total surface of 36.125 km<sup>2</sup> and it is constituted by a continental part, a group of territory near by the islands and a group of about 80 islands and islanders, the one with the largest distance is denominated Archipelago of Bijagós.

From phytogeographic point of view, this small country in the West Africa locates “in the zone of regional transition guineo-Congolese and sudanese” (White, 1983). It is located in the transition boarder between the regional center of Sudanese endemicity, to the north, and the regional center of Guineo/Congolese endimicity, to the south; it integrates arid ecosystems of the open forests and of savannas from Shaelian Africa, as well as wet tropical forest. It results from this geographical location that the country is covered of a diversified variety of ecosystems, namely arboreal and shrubby savannas, subwet, clear and open forests, gallery and mangroves forests.

The **Sudanese sector** occupies the whole oriental zone from interior of the country, although it includes some areas of low altitude. The lands with average altitude around 40 m (plains of Bafatá and Gabú) are predominant, to southeast, the hills of Boé present quotas for about 300 m. In the subsector of the hills of Boé, the arboreous savannas, herbaceous and shrubby steppes are predominant. In the subsector of the plains and peneplains of Bafatá and Gabú there are, overall, open forests and arboreous savannas, as well as “meadows” and hydrophyte vegetation.

The **Guinean sector** that includes the Archipelago of Bijagós extends from the north to the south in the western part of the country and it is occupied by lands of low altitude and it has remarkable coastal influence. Three subsectors are distinguished here: i) insular subsector, the Archipelago of Bijagós, composed mainly by open forests, arboreous savannas, mixed palm trees and mangroves; ii) Guinean subsector from the south, corresponding to the Southwest of the continental territory which presents, overall, open forests and arboreous savannas, such as “meadows”, mangroves and hydrophyte vegetation, in spite of existance of some stains of Guinean dense forest; iii) Guinean subsector from the north, in the northwest of the country, are occupied mainly by open forests, palm trees and arboreous savannas, as well as mangroves, “meadows” and hydrophyte communities.

### 1.1.1. Main Ecosystems and Habitats

The Biodiversity of Guinea-Bissau settles in the great flora and vegetal domains and in a great variety of ecosystems, namely natural ecosystems (forests, mangroves, internal, coasts and sea waters) and modified ecosystems (secondary forests, savannas).

#### 1.1.1.1. Gallery forests and palm trees

These domains are made mainly by natural palm trees mixed with Guinean *Elaeïs* in different densities (dense and open), but they also include more located plot of “cibe” (*Borrassus aethiopum*). The forests of palm trees habitually occupy adjacent areas towards “meadows” (savanna almost exclusively herbaceous of the low lands, periodically flooded, either by fresh or by salty water), distributed particularly in the western and northwest zone of the country, both continental and insular, and along the course of some rivers and wet zones.

Associated with this vegetable formation, there is the gallery forest, conditioned by the largest humidity of the slopes and valleys. The majority of them are located close to the marine fore part. Although *Guinean Elaeis* is the most frequent species; it is never the most abundant. There is one or more species of abundant trees, distinguishing among them kapok tree (*Ceiba pentandra*), the “Faroba-de-lala” (*Albizia adiantifolia*), the “pau-miséria” (*Anisophyllea laurina*), the “veludo” (*Dialium guineensis*), and the “mampataz” (*Parinari excelsa*).

#### 1.1.1.2. Sub-wet Forests

The sub-wet forest presents heterogeneous vegetable covering of huge diversity and density, of difficult penetration and with vegetable layer composed of trees of big and medium size and bushes. From the inside, it is made up of fresh microclimate, with small temperature oscillations. In function of the climate conditions, over all of the largest rainfall there, the main stains of this formation are located in the south of Guinea-Bissau, occupying a vast area in the south of Quinara and in the Region of Tombali. These forests are composed for trees such as “Pó-de-

*pinte*" (*Hunteria umbellata*), "*lixa*" (*Malacantha alnifolia*) and "*osso-di-dari*" (*Strombosia pustulata*). Three different layers can be observed in it: a superior layer with trees of big size (30 to 40 m of height), forming important biomass, a medium layer constituted essentially by trees of medium height (20 to 30 m) of substantial development, forming a closed top, and a shrubby layer, with vegetation of low height (from 5 to 10 m), with abundant settlement of lianas.

#### 1.1.1.3. Dry and semidry forests

The semidry forests and droughts are composed by stains of an arboreal layer of which height varies among 20 to 30 m, a shrubby and lianas layer. In this formation they dominate the following vegetable associations: "*Bissilon*" (*Khaya senegalensis*); "*Pó-de-conta*" (*African Afzelia*); "*Mancone*" (*Erythropheleum guineense*); "*Palmeira-de-óleo*" (*Guinean Elaeis*); "*Pó-de-carvão*" (*African Prosopis*); "*Pó-de-sangue*" (*Pterocarpus erinaceus*).

#### 1.1.1.4. Degraded and/or secondary forests

This formation is made by an arboreal layer with density of medium occupation of 10 m. Though the arboreal layer is dominant, its size and its floristic composition vary according to the areas, being strongly influenced by the characteristics of the soil.

It is important to emphasize that the degraded forest, specifically in the coastal zone, is already an intermediate product of the savanna process and consequence of the soils impoverishment state and of the burning effects.

In relation to the existing Savannas in Guinea-Bissau, they are mainly originated by men's actions and, normally, subject to burning every year. The main existing communities are:

#### 1.1.1.5. Shrubby coastal savannas

This unit is usually located in soils of low fertility, with sandy texture, product of the evolution of marine sediments. Its composition is simple and an herbaceous layer is predominant in it (1 to 2 m), frequently presenting shrubby layers little dense. The following associations can be found in it:

- » Arboreous savanna of "*Pó-di-sangue*" (*Pterocarpus erinaceus*) and "*farroba*" (*Parkia biglobosa*);
- » Arboreous savanna of "*pau-incenso*" (*Daniellia oliveri*), "*buco*" (*Combretum micranthum*) and "*Pó-di-sangue*" (*Pterocarpus erinaceus*);
- » Arboreous savanna of *Daniellia oliveri*, *Elaeis guineensis* and *Lophira lanceolata*;
- » Arboreous savanna of *Hexalobus monopetalus*, *Piliostigma thonningii* and *Holarrhena floribunda*;
- » Arboreous savanna of *Parkia biglobosa*, *Crossopteryx febrifuga* and *Terminalia albida*;
- » Arboreous savanna of *Borassus aethiopum* and *Elaeis guineensis*, and also dominated by palm trees (registered only in Cufada Park).

Linked to this unit, there are also dense shrubby formations of the coast, among which it is distinguished the vegetable formation located in the limits of the beaches, in the depressions and in the sandy strings, with the following associations:

- » Vegetation of coastal transition of *Elaeis guineensis* and *Mariscus ligularis*;
- » Vegetation of coastal transition of *Dialium guineense*, *Lannea acida* and *Neocarya macrophylla*;
- » Vegetation of coastal transition of *Dichrostachys cinerea*, *Phoenix reclinata* and *Vernonia colorata*;
- » Herbaceous and shrubby steppe of the laterite bench.

#### 1.1.1.6. Aquatic and hygrophilous vegetation

The aquatic and hygrophilous vegetation is distributed in the country in four wet and aquatic habitats of fresh water, namely rivers and streams of permanent course or semipermanent, internal plains periodically flooded (“meadows”), lakes, temporary puddles and small courses of ephemeral water.

In the courses of permanent or semipermanent water or in the lakes, the communities are organized according to depth gradients. In the deepest zones there are communities dominated by floating hygrophilous, by hygrophilous rooted of floating leaves (in the lakes) and by rooted hygrophilous and helophyte (in rivers and streams). In the transition between the bed and the margins, there are communities with different hygrophilous degrees and in the deepest zones of the margins of the rivers there are helophyte and hygrophilous communities.

#### 1.1.1.7. Halophytic coastal vegetation

The mangroves cover the whole coastal zone and it penetrates until 150 kms to the interior of the Guinean territory. Recent publications (Giri, 2011) shows a total surface of the mangroves in the country, in 2000, in the order of the 338.652 hectares, in other words, 2,5% of the world total. This way, the mangroves ecosystem is the most representative vegetable formation of the coastal zone of Guinea-Bissau, covering about 10,1% of this space and 9% of the national territory. Due to these data, Guinea-Bissau is among the 15 countries of the world and the second of Africa, after Nigeria, with larger mangroves surfaces (GIRI, C. et al., 2011). It differs equally from Nigeria for the low pollution level and degradation of this formation.

The mangroves are among the richest ecosystems in terms of biodiversity and biomass (up to 700 t/ha). Their productivities are very high (until 12 tons of carbon for ha/ano). This ecosystem is essential for the rural communities' life in Guinea-Bissau and their preservation is imperative.

These vegetable communities grow in zones of salty substratum, regularly flooded by salty water, and they have characteristics which enable them to adapt to this environment. The species that colonize the interface zones between sea and dry land become highly specialized in surviving in the prevalent conditions there, namely salty water, regular floods and unstable substratum. Therefore, they usually present adaptations such as pneumatophore, aerial roots in arch, salty excretive glands and coriaceous leaves that enable them to survive in such kind of environment.

This ecosystem was the subject of several studies. From the botanical point of view, it is frequently marked a weak diversity of varieties of mangroves in West Africa, in comparison with other areas.

At the country level, the mangroves are represented by three main families: **Aviceniaceae**, **Combretaceae** and **Rhizophoraceae**, which include a total from six to seven species (Adam, 1968), namely:

**Rhizophoraceae** family:

- » *Rhizophora mangle*
- » *Rhizophora racemosa*
- » *Rhizophora harrisonii*

**Aviceniaceae** family

- » *Avicennia germinans* *Avicennia africana*

**Combretaceae** family

- » *Laguncularia racemosa* *Cornocarpus racemosa*
- » *Cornocarpus erectus*

Generally, in Guinea-Bissau the distribution of mangroves follows a well defined outline for the mangroves of West Africa. *Rhizophora racemosa* are observed in the coast edges and river margins; behind these there are the *Rhizophoras* mangles. *Avicennia germinans* occupy the highest and flooded part due to semi-diurnal tides. The other associated species, namely *Laguncularia racemosa* and *Conocarpus erectus*, are found more in the south of the country. Recent studies, accomplished by INEP (2013) confirm the occurrence of the *Laguncularia racemosa* in many places in the region of Cacheu, especially in Natural Park of Mangroves of Cacheu River (PNTC).

### 1.1.2. Floral Biodiversity

Considering the revised list of flora in the country elaborated by the Botany Center of the Institute of Tropical Scientific Investigation, it will locate between 1.500 and 1.600 the number of species and existent subspecieses in Guinea-Bissau which reflects floral wealth relatively high taking into consideration the extension of the territory (Catarino, L., 2000).

This way, according to Davis et al. (1986), mentioned in the Biodiversity Guide, about 12 species are endemic. The families with larger number of species are **Papilionaceae**, with 131 species, **Rubiaceae**, with 73, and **Grass**, with 97.

Many of these species are in danger due to the quick expansion of men's activities and population growth. The extinction rates are 10.000 times higher than it was at any other time in the past (Sayre, R. 2003b).

Certain groups of organisms are more known than others; therefore, several investigations should be carried out. The groups of the vascular plants were the most studied one.

### 1.1.2.1. Vascular Flora

The synthesis of taxonomic groups of the vascular flora of Guinea-Bissau shows 1.606 rates of specific category or infra-specific corresponding to 1.578 species, belonging to 773 kinds. In addition to that, the introduced species were likewise registered (in number of 144) introduced and/or cultivated species. The number of autochthonous taxonomic groups of the vascular flora is smaller: 1.462 specific or infra-specific rate or 1.434 species.

The **Pteridophyta** are represented by 17 kinds of 14 families, the one that belongs to 22 species of plants of small size and of wet environment. All the registered pteridophyta are native.

The native **dicotyledons**, which correspond to more than two thirds of the vascular flora of the country, have 1.041 both specific and infra-specific taxonomic groups which belong to 525 kinds and 110 families. There are still 121 foreign taxonomic groups, as well as 5 families and 56 kinds represented only by introduced elements.

Concerning **autochthonous monocotyledonae**, they are represented by 157 kinds and 399 specific and infra-specific taxonomic groups, belonging to 34 families. It was equally registered 23 introduced species; there are 4 families and 18 kinds represented only by foreign elements. Most of the families of this group are species exclusively herbaceous. The woody monocotyledonae are confined and scarce families, as the palm trees and the pandanaceae. Gymnospermae were not registered which is not unpublished in tropical African floras where this group habitually has few representatives.

What concerns the most represented families in the autochthonous vascular flora of Guinea-Bissau, the most important is among the dicotyledons: **Papilionaceae**, with 171 taxonomic groups which correspond to 12% of the total flora, 16% of the dicotyledons.

In relation to the monocotyledonae, they are **Gramineous** with about 143 autochthonous rate, they represent about 10% of the flora and 38% of the monocotyledonae. However, while **Papilionaceae** include from small herbaceous to trees of big size, **Gramineous** are almost exclusively herbaceous.

Other important families of dicotyledons are **Rubiaceae**, with 90 rates of specific and infra-specific natives, and **Euphorbiaceae**, with 46, two families of major woody plants of tropical and subtropical distribution, but also the composed ones, family in a large part of herbaceous plants of temperate and tropical climates, with 42 taxonomic groups.

Still in high significant number of autochthonous rate, it refers to Acanthaceae and Convolvulaceae, with 33 representatives each, the **Cesalpiniaceae**, with 30, **Moraceae**, with 29, **Scrophulariaceae**, with 28, **Apocynaceae** and **Combretaceae**, with 27 each, and **Asclepiadaceae**, with 23.

Concerning the monocotyledonae, and besides **Gramineous**, other important families are **Cyperaceae**, family composed exclusively by herbaceous, with 92 of specific and infra-specific taxonomic autochthonous groups, following **Orchidaceae** and **Comelinaceae**, with 29 and 27 representatives, respectively.

### 1.1.2.2. Species of the endemic flora

Some publications estimate twelve, the number of endemic species, in Guinea-Bissau (Stuart & Adams, 1990; Sayre et al., 1992). The geographical and climate characteristics of the country explain the low numbers of endemism.

The national territory has a relatively small surface and without geographical accidents that break the continuity with the territory of the neighboring countries. Therefore, it is highly probable that the generality of the taxonomic groups present in the flora of Guinea-Bissau also happen in Senegal or in the Republic of Guinea, bordering countries, as well as in other countries of West Africa.

### 1.1.2.3. Rare species and with threatened status

According to UICN - Red List of Threatened Species, **nine species considered vulnerable** were registered in the flora of Guinea-Bissau in the area that integrates Guinea-Bissau, Senegal and the Republic of Guinea. They are all trees, species of long life cycle, therefore, in which populations' regeneration is slow. At least half of these species (African Afzelia, ferruginous Albizia, Khaya Senegalese and Milicia regia) have been sought and cut down for the quality of their wood, from where it is deduced that the threat to these species come over all from tree felling and/or destruction or fragmentation of the habitats where this cut of the trees happens.

**Table 1:** List of forest species with threatened status

Family	Species	
<b>Leguminosae</b>	<i>Caesalpinioideae</i>	<i>Afzelia africana</i>
		<i>Copaifera salikounda</i>
	<i>Mimosoideae</i>	<i>Albizia ferruginea</i>
		<i>Pterocarpus erinaceus</i>
<b>Rubiaceae</b>	<i>Hallea stipulosa</i>	
<b>Irvingiaceae</b>	<i>Irvingia gabonensis</i>	
<b>Meliaceae</b>	<i>Khaya senegalensis</i>	
<b>Moraceae</b>	<i>Milicia regia</i>	
<b>Sapindaceae</b>	<i>Vitellaria paradoxa</i>	

In the last years, the selective cut of the trees mainly of the “*pau-de-sangue*” *Pterocarpus erinaceus* has been observed, constituting about 98% of the exploitation between 2012 and 2014. Although they are not considered threatened or vulnerable at the regional level, the abundance of some other species seems to have decreased drastically in the last ten years. Among these there are plants of great use, as the trees *African Prosopis* (manufacture of coal), *Ceiba pentandra* (construction of canoes), palm trees *Borassus aethiopum* (woodwork of houses) and *Calamus deerratus* (manufacture of furniture).

Some other species of the flora of Guinea-Bissau can be considered rare, although they are not object of intentional depletion. It is the case, for instance, of two species probably endemic in the country, *Pandanus guineabissauensis* and *Hyphaene santoana*, of which occurrence is little frequent.



Prática de anelamento: *Prosopis africana*; Foto: F. BIAG

Corte seletivo: *Pterocarpus erinaceus*; Foto: L. BARBOSA

**Picture 2: Practice of abusive cut of trees**

#### 1.1.2.4. Introduced plants and their origins

Of the 144 rates of specific category or infra-specific which were introduced and registered in Guinea-Bissau, 109 are cultivated plants and only 35 are considered natural. The introduced plants have four main origins: 78 come from America, 55 from Asia, 4 arise in other areas of Africa and 2 are original from Oceania.

In Guinea-Bissau, in spite of the inadequacy and inaccuracy of information, all indicates the existence of several invading species, introduced intentional or unintentionally. Between the most known and problematic invaders, the following is distinguished: several acacias (*Acacia spp.*), the “chorão-das-praias” (*Carpobrotus edulis*), that invade the dunes and sandy zones where there are endemic species, “árvore-do-céu or *Ailanto*” (high *Ailanthus*) and the “árvore-do-incenso” (*Pittosporum undulatum*). The “háquias” (*Hakea spp.*) form dense forests quickly reduce the availability in the water and increase the fire risk. The “azeda” (*Oxalis pescaprea*) invades agricultural and desert areas.

The “jacinto-de-água” (*Eichornia crassipes*), the “azolas” (*Azolla spp.*), the “estrume-novo” (*Elodea canadensis*) and the “pinherinho-de-água” (*Myriophyllum brasiliensis*) proliferate in the courses of water. The green-seaweed (*Caulerpa taxifolia*) used in aquariums was introduced accidentally in estuaries through draining. Other species that also behave like invaders are the cane (*Arundo donax*) and the “erva-das-pampas” or feathers (*Cortaderia selloana*), much used as ornamental plant.

#### 1.1.2.5. Species and cultivated varieties

In Guinea-Bissau, there are several species and autochthonous varieties in the domesticated region and these regions are now cultivated. 11 species and subspecieses were registered and all of them with usefulness related to food.

**Table 2:** List of some species and varieties cultivated in Guinea-Bissau

Family		Species
<i>Zingiberaceae</i>		<i>Aframomum melegueta</i>
<i>Rubiaceae</i>		<i>Coffea liberica</i>
<i>Sterculiaceae</i>		<i>Cola nitida</i>
<i>Gramineae</i>		<i>Digitaria exilis</i>
		<i>Pennisetum glaucum</i>
		<i>Sorghum bicolor</i>
<i>Dioscoreaceae</i>		<i>Dioscorea cayenensis</i>
<i>Palmae</i>		<i>Elaeis guineensis</i>
<i>Pedaliaceae</i>		<i>Sesamum radiatum</i>
<i>Leguminosae</i>	<i>Papilionoideae</i>	<i>Vigna subterranean</i>
		<i>Vigna unguiculata</i>

### 1.1.2.6. Non-vascular flora

The state of knowledge on non-vascular flora of Guinea-Bissau is still quite incipient. During the studies on bryophyta samples, seven species of mosses and eight of liverworts were identified (Laboratory and Botanical Garden of the University of Lisbon).

**Table 3:** List of non-vascular flora species identified in Guinea-Bissau

MOSESSES	LIVERWORTS
<i>Bryum</i> aff. <i>caespiticium</i>	<i>Caudalejeunea hanningtonii</i>
<i>Calymperes palisotii</i>	<i>Caudalejeunea lebemanniana</i>
<i>Fissidens</i> aff. <i>somaliae</i>	<i>Cheilolejeunea</i> aff. <i>intertexta</i>
<i>Fissidens submarginatus</i>	<i>Cololejeunea obtusifolia</i>
<i>Octoblepharum albidum</i>	<i>Lejeunea</i> aff. <i>setacea</i>
<i>Pelekiium gratum</i>	<i>Leptolejeunea astroidea</i>
<i>Thuidium</i> aff. <i>Aculeoserratum</i>	<i>Mastigolejeunea</i> aff. <i>auriculata</i>
	<i>Microlejeunea africans</i>

Concerning the algae of fresh water and cyanobacterias (Catarino, 2002), the samples picked in the Cufada and Bedasse lakes, in NPCL, allowed to identify 152 species, distributed in seven families such as:

- 78 **Chlorophyta**
- 58 of **Bacillariophyta**
- 4 of **Euglenophyta**
- 4 of **Chrysophyta**
- 2 of **Pyrrophyta**
- 1 of **Ciliata**
- 5 of **Cyanobacterias** or blue algae

### 1.1.3. Faunistic Biodiversity

The location of Guinea-Bissau, in the transition zone, influences faunistic elements strongly; it is intimately related with the existing habitats in the country (Limoges et al., 1989). In this context, the quantity and the variety of species of the existing wild fauna in this area are proportional to

the quantity and the quality of the vegetation; this is the reason why the country does not constitute exception related to the excessive radiations that characterized the African fauna.

**Table 4:** Species of fauna registered in Guinea-Bissau

Species	No. of inventory
<b>Mammal</b>	130
<b>Birds</b>	508
<b>Reptiles</b>	73
<b>Arachnida</b>	196
<b>Fish</b>	693
<b>Fish of fresh water</b>	35

The fauna of Guinea-Bissau, although still fairly little studied, it is extremely rich. Only among the vertebrates there are more than 1.000 registered species (cf. Vié, 2001 & Dodman et al., 2004). Invertebrate animals will exist, certainly, in thousands of *rates*. Each one of these countless autochthonous animal species constitutes property that deserves to be preserved.

#### 1.1.3.1. Terrestrial and marine mammals

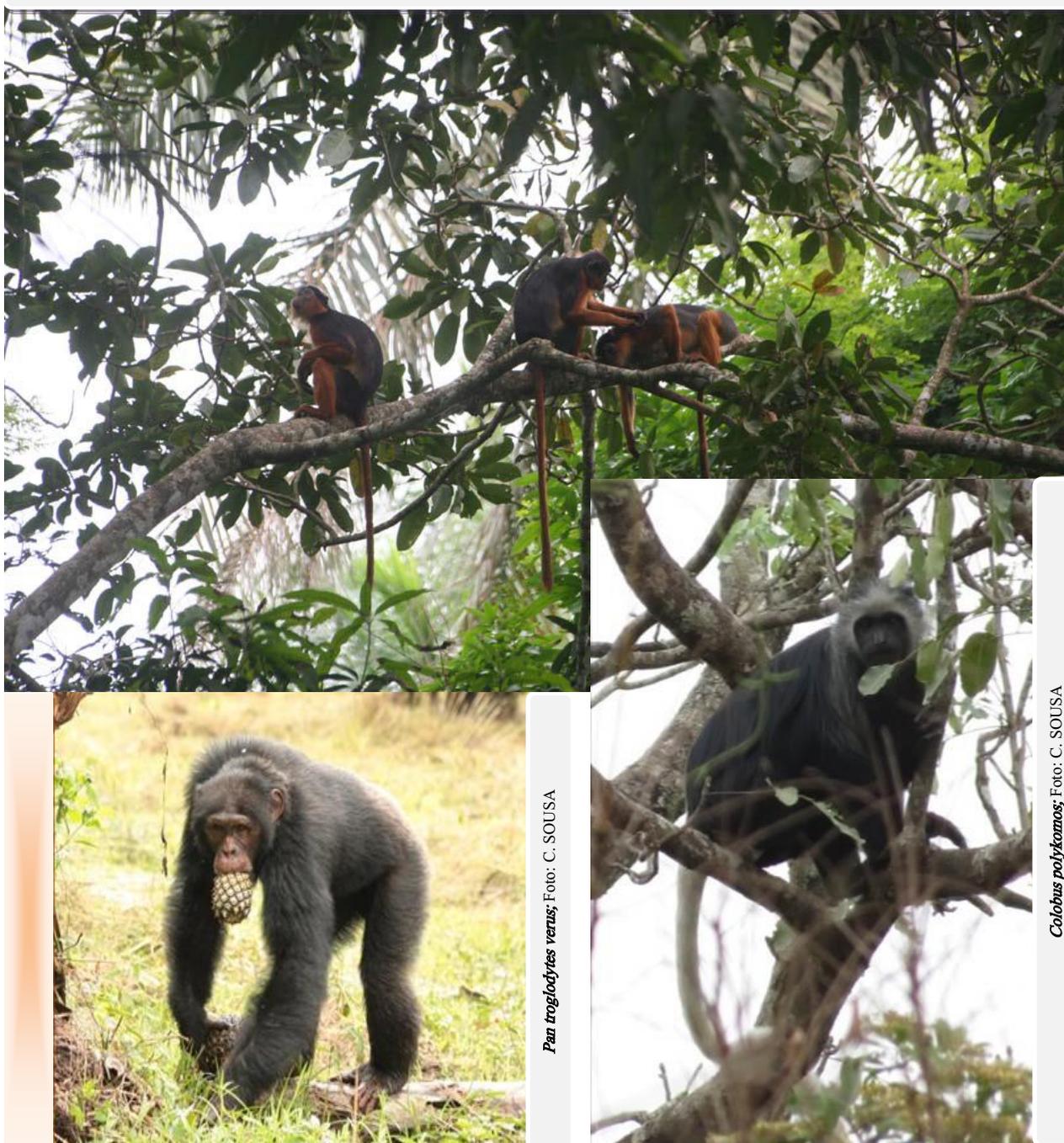
In general outlines, the existing terrestrial mammals in Guinea-Bissau are known. So far, **130 species of mammals** have been registered, and these species are distributed in **34 families** and **12 classifications** (compilation of different work: Limoges, 1991; Boesl, 1995; Reiner and Simões, 1999; Rainho and Franco, 2001; Vié, 2001; Karibuhoye, 2004; Silva et al., 2007; Rainho et al., 2007; Laar, 2008; Cockroach, 2009).

**Table 5:** List of mammals of Guinea-Bissau

Sequence	No. of Family	No. of Species
Primates	4	11
Insectivorous	1	5
Lagomorpha	1	1
Rodentia	6	20
Tubulidentata	1	1
Pholidota	1	2
Proboscidea	1	1
Artiodactyla	3	20
Carnivorous	5	23
Chiroptera	8	43
Sirenian	1	1
Cetaceous	2	2

Of the mammals registered in the country, 25 of them (19%) are considered particularly threatened:

**The sequence of Primates:** among the most important and with threatened status, the following is mentioned: *Cercopithecus petaurista*, *Colobus badius*, *Colobus polykomos* and *Pan troglodytes verus*. Concerning this last one, the studies on its genetics, alimentary regime, as well as its behavior have been conducted for many years.



**Picture 3: Some primates' threatened species**

According to SILVA (2010), *Cercocebus atys*, already considered by many as extinct in the country; it was observed in the region of Boé, where it is common among the groups with about twenty of other partners.

There is exception of *Galago senegalensis* and *Galago demidoff*. All the primates' species are subject to hunting for the supply of big markets, especially of the capital, even though they are protected by the national law of hunting and by the internal regulations of the Protected Areas. In what concerns to the chimpanzees, they are many times observed in captivity, even though they benefit from status of protected species.

**Sequence of insectivorous:** made of small mammals with insectivorous regime, and so far, only 5 species of this kind are known in Guinea-Bissau.

**Sequence of Lagomorpha:** from 2 families that form this sequence, only a (Leporidae) is present in the country; it is represented by only one species, *the Lepus crawshawy*.

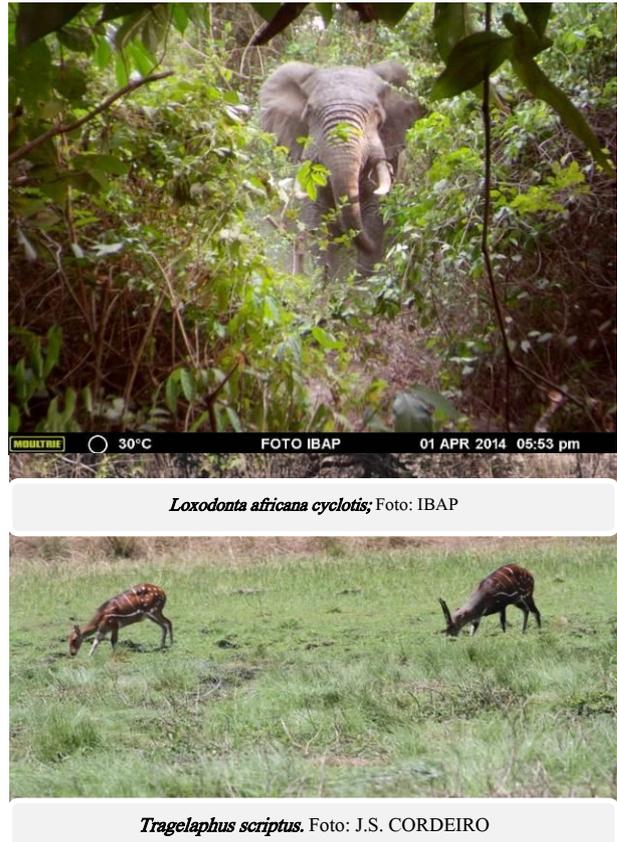
**Sequence of Rodentia:** from the 20 identified species, only *Anomalurus beecrofti beecrofti* is considered rare and meritorious of protection; the remaining species are considered common. In spite of that, *African Atherurus* is not very common; it is unknown, however, if the species is really threatened.

**Sequence of Tubulidentata:** the only existing species, the *Orycteropus afer*, is more and more rare, it is found in strong regression in the zones where it still arise.

**Sequence of Pholidota:** the two species of existing pholidotas in the country are considered rare, mainly *Manis (smutsia)* extremely big and *Manis tricuspis*. This last one was not observed directly, but its observation was refered in palm trees.

**Sequence of Proboscidea:** the only existing species, *cyclotis African Loxodonta*, was considered practically extinguished in the country, and with just a few of them (2 to 7) observed in the National Park of Cantanhez.

In recent years, it has been observed the return of this species to the forests of the south of Guinea-Bissau, but it is in danger because of ongoing deforestation.



**Picture 4: Some threatened species**

**Sequence of Artiodactyla:** 5 of the 20 identified species are considered rare, 4 threatened and 1 extinguished. The following species are considered threatened: *Tragelaphus spekei gratus*; *Sylvicapra grimmia*; *Kobus kob*; *Redunca redunca*; *Hippotragus equinus*; *Ourebia ourebi*, *aquatic Hyemoschus*.

Concerning the *Hippopotamus amphibius*, there is no quantitative data, but according to accomplished research, there is an exponential increase of these species in all the coastal zones of the country and they come into a direct conflict with the communities on the rice fields.



*Hippopotamus amphibius*; Foto: L. RAZAFINDRAKOTO

**Picture 5: Charismatic species of the National Park of Orango**

**Sequence of Carnivorous:** 23 species were registered in the country, of which the common jackal is considered extinct. All the species belonging to the **Canidae** families (Kennels adustus, Kennels aureus) and Felidae (*Felis caracal*, *Felis serval*, *Felis libyca*, *Panthera leo* and *Panthera pardus leopards*) are extremely rare and they are threatened. They could disappear in the near future in case consistent rules for conservation are not taken.

Lion footprints were observed recently in the Park of Dulombi and the hope is to confirm its presence through infrared cameras.

**Sequence of de Cheiroptera:** several scientific investigations on bats were developed in Guinea-Bissau. The work accomplished by A. Rainho (2007), and other punctual studies, allowed to identify 43 bat species, one of the Pteropodidae, megaquirópteros family, and the remaining of microcheiroptera (**Emballonuridae, Nycteridae, Megadermatidae, Vespertilionidae and Molossidae**). Of these, six can be preliminary considered as priority, thanks to the status that is given to them by UICN worldwide. They are: *Epomops buettikoferi*, *Rhinolophus alcyone*, *Hipposideros fuliginosus*, *Eptesicus guineensis*, *Chalinolobus poensis*, *Chalinolobus beatrixvárias*.

Most of the cheiroptera identified in Guinea-Bissau are forest species, using the area for shelter and feeding.

**Sequence of Serenia:** a single serenia was registered in the country, the *Trichechus senegalensis* lives in the estuaries of the Cacheu, Mansôa, Geba and Corubal rivers, as well as on the Archipelago of Bijagós. It is protected by the Hunting Law, but it is threatened by the constant incidents with the fishermen (involuntary captures). In 2011, a Net of Quick Alert (NQA) was created in case of accidental capture of this species; this way to reduce the death through the accidental fishing, as well as to locate the occurrence of this species geographically.

**Sequence of Cetaceous:** There is no data of the scientific campaigns about any of the referred species. The *Sousa teuszii* and *Tursiops truncatus* species probably represent small populations, although it can be easily observed in the waters of the Archipelago.

### 1.1.3.2. Amphibians (Batrachia) and Reptiles

The available reports on amphibians and reptiles registered in Guinea-Bissau are scarce. Preliminary studies were accomplished by Bocage (1866, 1867, 1872, 1888), Monard (1940) and Manaças (1947, 1949, 1950, 1951). Other reports supply more general data of the fauna of whole vertebrates, as well as tests on the herpetofauna (Friar, 1950; Naurois, 1969; Limoges, 1989).

The last records of herpetofauna which was published refer mainly to the marine turtles in especially the *Chelonia mydas* (Catry *et al.* 2002; Fortes *et al.* 1998).

A recent compilation on the herpetofauna of the Archipelago of Bijagós and the first verification list of the country allowed to identify 25 species of amphibians and 73 species of reptiles, distributed as they are indicated.

**Amphibians** - 25 species distributed by eight families, such as: **Hyperoliidae**, **Phrynobatrachidae** and **Ptychadenidae** with 5 sp., **Arthroleptidae** with 3 sp., **Bufonidae**, **Ranidae** and **Pipidae** with 2 sp. and **Hemisotidae** with 1 sp.

**Reptiles** - 73 species distributed by 12 families and represented by three main sequences: *Testudines*, 11 species distributed by five families, **Cheloniidae**, with 4 sp. and **Dermochelyidae**, with 1 sp, representing the marine turtles; **Pelomedusidae**, *Testudinidae* and **Trionychidae**, with 2 sp each, representing the terrestrial turtles and of fresh water; *Squamatas*, with 60 species distributed by 14 families:

Subsequence of saurian, with 20 sp belonging to 8 families, such as: **Scincidae** family with 6 sp, **Amphisbaenidae** and **Agamidae** families, with 3 sp each, **Chamaeleonidae**, **Gekkonidae** and **Varanidae** families, with 2 sp each and **Lacertidae**, as well as **Phyllodachylidae** families, represented each one with 1 sp.

Subsequence of ophidians, with 39 sp distributed by 7 families, such as: *Lamprophiidae*, with 14 sp, *Colubridae*, with 12 sp, *Elapidadae*, with 6 sp, *Viperidadae*, with 3 sp, *Pythonidadae* with 2 sp and, *Leptotyphlopidae* and *Typhlopidae* with 1 sp each.

Subsequense of Subordem dos Crocodile, with 3 sp belonging to the *crocodylidae* family

In the last 10 to 20 years, in Guinea-Bissau, considerable efforts were accomplished with the purpose of improving the knowledge on the mirine turtles. Among the great success, there is huge progress in the knowledge about their status, distribution and their threats.

The marine turtles that have been the subject of studies for many years are constituted by the **Cheloniidae** and **Dermochelyidae** families.

Of the seven species of existing marine turtles, five spawn in the waters of Guinea-Bissau. These five are: green turtle *Chelonia mydas*, turtle-of-ridley *Lepidochelys olivacea*, turtle-of-comb *Eretmochelys imbricata*, turtle-big-headed *Caretta caretta* and turtle-of-leather *coriaceous Dermochelys*.

The most important inhabitants, as in absolute values as relatively to the international context, are, from distance, are the green turtles. A detailed census revealed that, in the year 2000, at least 7.400 postures of this species were deposited in kapok tree which should correspond to 2.500 reproductive females (Catry *et al.* 2002). These results indicate that kapok tree is among the 10 more important reproduction colony of the world and it constitutes the most important site for

the nesting of this species in the whole Africa. The green turtle is also the most common species in other places of the country, although in more reduced numbers, with just some few hundreds of nests in the whole region.



*Chelonia mydas*; Foto: C. BARBOISA



*Eretmochelys imbricata*; Foto: C. BARBOSA



*Filhotes de Chelonia mydas*; Foto: M.B. FERREIRA



*Lepidochelys olivacea*; Foto: B. INDJAI

**Picture 6: Species of more frequent sea Turtles in the beaches of Bijagós**

The turtle-of-ridley is, probably, the second most common species, with some hundreds of nests a year in the whole country, although there are indications (still to be confirmed) that their numbers have suffered a dramatic reduction in recent years. The annual activity of turtle-of-comb may not surpass some dozens of nests in the whole country. Turtle-of-leather and turtle-big-head are very rare and it is possible that they do not even build their nest annually in any beaches of the country. It is thought that all of the Guinea-Bissau beaches welcome, with high or low frequency, some marine turtles in spawning.

In general, the turtles are considered threatened species and they are listed in the Attachment of CITES and in the Red Book of the Threatened Species, of UICN. In this aspect, the beaches where turtles spawn are of extreme importance of the point of view of the conservation and of the protection of these species. Among the identified threats by several studies, the erosion seems to be the most preoccupying.

### 1.1.3.3. Avifauna

In Guinea-Bissau it was already registered a total of 508 species of birds. In spite of the undertaken efforts, above all in more recent researches on the study of aquatic birds of coastal boarder and for the inventory IBA, the avifauna of Guinea-Bissau continues to be badly known.

Ten IBAs were identified in the country, and all of them accomplishing more than one criterion (A1-A4) of identification, defined for the effect throughout Africa (Fishpool & Evans 2001). All of them have a proven value for the conservation of the birds, as well as for other species of the fauna and flora.



Picture 7: Species of threatened birds

The forest birds constitute about 76% of the total diversity in Avifauna, data published officially by the Office of the Coastal Planning, with the support of Wetlands International and Bird Life International 2004. The largest diversity found in the forests is still in good condition, namely the forests of Cufada Lakes, forest that surrounds the Geba and Mansoa rivers, forests of Cantanhez and of the Natural Park of Mangroves of Cacheu River. In those places, minimum of 178 species and maximum of 235 forest birds were registered. The same source indicates that the most representative families in terms of diversity of species are: **Accipitridae**, **Sylviidae**, **Estrildidae**, **Ploceidae** and **Hirundinidae**.

According to T. Dodman, J. Sá and P. Robertson (2004), 35 species of forest birds depend on Bioma Sudano-Guineense and 58 depend on the forest Congo-Guineense. Of these, 5 species such as: *Circus macrouru*, *Psittacus timneh*, *Balearica pavonina*, *Ceratogymna elata* and *Laniarius Turatii* are threatened.

The wet zones of Guinea-Bissau are of the great importance at ornithological level. Several estimates show about a million the number of limicoline birds originating from West Palearctic which visit the Guinean coast during non-reproductive period, with approximately three quarters ( $\frac{3}{4}$ ) of that number in the Archipelago of Bijagós. The insular zone of Bijagós is, in this base, the second more important site in the West Africa, right after the Arguin Banc, in Mauritania. Besides this, it is considered the occurrence from 330000 to 490000 aquatic birds in the mud banks, in the mangroves, on the rice fields and in the flood valley (Altenburg & van der Kamp, 1986), including 50000 to 90000 herons, crow-marines and pelicans, 8000 to 15000 ducks and geeses and 270000 to 385000 limicolines. Thanks to their rich and diversified habitats, the whole country's coastal boarder is, in their group, an important area for aquatic birds, as for residents as well as for migratory.

The migratory corridor of East Atlantic Ocean, where the country is inserted, constitutes principal migratory route for series of limicoline, such as the Pilrito-of-long beak *Calidris ferruginea* and Fuselo *Oozy lapponica*. Most of the limicolines that follow this corridor build nests in the arctic and subarctic regions, including Siberia and Gronelandia. After nesting they migrate to south with several stops along their route. The Sea of Wadden, in Europe, is a place of particularly important stop, where the birds find food abundantly and they prepare the next stage of their migration. Then, there are stop and resting points along the East Coast of Atlantic Ocean used by the birds until they reach the definitive places of hard winter, in Northern Hemisphere. The coastal zones of Guinea-Bissau represent these points for several species of birds. Some, such as, the Pilrito-of-black-chest *alpine Calidris* which many times do not arrive in the south in substantial numbers, while others, as such as the Blowpipe-real *Numenius arquata* fly much more to the south, reaching the coast of Namibia. The Blowpipe-Galician *Numenius phaeopus* can be found in all the coastal areas of West Africa. The local or sub-regional moviments occur among the sites during the winter of the North, but those movements are not very well known.

The terns and the migratory gulls that use the Palearctic nesting areas and the hard winter areas in Africa also favor this migratory route. They are the cases, for instance, of the Black-Tern *Chlidonias niger* and of the Gull-of-dark-wings *Larus fuscus*. In this last one's case, some of the elements don't go back to Europe to nest after adapting to the conditions of the country for nesting, especially in the Archipelago of Bijagós and on the Jeta Island.

However, many other species of migratory birds arrive from Palearctic to Guinea-Bissau through other migration strategies; most of them cross the desert of Sahara. Among these, are included the limicolines which don't depend on coastal zones, such as oozy *Oozy Curlew*, birds of prey, such as the fish-hawk *Pandion haliaetus* and most of the passerine, for instance, the chimney swallow *Hirundo rustic*. Frequently, the birds take independent routes. This was demonstrated by following through satellite of fish-hawk marked in United Kingdom.

There are also movements and intra-African corridors which are less evident than the movements and 'north-south' corridors. The intra-African movements are unchained mainly by the levels of precipitation. Guinea-Bissau has important reproduction areas for intra-African migrants, for instance, *Irerê Dendrocygna viduata*. Other species intra-African migrants have their reproduction areas in other regions, but they come to Guinea-Bissau in certain times of the year; these species include Bee-eater-of-white-throat *Merops albicollis*.

Species, such as the small-flamingo *Phoenicopterus minor*, the male pale-kestrel *Circus macrourus*, crowned-crane *Balearica pavonina* and the hornbill-of-yellow-crown *Ceratogymna elata*, acquire status of preoccupying conservation in Guinea-Bissau. The Turati's boubou *Laniarius turatii* was considered by Collar et al. (1994) as Almost Threatened, but it is now classified by Bird Life International (2000) as LR/lc (Low Risk/a little concern). *P. minor* arises as non-reproducer visitor in variable numbers; *C. macrourus* is a Palearctic visitor and a little common and *C. elata* and *L. turatii* are resident forest species. *B. pavonina* is a resident species in wet zones of Sahel. Species with restricted distribution area were not registered in Guinea-Bissau.

#### 1.1.3.4. Insects

There is a huge gap in the knowledge of afro-tropical insects, especially the ones from West Africa. Studies on invertebrate animals and, particularly, on the insects and the arachnids are rare. Among the insects there are references to:

- 9 sp of Odonata (Schmidt, 1949)
- 2 sp Homoptera Coccoidea (Castel-Branco, 1956)
- 4 sp Heteroptera (all **Reduviidae** family) (Tordo 1955 e 1974)
- 3 sp Mallophaga (Tendeiro, 1954)
- 1 sp of Coleoptera (1 of **Chrysomelidae** family, Alves 1949)
- 7 sp of Diptera (3 of **Glossinidae** and 4 of **Tabanidae**) (Fraga de Azevedo, 1948 & Tendeiro et al. 1948)
- 8 sp of Lepidoptera “*Rhopalocera*” (Bacelar 1949)
- 42 sp of daily Lepidoptera (**Papilionoidea** and **Hesperioidea** family)
- 37 sp of night Lepidoptera (of **Phingidae** family)

Later on, the studies undertaken in the Natural Park of Cufada Lakes allowed identifying 1034 morpho-species belonging to 147 families and 16 sequences, being the most representative of the **Coleoptera** and **Lepidoptera** family.

**Regarding the Arachnids**, in Guinea-Bissau only 3, 58% of the total species distinguished in Afro-tropical Region are known. Dippenaar-Schoeman & Jocqué (1997) referred the existence of 71 families, 893 kinds and 5423 species of spiders in the Afro-tropical Region. Of those only 28 families, 104 kinds and 196 species (Simon 1907, 1909; Baessa-of Aguiar, 1999, 2002 and 2003a) are known in Guinea-Bissau. The most represented ones are the families of **Araneidae** with 34 sp, **Salticidae** with 29 and **Tetragnathidae** and **Thomisidae** with 23 and 20 sp, respectively.

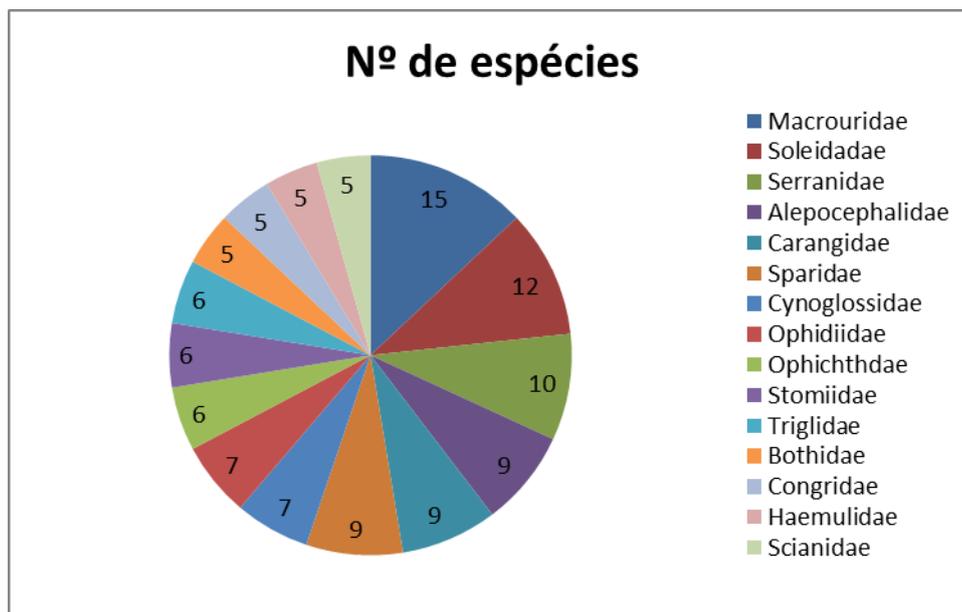
#### 1.1.3.5. Fish and shellfish

The demersal resources are relatively sedentary, not migrating at great distances. The most important demersal species found in the continental platform of Guinea-Bissau are shrimp, cuttle-fish, octopus, corvina and the sea-bream. The campaign of stock evaluation, accomplished in 2008, shows a biomass of 148618 tons of demersal species, in other words, species (fish,

crustaceans and mollusks) that live associated to the sea bottom and spend much time in contact with the sea substratum. In this species, the group of fish is the most representative, both in weight (95%) and in number (91%). This group also presents a larger specific diversity, with a total of 327 captured species (68%), and followed by the crustaceans, with a total of 114 species (24%) and, finally, the mollusks, with a total of 37 species (8%). It is also important to mention the large presence of benthonic species, with 215 species. Based in these results, it is considered the existence of about 693 species in the waters of ZEE of Guinea-Bissau.

The 327 species of captured fish belong to 124 families, 110 (88%) are of the bony group and 14 (12%) of the cartilaginous group. The following histogram illustrates the presence of families of bony fish with larger specific diversity:

Family and no. of fish species



Source:

Concerning the group of cartilaginous fish, the **Rajidae**, **Dalateidae** and **Scyliorhinidae** families are the ones of the largest diversity.

The abundance of *pelagic resources* is recognized in the waters of Guinea-Bissau, for being the coastal areas and the preferential local estuaries of spawning and growth for the juvenile ones of many of those species. The main identified species belong to the families of **Clupeidae** (sardines, sardinella), **Carangidae** (xaréus) and tunas (albacore, broad-footed, tufted). Migratory movements of these species occur along the West African Coast and even in the Atlantic Ocean (as it is the case of the tunas); so, the accomplishment of an estimate of its potential becomes very difficult, restricted to the waters of Guinea-Bissau.

In the last two campaigns of scientific evaluation accomplished in ZEE of Guinea-Bissau (2011 and 2013) biomasses were estimated of 452 thousand tons (CIPA & IMROP, 2011) and 340 thousand tons (CIPA & AtlantNIRO, 2013) of pelagic species. This difference is due eventually to the fact of these two campaigns have been accomplished in the different climate periods and conditions. The campaign of 2011 occurred at the end of September and beginning of October, in

other words, at the end of the rainy season, while the one of 2013 occurred in January, during the dry season.

In 2011, the *Sardinella maderensis* had a biomass of 163 thousand t. (36%), followed by the *Sardinella aurita*, with 42 thousand t (9,3%), the *Caranx rhonchus*, with 39 thousand t. (8,6%) and the *Trachurus trecae*, with 8 thousand t. (1,8%); other additional pelagic species 200 thousand t. In the campaign of 2013, *Sardinella aurita* and *Sardinella maderensis* obtained 81%, followed by *Trachurus trecae*, with 13%, the *Caranx rhonchus*, with 6% and *Scomber japonicus*, with 1%

Concerning the crustaceans, 114 species belonging to 43 families were identified. The total biomass estimated during the campaign was of 2789 tons; the following families are the most abundant: **Galatheidae** (17%), **Diogenidae** (11%), **Paguridae** (11%) and **Nematocarcinidae** (10%). Other families still occurred (**Portunidae**, **Pandalidae**, **Dromiidae**, **Penaeidae**, **Matutidae**, **Lithodidae**, **Calappidae**, **Dromiidae**, **Matutidae**, **Lithodes ferox** and **Parapenaeus longirostris**), of which biomasses locate below the 10% each.

In what concerns to the crustaceans, the followings are highlighted: *Dardanus arrosor*, with 48%, followed by *Paguridae* sp. (37%), *iris* (30%), *Aristeus varidens* (28%), *Parapenaeus longirostris* (24%), *Bathynectes maravigna* (21%), *Dromiidae* sp. (21%) and *Nematocarcinus africanus* (20%) as the most frequent. The remaining species represented, together, less than 20%. *Parapenaeus longirostris*, *Farfantepeaneus notialis* and *Aristeus varidens* are however considered as the most important of the commercial point of view (Relat. Scientific Committee CIPA, 2011).

In the campaign accomplished in ZEE of Guinea-Bissau with IEO, 10 families and 37 cephalopoda species were identified; they are distributed as following: **Octopodidae** (13 species), **Ommastrephidae** (6), **Sepiidae** (5), **Loliginidae**, **Onychoteuthidae**, **Opisthoteuthidae** and **Sepiolidae** with two (2) species and **Amphitretidae**, **Cirroteuthidae** and **Enoploteuthidae** with a (1) species each

Among the seven classes of **mollusks** (*Monoplacophora*, *Polyplacophora*, *Aplacophora*, *Gastropoda*, *Bivalvia*, *Scaphopoda* and *Cephalopoda*), in Guinea-Bissau, the group of *Cephalopodes* is the most important in the capture of the industrial fishing, being little representative in the handmade fishing. The bivalvia and gastropoda classes, by the way, enter as accessory captures, being in some cases rejected by the ships in operation. In the campaigns of stock evaluation in ZEE of Guinea-Bissau, little importance was given to these last two classes and therefore they are little mentioned in the reports of the scientific evaluations accomplished in the waters of the country

What regards **the fish of fresh** water, few surveys were accomplished. The compilation of the different work allowed creating a list of 35 species belonging to 14 families, highlighting **Cichlidae**, with 11 species, **Synodontidae** and **Mormyridae**, with 3 species each, **Mockokidae**, **Clariidae**, **Cyprinidae**, **Schlibeidae**, **Chrysichthidae** and **Characidae**, with 2 species each, and finally **Hepistidae**, **Notopteridae**, **Latidae**, **Claroteidae** and **Malapteruridae**, with 1 species each.

#### 1.1.4. Agropastoral Biodiversity

The agropastoral Biodiversity consists of a multiplicity of introduced plants and animals species used in the agriculture and in the livestock.

##### 1.1.4.1. Main vegetable species introduced in Guinea-Bissau

In 2013, a survey on the introduced and cultivated species was done in Guinea-Bissau, making the total of 144 registered species in Guinea-Bissau, among them, 109 are cultivated plants and only 35 are considered natural. The introduced plants have four main origins: 78 come from America, 55 from Asia, 4 arise in other regions of Africa and 2 are original from Oceania.

Concerning the species and varieties cultivated in Guinea-Bissau, several are the autochthonous varieties of the regions which were domesticated and are cultivated now. 11 species and subspecieses were registered with these characteristics. All of them have a use related to food.

**The Oryza L rice** is the main culture of the country; there is a variety of species that adapt to different types of soils.

Fruit Species cultivated and exported in Guinea-Bissau are: Mango *Mangifera indica*, bananas *Musa sp.*, citrinous *Citrus sp.*, palm tree *Elaeis guineensis*, cotton *Gossypium sp.*, and peanut *Arachys hypogaea*. Cultures such as sweet potato, bean, cassava *Manihot sp.*, igname *Dioscorea sp.*, bacil-corn *Zea mays*, black corn *Pennisetm americanum* and horse corn *Sorghum sp.* are other so many export cultures with development potentialities in the country

**The production of vegetables**, such as cucumber (*Cucumis sp.*), cabbage (*Brassica sp.*), lettuce (*Lactuca sativa*), tomato (*Lycopersicum esculentum*), chilli pepper (*Capsicum frutescens*), Pepper (*Capsicum annum*), sorrel leaves" (*Hibiscus sabdariffa*), okra (*Hibiscus esculentus*), "djagatu" bitter (*Solanum incanum*), egg-plant (*Solanum melongena*, etc., has been increasing in the last times, acting as a trong source of gaining revenues

The **cashew-tree** *Anacardium occidentale* is the perennial cultivation and of dominant revenue in the country, both in terms of surface and in terms of quantity of export. The volume of medium production varies between 100 and 150 thousand tons/per year.

##### 1.1.4.2. Main species and animal race of the agrocattle-raising sector

The low genetic quality of the races, the animal diseases and the feeding conditions, as well as the lack of facilities of basic treatment, including milk and meat, is seen as the principal constraint for the agrocattle-raising sector. There are, however, the races adapted locally. They are:

- **For the bovines:** Boenca or N'dama Race, including the Bros *brachycerus*, one of the well studied of the Guinean region; Fula or N'Gabú Race, more present in the East zone of the country; manjaca or "the lagunes" Race.

In relation to the small ruminants

**Ovines:** Djalonké, classic, rough and trypanotolerant Race.

- **Caprines:** Dwarf race of Guinea.
- **Concerning the swines**, they are descendants of the Iberian pig of small size

- Concerning the **birds**, there is the African hen.
- Concerning **echinus and asinine**, they are of the Arab and Berber type with little existence at the national level.

From 1975 until the end of the years 80, races of different species were introduced, such as:

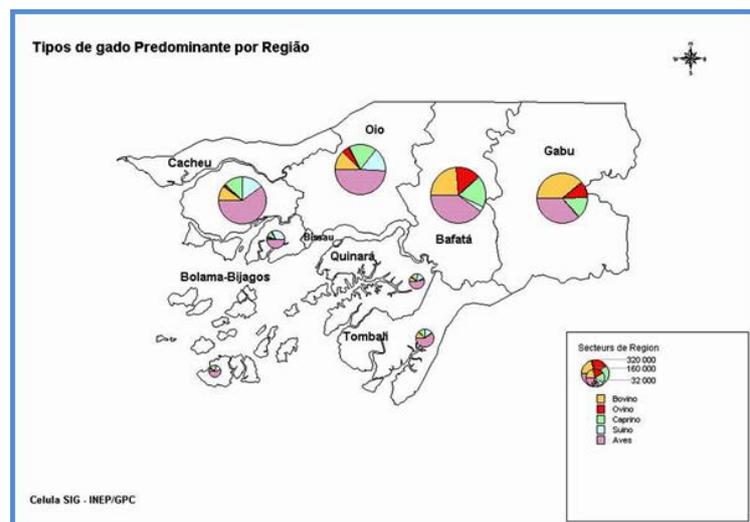
**Bovine:** Males of Charolais and Jersey races, coming from France and former Democratic Germany, and semen of the Zebus Gir leiteiro and Nelore de carne races was imported from Brasil.

**Swines:** Males and females of Large White, Landrace and Duroc races originating from England, of which purpose was intensive production and the vulgarization of males through existing Copulation Points in the different regions and sectors of the Country, namely in Bissorã, Gabú, Bula, Canchungo, Bolama, Farim and Catió.

**Hens:** Plymouth Rock (of red and white plumage), Sussex (of black plumage) and Rhode Island, all imported from Portugal. Of this last race, it was made vulgarization in the region of Quinara, particularly in the village of Tubandim.

No more imports of races and not even of semen were made from the end of years 80.

**Picture 8: Distribution of cattle types per region**



Source: General Office of Livestock, 2009.

In this matter, two (2) aspects should be taken into consideration:

- 1) It was always difficult to know accurately the effective numbers of the existing cattle in Guinea-Bissau, once the owners, populations, the majority in rural areas, refuse to reveal the precise number of their cattles and the State does not raise cattles.
- 2) The cattle raising has been confronted with the shortage of water in a zone where, during dry season, several points of water disappear, forcing the shepherds to lead the animals for

dozens of quilometres, for instance, they move from Gabú to Gambiel and Ganadú, the wet zones in the basins of the Geba river.

This **transhumance will probably have negative impacts on the environment**, since the used itineraries can suffer the loss of the vegetable place with negative consequences for the bare soil, vulnerable to erosion. In these conditions, the sahelization process, through savanization is emphasized. In compensation, the amount of excrements rejected along the route can be beneficial for the agriculture, serving as organic fertilizer.

## 1.2. Importance of the ecosystems for the well-being of the local populations

In Guinea-Bissau, the local populations use the natural resources to fill in a great variety of needs, and these needs can be related to food, associated to the shepherd activities and animals feeding, medicinal, craft, phytochemistry, of fuel, of construction materials, of fibers, ceremonials and others.

Each community or ethnic group of the country, depending on their economic, sociocultural and religious practices, has their own characteristic way of administration and use of the space as well as the use of the natural resources, consequently different economic and sociocultural benefits can be taken out from each.

### 1.2.1. Contribution of different ecosystems in the local rice production

It is estimated that more than 80% of Guinean people depend on the agriculture for survival.

The cultivation of **Oryza L. rice** represents the main economic activity, both in terms of use of family labor as of the total working time invested annually. Rice, as the main food base (119 kg/person/year), is produced through four different systems, i) dry, rice of the plateau “m'pam-pam”, ii) in hidromorfos soils of mangroves “*salty rice paddy*”, iii) “*bas-fonds*” small valleys and iv) irrigated rice. A surface of 80000ha is cultivated with rice, 45% of the surface is cultivated with rice of mangroves, 37% with dry rice and the remaining ones 18% with the rice of *bas-fonds* (MARD 2002).

Although there are small variants in the country, the **traditional and itinerant pluvial agriculture** with burning, known internationally by “*shifting cultivation*”, is, generally, the system of dominant cultivation among the Guinean communities, found in the three agroecological zones of the country. This form of rice cultivation, meant essentially to satisfy the self-consumption needs, occurs mainly in the forest ecosystems and in the savannas.

This agricultural system consists of the ruined natural vegetation in areas that, after being cultivated for two or three years, in some cases even immediately after a year of cultivation, they should be left in suspension by periods from 5 to 15 years, for the restoration of the soils fertility. The duration of the suspension time intimately depends on the population density and the readiness of plowed lands.

It is estimated that about 40000 agricultural units practise annually the cultivation of “*m'pam-pam*” rice, covering an extension about 26000 ha and with revenues that vary among 400 to 600 kg for hectare, representing approximately about 10% of the national production of rice in peel

“paddy”, without any use of inputs from the farmers (World Bank, 2009). In terms of revenue, the system of dry production is not as competitive as other systems of production of this cereal.

In this form of organization of the production, rice, as the main culture, is associated to other secondary cultures, namely bean (*Vigna unguiculata*), “mancarra” peanut (*Arachys hypogaea*), cassava (*Manihot* spp.), bacil-corn (*Zea mays*), black corn (*Pennisetm americanum*) and horse-corn (*Sorghum* spp.), as well as other vegetables and seasonings such as the pumpkin (*Cucurbita* sp.), bottle-gourd (*Lagenaria siceraria*), cucumber (*Cucumis* sp.), tomato (*Lycopersicum esculentum*), chilli pepper (*Capsicum frutescens*), sorrel leaves (*Hibiscus sabdariffa*), “candja” okra (*Hibiscus esculentus*) and “djagat” bitter (*Solanum esculentus*), destined to the subsistence.

The South agroecologic zone includes the regions of Tombali, Quinara and Bolama/Bijagós and it is recognized as the greatest agricultural potential in Guinea-Bissau, especially for **mangroves rice**, “paddy”. The estimation shows that more than 106000 ha are potentially suitable for the production of mangrove rice, and only 50000 ha are complained and partially managed by the farmers. Only the valley of the Cumbidjã River is considered the main area of paddy rice cultivation, and it has an estimated potential of 22000 hectares.

Without use of mineral fertilizers, the cultivation of rice in the hydromorphic soils of mangroves presents higher revenue in relation to the other systems and it is also the most demanding in terms of water management. This traditional system involves the construction and maintenance of anti-salt dikes, as well as, the manual execution of all the practices, resulting in a very intensive system in terms of labor.

The revenues of the mangroves rice vary between 1700 and 2600 kg/ha. The production of “paddy” rice represents traditionally 80% of the annual production of rice, but it is estimate that it only represented 20% in 2007 (World Bank 2009).

At the national level and in the West African sub-region, the balanta ethnic group is known as one of the best trustees of the traditional knowledge on rice cultivation in the halo-hydromorphic lands of mangroves. For this ethnic group, located especially in the north and in the south of Guinea-Bissau, rice cultivated in the mangroves represents the main economic activity, both in terms of use of the family labor as of the total working time invested annually. For being a very intensive activity and with a great work coefficient, all the social organization and these people's lives depend and are accomplished based on the production of this cereal.

The **rice production system in the small vallyes, “bas-fonds”**, is present in all the agroecologic zones; it has more relevance in the east zone of the country, where a potential of 25000 of irrigable “bas-fonds” is evaluated, only in the valley of the Geba River. The agroecologic zone in the North, which includes Oio, Cacheu, and Biombo also, has a good agricultural potential for rice cultivation in the low wet zones. It is estimated a total potential of 200000 available hectares for this type of rice production, and just a tiny part (13,5%) of these potentialities are taken advantage of. The revenue gained on the production by the small farmers, the users of these valleys, oscillates among 600 to 1200 kg/ha. The total annual production of *bas fonds* (pluvial and irrigated water) represents historically about 10% of the national production (World Bank, 2009).

Some of the “*bas fonds*” and surfaces of the rivers in the East, especially in the Geba River, are already irrigated through water pump, and varieties of improved water pumps are used according to acquired knowledge. There are cases when the land is already prepared by tractors. With an appropriate management, it is possible to harvest twice a year, with revenues that vary from 3 to 5 tons/ha and up to 7 tons/ha in the dry season.

**Table 6:** Summarized list of the survey of useful plants of Guinea-Bissau

Kind of use	Autochthonous	Introduced	Total
<b>Medicinal</b>	180	21	201
<b>food</b>	83	59	142
<b>Animal feeding</b>	34	2	36
<b>Ornamental</b>	3	27	30
<b>Construction Materials</b>	21	1	22
<b>Fibres</b>	18	2	20
<b>Workmanship</b>	15	1	16
<b>Phytochemistry</b>	14	1	15
<b>Ritual</b>	13	2	15
<b>Fuel</b>	4	-	4
<b>Veterinary</b>	3	-	3
<b>Others</b>	19	9	28
<b>Nº of rate used</b>	299	100	399

The following uses of some species of registered plants were identified in different literatures: 128 have use in the traditional medicine; 30 species provide construction wood; 76 have feeding uses in the human nutrition; about 86 species are object of several uses, such as: the feeding of the cattle, the workmanship, etc...

### 1.2.2. Supply of the domestic energy: firewood and coal

The rural and semi-urban populations from Guinea-Bissau depend strongly on the forest resources for their survival. The needs of domestic energy for the illumination, heating of the houses and food preparation are mostly satisfied in many cases by the firewood collected in the different forest ecosystems. About 63,4% of the population of the country uses the firewood, 35% the vegetable coal, 1,1% uses gas, and the remaining population uses other forms of energy (ILAP2, 2011). The use of this energy source for smoking of fish, the transformation of salt and the trade of firewood for the supply of the big cities is in the root of the increasing pressure on the forests. The unitary consumption of woody fuel in 1999 is estimated in the sequence of 666 kg/habitant/year, being 555 kg/habitant/year for firewood and 116 kg of the equivalent firewood/habitant/year converted into 21 kg of coal by each element of the Guinean population a year. In the traditional system of transformation of the firewood into coal, it is considered an exploitation rate that varies between 17 and 20%, which means that in every 100 firewood kg the equivalent is obtained from 17 to 20 kg of coal (DA SILVA et DIOMBÉRA, 2006). The unsustainability of this way of vegetable coal production is very obvious.

The responsibility for gathering the firewood falls mainly upon women and girls. This stressful, exhausting and slow activity contributes to emphasize the inequality of opportunities in both

sustenance and education. There are cases where more than 20 kg of this material are transported by head for a long distance.

The undertaken and intensive exploitation of mangroves wood is not rooted in the coastal communities' tradition in the country. Though, the women, while they go fishing or collecting mollusks, they take advantage of the logs and/or the branches of mangroves as source of energy for illumination and food preparation. In the last times, though, there are indications of attempts to commercialize logs of this kind around big population gatherings. Traditionally, the branches of mangroves are used in the construction of houses, fences around the houses and orchards.

### 1.2.3. *Non-woody forest products*

Yet, there are not sufficiently explanatory studies on the amounts and values that the Non-Woody Forest Products (PENL) represents in the familiar, community and national economy. In spite of that, it is verified that many Guinean family groups depend a lot on these products to satisfy their basic needs of subsistence and monetary revenue.

The PENL are available in a differentiated way along the year and they offer a significant contribution for the warranty of the food safety of the rural families and their particular microeconomics. The women and young girls play a preponderant role in the collection, transformation and commercialization of these products, although the extraction of some of them requires the young boys and adults' support.

Several categories of PENL, animal and vegetable, are recognized and used in the country. The meat, skin, trophies, living animals, honey, wild wax and raw material for the traditional pharmacopoeia represent among the most requested PENL of animal origin. In what concerns to the vegetable world, PENL sought by the local communities start from destined to the feeding (fruits, vegetables, nuts, roots, tubercle, etc.), passing by the pasture for domestic animals, products for traditional medicine - the use of medicinal plants is known broadly in the rural communities in the country - and aromatic prepared, all the way to the raw material for the production of pigments and dyes, utensils, workmanship, construction materials, ornamental plants, saps and oils, etc.

It is difficult to calculate amounts of these activities since a lot of times there are not market prices for the products and services rendered by the forests to the local communities. In its estimation, however, the World Bank indicates the values of the natural wealth of PENL supplied by the forest lands in the sequence of 366 American dollars *per capita*.

#### 1.2.3.1. *Non-woody forest products and the food security*

A diversity of trees and bushes are used for the collection of fruits, roots, leaves and fibers as constituent elements for diet and the local communities' food safety. In this context, the following is highlighted the "*foli pequeno*" (*Saba senegalensis*), "*foli garandi or foli lifanti*" (*Landolphia heudoloti*), "*palmite*" and fruits of the "*cibe*", "*ancôl*" (*Borassus aethiopicum*), fruit and leaves of baobab (*Adansonia digitata*), "*farroba*" (*Parkia biglobosa*), "*veludo*" (*Dialium guineense*), "*banana santcho*" (*Uvaria chamae*), "*tambacumba*" (*Neocarya macrophylla*), "*mandiple*" (*Spondias mombin*), "*mampataz*" (*high Parinari*), etc.

A study ordered by a national NGO – Action for Development (Keita, 2009) identified, in the north part of the Cacheu River, a total of 45 exploited forest products that contribute to the food safety of the populations from that zone. The surveys done in 2012 by the direction of the Marine National Park João Vieira Poilão (PNMJVP) identified, by the way, 42 eatable species of wild plants on the Canhabaque Island and on the islanders that form this park.

If, in the past, most of these species was exploited only for subsistence needs, now many of them are transformed and commercialized at the local, national, and sub-regional level.

The **hunting** of small scale with individual and family autoconsumption purpose is also practised by a small group of the resident populations, but the extraction of **honey** occurs transversally, both in the forests/savannas and mangroves, representing another important activity in the local communities.

#### *1.2.3.2. Use of different species of palm trees*

There are five species of palm trees in Guinea-Bissau: Coconut (*Coconuts nucifera*), natural palm tree (*Elaeis guineensis*), "*cibe*" (*Borassus aethiopum*), "*tara*" (*Raphia exica*) and "*mantampa-de-serra*" (*Calamus deeratus*). Among the mentioned species, the coconut is the only one that was introduced during the colonial period and, exception is the case of Bolama Island, which has less relevant economic importance in the country. The *cibe* and the natural palm tree are the most abundant species and they are the most important economically. The *tara* and the *mantampa-de-serra* have more located importance but, in their existing zone, they have been contributing significantly for the improvement of the revenues of some family groups.

The exploitation of the **natural palm tree** (*Elaeis guineensis*) appears as the main activity of the family groups (men, women and youths) of different ethnic groups in the country. Of these forest essences, the fruits of infructescence "*chabéu*" (palm nuts) are extracted and used in the palm oil production destined for either personal consumption or commercialization. From the almonds the palm-oil is extracted, of which consumption has been reducing significantly with elapsing of times.

The trunk of palm trees is also used in the construction of the houses (in substitution of the "*cibe*") and dikes of the rice fields of salty water.

The women take advantage of the branches for the production of brooms, used in the cleaning of the houses and public spaces in the villages, or for the commercialization (in the last years, this subproduct became commercialized broadly in the internal and external markets).

The ecomic activities associated to the palm tree are still complemented with the exploitation of palm wine, sale of fresh fruit regimes, production of palm oil, and coconut for production of soap.

The soils occupied by the forests of palm trees are considered to be of great productivity after being transformed into fields of rice cultivation.

The "*cibe*" ***Borassus aethiopum*** is a resource of multiple uses in Africa, in general, and especially in Guinea-Bissau since its products occupy a distinguished place in Guinean microeconomics and workmanship. Its trunk is used preferably in the building construction while other subproducts are taken advantage of for the workmanship, feeding or as domestic

utensils. For being a fibrous material, of difficult rotting and high physical and chemical resistance to the termites, its trunk is used in the construction of housing infrastructures, in the bridges and rice fields as water pumps.

The estimations of 2000 indicated an exploitation of about 250000 splits of *cibe* a year and a contribution of about 75 Million Francs CFA for the State (MDRA/DGFF, 2010). The quality of “*cibes*” sold for construction indicates an over-exploitation which is in the origin of the degradation and disappearance of important marks of these species in its existing zones in the North, in the Center and in the South Center of the country.

The fiber extracted from the base of leaf stem has important qualities of resistance to the chemical products and water; therefore its leaves are used for several purposes. The tree also produces many types of food, for being a young plant consumed as vegetables “*palmito*” roasted or pounded. The fruits are also consumed boiled or raw and its sugary sap, obtained from young flowering; the fruits are also consumed in the ceremonies and rituals, besides possessing medicinal properties. The immature seeds, containing a sweet jelly which has refreshing flavor, are much appreciated in their occurrence zones, both by the humans and the primates.

The community of palm tree “*tara*” *Raphia exica* constitutes a peculiar biotope of wet zones in Guinea-Bissau; this kind of palm tree could also be found in the bordering zones to the forests of palm trees, next to the bed of floods or in the center of the forests. Besides its natural beauty, it still contains economic and cultural value, because its products and subproducts are used thoroughly by the populations in the basketry, in the grass mats manufacture, domestic utensils and traps for hunting and fishing.

Different to what happens in the Archipelago of Bijagós, where the making of grass mats is dominated by the women, in other areas of the country, it is made by men and young boys.

The species is taken advantage of especially for the making of varied types of furniture of local use and some domestic utensils. The stem is used to make furniture pieces and for the construction of perches for the transport and repose of the chickens. In the Bijagós community, besides being used in the making of grass mats and as a rope, the fibers of the branches and new leaves are also used to manufacture skirts for dead bodies, clothes for dancing, and bijagós “*settees*”, among others.

Occurrence zones of Taras “*tarreiro*” population are many times restrained for rice cultivation. Their plants, once unprovided with leaves, become much more exposed to the burning effects. Burnings, by the way, provoke a substantial degradation of the plants of “*Rafia*”, which delays the regeneration process of the “*tarreiro*”, reducing its surface and, consequently, restricting the possibilities of its exploitation.

The *mamtampa-de-serra Calamus deeratus* produces a cane of moderate quality, with even about 18 diameter mm. It grows in the intermediate zones, in the rice field of fresh water, between the sea and the bush, in the border of wet tropical forest. Its principal use is reflected in local workmanship, in the making of furniture of “*rotin*” type (cradles, beds with headboard tables, sofas, settees, etc.) for sale or for the local use.

### 1.2.3.3. Etno-cultural and magic usefulness

In the country in general, but particularly in the coastal zones, some areas, such as: forests, beaches, rivers, inlets or even islands and whole islanders, are traditionally considered sacred.



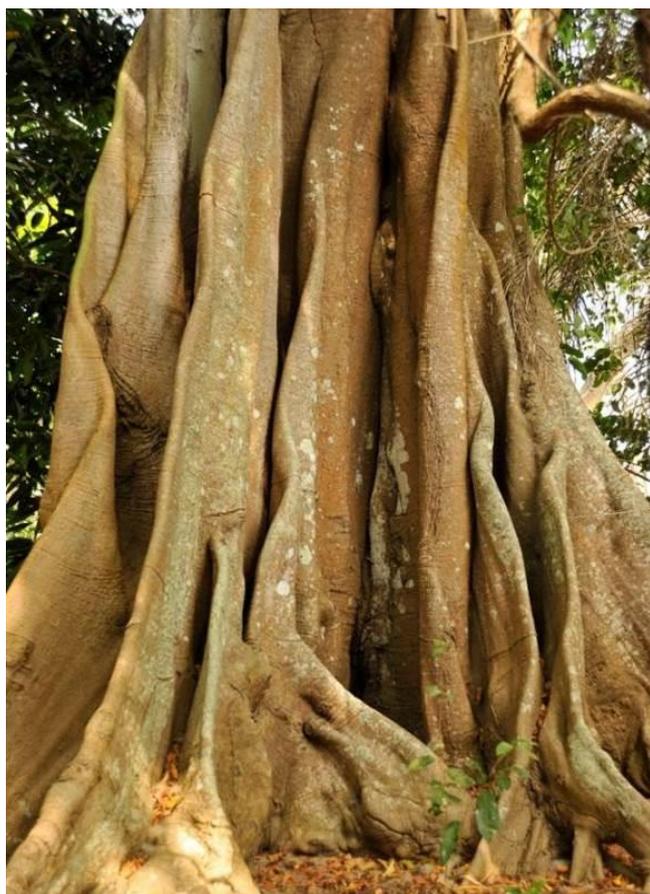
Árvore sagrada: *Adansonia digitata*; Foto: A. R. DE BARROS

Once acquired this status, these areas cannot be inhabited, nor should economic activities of great scale be practiced in them, even if they have varied useful resources. In spite of that, they can, periodically, be used for agricultural purpose (itinerant agriculture) and of forest extracting (fruit and palm wine, firewood for fuel production, construction material, collection of mollusks and wild fruits, etc.), serving strategically as rear-guard sites for the safeguards of food safety.

In Guinea-Bissau, the sacred sites and bushes have great sociocultural and symbolic importance in the tradition of several ethnic groups and their communities. On one side, the sacred aspect plays a decisive role in the dynamics of construction of the ethnic territories and, more specifically, the villages' territories; on the other hand, it has an impact in the form of how the traditional societies interact and act with the nature and especially in the relating processes of social reproduction.

They are considered as a form of the recognition and legitimation of the property and rights of ethnic and ancestral uses on the respective territories (Said et. al., 2011) and their main function is to be the sites of the fulfilment of ritual rights, serving, for instance, as areas of the men's and women's initiations, the kings' enthronization areas, the souls' path, etc.

The trees of big size, such as kapok tree *Ceiba pentandra* and baobab *Adansonia digitata*, which are located in the sites, bushes or forests denominated "sacred", are used for representation of mystic-religious powers, where series of traditional ceremonies and worship take place every day.



Sacred tree: *Ceiba pentandra*; Foto: JMPA

**Picture 9: The trees of sociocultural importance**

For the fact that these spaces are submitted to different taboos, only the people (men or women) who have already accomplished their ceremonial obligations can enter there.

#### *1.2.3.4. Traditional pharmacopoeia*

The flora of Guinea-Bissau is very rich in plants used in the traditional pharmacopoeia; this practice is deeply rooted among the rural communities of the country. Medicinal plants are essentially for the cure of the most frequent diseases, such as: malaria, diarrhea, skin diseases, hepatitis, hypertension, diabetes, snake bites, among others. For shortage or the total lack of medical and paramedical personnel, of diagnosis means, medicines and other materials and medical instruments, the populations, particularly of the most distant and isolated zones of the country plead a lot of times to the healers' knowledge, or traditional doctors, who resort to the ecosystems and the integral biodiversity services.

The rational use of the flora (peels, roots, leaves, etc.) rather requires the work of scientific research, so that its application in the industry and national pharmacopoeia can constitute an alternative to the modern medicine. In this regard, some training was given to the traditional healers by the Charity organization, that gave them support in the material and intellectual organization of their work. In the Archipelago of Bijagós, up to the present date, two

Although these sacred areas are spaces of sociocultural reproduction, they constitute an entire traditional management system that allows to conserve sensitive areas, to create spaces of future reservation, and to protect some species. The common strategy of all is to reduce the maximum human presence in them. These Guinean people's ancestral practices of prohibiting, in a permanent or periodic way, the open and free access to certain zones and to their resources for man, are a form of creating preservation zones where the flora and the fauna can calmly reproduce.

The great majority of the sites with this designation has a great diversity of animals or they are either excellent occurrence zones of a certain animal or vegetable species, being covered, consequently, with great ecological importance or vice-versa.

publications have been edited on the *mezinhas* of traditional pharmacopoeia based on the inventory of plants of medicinal use.

The first book, on the medicinal plants of the National Park of Orango Island, in 2010 and in 2014, one about Canhabaque/The National Park of João Vieira Poilão was edited. In the entitled book *Mezinho de Orango*, 46 species of plants of medicinal use in the traditional pharmacopoeia were mentioned; these plants belong to 28 families and 43 kinds. Twenty three of the used species are trees, fifteen are bushes, six are herbs and two are lianas. The parts of the plants which are more used are usually the leaves, being the base of 32 revenues, followed by the roots, in 29 cases, and the peel of the stem, in 15. If the species is an herb, the whole aerial part of the plant can also be used (6 revenues). Fruits, sap, and branches with leaves are used in a revenue each (Indjai, B.; Catarino, L. E. and Mourão, D.: 2010).

In entitled work, "A utilização das plantas em Canhabaque e no Parque Nacional Marinho João Vieira Poilão" (The use of the plants in Canhabaque and in the Marine National Park João Vieira Poilão) (2012, not published), Barbosa identified 85 species of useful plants. Of these, 25 are only used in the traditional pharmacopoeia, 23 include other uses, besides the pharmacopoeia, and 37 hold several usefulness. By the way, in the entitled study "*Mezinhas da terra e curas tradicionais nas Ilhas de Canhabaque e do Parque Nacional Marinho João Vieira e Poilão*" (Traditional medicine and cures in the Islands of Canhabaque and of the Marine National Park João Vieira e Poilão) were registered 45 species of plants, belonging to 25 families, used in a total of 85 revenues different from the inhabitants and users' traditional pharmacopoeia of these islands (Indjai, B.; Barbosa, C. and Catarino, L. E.: 2014).

#### 1.2.3.5. Workmanship and ornamentation

Among the different Guinean communities, especially animists, three types of workmanship can be distinguished:

- i) **Specific workmanship** for **religious** purposes (masks, benches, sticks, pillars, statuettes, etc.), where the "*irãs*" (idols) spirits are represented and of which completion requires perfect knowledge relatively to the quality of the wood to be used in the necessary ceremonies, how to cut it and how the production process should be made;
- ii) **Practical workmanship**, which can include masks and dancing accessories, Bijagós skirts, pipes, plates, spoons, pestles, "*cufos*", baskets of several kinds and sizes, hats, furniture pieces (tables, benches, chairs, beds, couches), mattress, coops, bases, shields, etc.
- iii) **Workmanship for tourist** purposes, which are mainly statuettes and masks, and also furniture pieces (mainly the one of European origin, such as cradles, beds with headboard tables, sofas, couches, etc.), baskets and mattress.

The raw materials used for the three types of workmanship are variable; they differ from region to region and from community to community, but they are, in their great majority, extracted from the nature.

The palm tree leaves (natural palm tree, cibe, tara and mantampa-de-serra), for instance, are used broadly in manufacture of artefacts of common use in homes (baskets, brooms, shoulder baskets,

rugs, ropes, furniture, grass mats, etc.), of decoration objects (hats, fans, umbrellas, etc.), of protecting gloves of arms for the manual harvest of cereals, and also of roofs, recipients to conserve and to transport fruits, fish, vegetables, etc. The leaves of the palm tree are used equally to produce and to mark the “*mandjiduras*”, sacred places, and to create decorations for dancing; the central rib of the leaves, the “*daria*”, is used in the “*cassinques*” production (species of bag that bijagós and felupes men use to transport their everyday objects, and these species of bag are also found in the ceremonies), couches, coops for transport of the birds, ropes to climb the palm trees, among others.

In the Archipelago of Bijagós, the benches, or seats, “*turpessa*” represent symbols of power. They are made out of resistant logs of some trees of big size, such as, “*pau fidida*” (*Acacia álvida*), kapok tree (*Ceiba pentandra*), the “*pó-di-sangui*” (*Pterocarpus erinaceus*) and the “*macite*” (*Terminalia macroptera*). The priests' seats are particularly made of mango tree logs (*Mangifera indica*) or “*forroba di lala*” (*Albizzia adianthifolia*).

The production of bijagós skirts can be made of several types of vegetable fiber, emphasizing the *Entada pursaetha*, a type of creeper, the *Hibiscus tiliaceus* and the *Sterculia tragacantha*.

The Bijagós use a type of waistbelt, called “*orancono*”, to tie the belly after each child delivery, so that the womb may return to the normal form, this way they reacquire the precedent corporal form, reshaping the woman's body. This belt, made of fiber wood (log), can be made with two tree species, the *Lonchocarpus sericeus* and the *Ficus guaranitica*.

Other uses: the log of “*pau-de-sangue-branco*” (*Terminalia macroptera*) is used to make “*bombolom*” (traditional musical instrument); the ash resultant of the burning peel of the kapok tree fruit (*Ceiba pentandra*) is used to make soap; the “*tagara*” (*Alstonia sp*) is a tree that offers multiple applications; it serves to make a great diversity of pieces and utensils (canoe, masks, statuettes, plates, spoons, bowls, machetes, benches, axes, canes, etc.).

In many regions of Guinea-Bissau, the presence of great extensions of both bamboo cane (*Oxytenanthera abyssinica*) and of “*mampufa*” (*Cyperus articulatus*) is still noticeable, both used transversally in the workmanship, in the traditional construction, mainly in the East of the country, and in the fencing of yards.

The gramineae extraction, mainly of the *Analdelphia afzeliana* species, which can be found in the herbaceous savannas, is a seasonal extracting activity of great relevance in the whole national space.

#### 1.2.4. *The marine and coastal resources and the communities' well-being*

Fish and mollusks are the main sources of animal protein of the country, and they serve as vital importance for the economy and the food safety of the poorest rural populations.

On the other hand, several products of the mangroves ecosystem appear among the most traditionally used resources in the Guinean coastal zone. The “*madeira-de-sangue*” blood wood (log and branches) is used regularly as construction material and fencing of the houses and yards; to make domestic furniture and workmanship since it is an energetic material; it is also used to produce salt and to transform fish.

#### 1.2.4.1. Shellfish: important source of animal protein

Crustaceans and gastropods represent an essential resource to satisfy basic needs of animal proteins origin in the food regime of several people of Guinean littoral, on the other hand, they contribute to increase the small individual economy of the respective family groups.

In the aerial roots of *Rhizophoraceas*, regularly submerged by the tides, grow the settlement of oysters. These bivalve and other several mollusks, such like “Combés” (*Anadara sinilis*), “Ligrón” (*Tagelus adansonii*), “Gandim” (*Pugilina morio*) and “Cunthurbedja” (*Cymbuim spp.*), emerge of the sandy and muddy substratum of the mangroves embroderies and in the sandbanks.

Because of their meaning and special value in different religious worship events and in the warranty of food safety, in a lot of zones, their traditional use is implemented with specific management rules. In felupe and bijagó's tradition, the oysters are not collected during the rainy season, for instance, and the rules interdict the cut of the aerial roots of the mangroves where they are located. Even during the dry season, usually the open period for the exploitation of the oysters, there are situations where the extraction of the oysters in certain rivers is reserved for special ceremonies. Likewise, they are the instituted rules that implicate the alternate exploitation in different margins.

Though they are of great cultural and food importance for the inhabitants of the coastal zone and of the islands of the country, particularly of the Archipelago of Bijagós, the bivalve and gastropods were little studied in Guinea-Bissau. The mollusks are not just one of the main sources of animal protein for bijagó population; they also occupy an important place at the cultural level. Very linked to their culture, this insular people preserve, manage and value this resource which they use in several ceremonies. The group of management rules bases on the very deep knowledge of the natural mean in which the bijagó society interferes.

The exploitation of mollusks is almost exclusively insured by women. They still practice small fishing with support of circular nets and they collect oysters, crabs, (*Callinectes marginatus* and *Callinectes pallidus*), “pera mare” (*Menippe nodifrons* and *Calappa rubroguttata*), “cacré” (*Uca tangeri*, *Cardiosoma armatum*), “djapouf” as well as other types of mollusks and crustaceans.

#### 1.2.4.2. Traditional fishing of subsistence and small scale production

In the subsistence fishing, very modest and appropriate means are used for the exploitation of the halieutics resources located in the close coastal channels and near the mangroves. The mangroves zone is also exploited by handmade fishermen of small scale. For this type of fishing, monoxylous canoes (oaring canoe) or sailing canoes are used; yet, improved monoxylous canoes with motor outside the board of small cylinder capacity is still used. The most captured species of fish by these production units are: catfish (*Arius parkii*), “djafal” (*Ethmalosa fimbriata*), “corcôr” (*Pomadasis peroteti*), mermaid (*Raja miraletus*), “bentana” (*Tilapia guineensis*), “barracuda” (*Sphyraena guachancho*), “tainha” (*Mugil curema*), “corvina” (*Pseudolithus senegalensis*), “raia” (*Dasyatis Margarita*), and “barbo” (*Galeoides decadactylus*).

In the ricefield of salty water and in the small inlet of the rivers a method known by fishing “a pé” (on foot) is used, seeking essentially the capture of tilapias (*Chichlidae*) and other species of

small size. The revenues obtained out of the subsistence handmade fishing of small scale are destined essentially to satisfy the family and village's basic needs; a significant quantity of tilapias is exposed in the local markets either to change with other first-need products or to sell.

The traditional fishing of shrimp is made in the coastal and in the mangroves zone. It is done essentially by the women and the tendency is to capture the immature migratory shrimp, but certainly some adults, too. A small part of the shrimp caught is consumed fresh, but a great part is dried and/or crushed. Only small quantities of shrimp are transported for the internal consumption by the canoes of small scale and they are sold cool.

#### 1.2.4.3. Specific use of the wet zones

As it was already mentioned, the socioeconomic activities developed in the country by the communities around the wet zones are quite diversified. Among them, the following is distinguished: the fishing, agriculture, collection of mollusks and of PENL, cattle pasture, leisure and recreation activities, etc.

A significant part of rice produced locally comes from the "*lalas*" (meadows) and from the small valleys (*bas-fonds*). These are seasonal vegetable formations, conditioned mainly by the presence of water. They occupy the zones in depression, where the soils are submerged or with underground water very close to the surface in rainy season. This formation presents just a herbaceous stratum from 1 to 2 m, being almost unprovided with trees; therefore, it is also used broadly to tend cattles, either domestic or wild fauna, especially after the rainy season.



Rízicultura nos pequenos vales; Foto: J. BIAI



Pastorícia nas zonas húmidas; Foto: J. BIAI



Starting from the middle of February to March, the cattles shepherds, especially bovine, accompany their animals, traveling a long distance searching for the wet zones so that their cattles may have pasture for feeding and water to drink.

The horticultural production in the country, in general and in Bissau (peri-urban zone), particularly, occurs in the flooded plains and in the small valleys.

**Picture 10: Examples of use and valorization of the wet zones**

In Bissau city, it is considered that 26% of urban and periurban family groups cultivate vegetables, essentially in the well-known green waistline of Bissau.

In dry season, the periurban horticulture covers among 70 and 80% of the market demand in fresh vegetables and during the rainy season this covering rate reduces to 60%. It is considered that this subsector is broadly dominated (80%) by the women (CPDA 2002).

### 1.3. Biodiversity and ecosystems and the key sectors of production and of development of the country

The economic wealth of Guinea-Bissau bases essentially in its natural capital. According to the World Bank (EDMUNDSON, H. 2014) estimation, the total of the country's natural wealth, including minerals as bauxite and phosphate, fishing, wood, fertile lands and rich ecosystems, can reach 3.874 US American dollars per capita. It is pointed out that, in 2013, the GDP per capita was estimated in only 590 US dollars, which confirms the position of Guinea-Bissau as one of the poorest countries in the world.

The renewable natural resources, such as agricultural lands (for cultivation and pastures), fishing (traditional, of collection of mollusks, workmanship, industrial and sport), forests (firewood and wood, Non-woody Forest Products, capture of carbon), habitats and protected ecosystems represent more than 90% of this wealth.

#### 1.3.1. Agrarian sector

The agricultural lands are broadly the largest source of natural wealth of the country, and the cultivation lands have an estimated value in 1.734 American dollars *per capita* and the lands for pastures about 591 American dollars *per capita*.

The agricultural section, with about 50% of GDP and employing more than 85% of the population, represents the spine of Guinea-Bissau economy. This section provides support for the overwhelming majority of the population and it plays an important role in the country's external account. The agricultural exports represent more than 98% of the total of the exporting goods (MADR, 2002; DENARP II, 2011).

##### 1.3.1.1. Subsector of revenue cultures

In terms of business, the subsector of cashew is of the most important of Guinea-Bissau and it has a decisive role in the economy of the country, both in micro and macro. The economy of the country is extremely dependent on the monoculture and of the export of cashew nut (*Anacardium occidentale*), which occupies about 50% of the cultivation area and approximately 5% of the total terrestrial surface of the country. This **revenue product** is cultivated mainly by small producers, who plant an average of 2 - 3 hectares of land each. The average production of rough cashew/habitant/year is estimated in about 53 kg. It is rarely nowadays to find a Guinean family who does not possess any cashew trees. Cashew is planted now in 210.000 hectares, and it is considered that its area is increasing by 6% a year, according to data concerning the period from 1994 to 2013 (World Bank 2015).

Since 2000, this product represents among 88 to 98% of the total revenue of exports. This reality demonstrates the dependence degree in relation to this kind of exports, superior to the dependence of the exports from most of OPEP countries relatively to the petroleum. Guinea-Bissau is the fifth largest world exporter of cashew nut, after India, Vietnam, Ivory Coast and

Brazil. Data of the World Bank indicates that the country has already surpassed even Brazil in terms of production, occupying this way fourth position in the world classification (World Bank, 2015).

However, on the contrary to what happens with the remaining producers, almost the whole cashew produced in Guinea-Bissau is exported in rough (in 2011, the country exported about 174.000 tons of rough cashew nut). About 1 million tons are processed in India, in Vietnam 550 thousand, in Brazil 300 thousand, in Mozambique 35.000, in Tanzania 32.000 and in Nigeria 15.000, but in Guinea-Bissau the installed capacity of processing is just of 12.000 tons. It is important to reinforce, however, that, since 2010, the installed capacity of processing has experiment a certain evolution, reaching about 40.000 tons in 2013. On the other hand, most of the processing capacity of small size (units with inferior capacity to 1.500/2.000 tons of processing a year) installed in the country is not used. In 2010, only 60 tons were exported as grain, which demonstrates clearly that only a tiny part of this product is exported in form of grain (World Bank 2011).

Mango (*Mangifera indica*), bananas (*Musa sp.*), citrinos (*Citrus sp.*), natural palm tree (*Elaeis guineensis*), cotton (*Gossypium sp.*) peanut (*Arachys hypogaea*) are other as many export cultures as development potential in the country. Cultures such as: sweet potato, bean, cassava (*Manihot sp.*), "igname" (*Dioscorea sp.*), bacil-corn (*Zea mais*), "black-corn" (*Pennisetm americanum*) and "horse-corn" (*Sorghum sp.*) are also cultivated, serving essentially for self-consumption, individual and family, and/or commercialization at the national level, in the neighboring and in the sub-regional countries. The dry cereals, namely the "black-corn" and the "horse-corn", prevail in relation to the rice in the Northeast and in the East of the country.

The production of vegetables, cucumber (*Cucumis sp.*), green cabbage (*Brassica sp.*), lettuce (*Lactuca sativa*) tomato (*Lycopersicum esculentum*), chilli pepper (*Capsicum frutescens*), Pepper (*Capsicum annum*), sorrel leaves (*Hibiscus sabdariffa*), okra (*Hibiscus esculentus*), bitter (*Solanum incanum*) egg-plant (*Solanum melongena*, etc.), has been increasing in the last times; it acts as secure source to obtain revenue. It is obvious, especially in Bissau, the great implication and the women's dominance in this economic activity.

#### 1.3.1.2. Subsector of the Cattle raising

The cattle raising is covered of great economic potentialities and the pasture lands, together with cultivation lands; they represent the largest natural assets of the country. The **subsector of the cattle raising** is represented by approximately 1, 5 million of the cattles heads, contributing with about 17% in the formation of national GDP and 32% of agricultural GDP. The national effective is represented by 304.745 ovine, 649.084 caprine, and 343.680 porcine (DGP, 2009).

According to BAD/Presar 2009 data, the national territory has great potentialities in the domain of the livestock and this subsector can play an important role in the complement to the agricultural production. However, the cattle rasing subsector is extremely weak in terms of total production, marginal productivity and processing capacity.

In the East province of the country, in other words, in the regions of Gabú and Bafatá, a great dynamism is marked in this subsector. These two administrative regions have 72% of the bovine cattle, 76% of ovine, 40% of caprines, 86% of asinine and 73% of echinus. In terms of bovine,

ovine and asinine, the region of Oio occupies the third place in the sequence of importance, after Gabú and Bafatá. For the class of the small ruminant in general, Oio is, after Gabú, the second largest concentration, and main swinish area, representing 57% of the total registered in the country. In spite of the importance of the livestock in the economic, sociocultural and nutritional plan, the percentage of public investment foreseen for this subsector remained relatively low and in constant regression for about 30 years.

**Table 7: Distribution of the actual animals per region (April and May of 2009)**

Region	Bovines	Ovines	Caprines	Equines	Asinines	Porcines	Birds
<b>Tombali</b>	11 010	4 555	34 645	110	164	6 825	63 034
<b>Quinará</b>	19 778	472	23 626	91	0	18 075	131 180
<b>Oio</b>	223 943	61 510	173 731	950	4 450	196 029	422 289
<b>Biombo</b>	25 042	341	26 305	0	0	21 462	69 244
<b>Bolama/Bijagós</b>	9 065	225	15 654	0	0	31 930	57 948
<b>Bafatá</b>	294 070	77 348	98 052	658	8 875	15 295	211 099
<b>Gabú</b>	654 543	153 349	193 445	2 503	20 890	1 484	318 209
<b>Cacheu</b>	87 240	6 304	80 726	44	391	38 989	166 510
<b>S. A. Bissau</b>	721	641	2 900	0	0	13591	43 129
<b>Total</b>	<b>1 325 412</b>	<b>304 745</b>	<b>649 084</b>	<b>4 356</b>	<b>34 770</b>	<b>343 680</b>	<b>1 481 642</b>

Source: Synthesis report of the national registered livestock in Guinea-Bissau (DGP, 2009).

In general number, in Guinea-Bissau, the cattle breeding is an activity practiced for about 96 700 thousand creators that contribute to increase the food safety and rural revenue, for the improvement of the balanced scaled payments and for the development of the interaction between agriculture and livestock.

### 1.3.1.3. Forest Subsector

The forest sector contributes with about 2% for GDP and it is the source of food, fuel (woody energy) for the domestic and industrial use of small scale, of construction materials, of fibers and of medicines for the the majority of Guinean people. The forests represent a significant opportunity for the generation of revenues for the Government and they are an important source of revenues and resources for the poor people in the country.

To forest component is the second largest potential source of natural wealth of Guinea-Bissau. Besides the wood, which represents 304 American dollars *per capita*, the forest ecosystem supplies an infinity of products and services, emphacizing PFNL or non-woody forest resources estimated with about 366 American dollars *per capita* (EDMUNDSON, H. 2014). This figure could rise even more, if the contribution of the mangroves in the creation of wealth was not omitted in these calculations. It is good to remember the role played by the mangroves forests as nursery for fishing resources, especially for the shrimp, benefitting a large boundry of the West-African coast.

The economic revenues of this sector are not being secured properly, and it is still more preoccupying that the wood is leaving the country roughly (illegal activity) instead of being processed by the national sawmills. This way, Guinea-Bissau is losing three types of revenues: i) the wood extraction which allows rates that authorize the activities of legal extraction; ii) the economic revenues of products based on the wood, which are not being manufactured domestically now, and iii) revenues associated to badgetary income. If it is managed in a

sustainable way, the wood can be picked up and processed to manufacture furniture or other consumption goods, constituting this way an important source of revenues.

Additionally, the forests have the potential to provide the country with credits of carbon which can be sold at the international markets of this product. The CARBOVEG-GB project, promoted by the General Direction of Environment of Guinea-Bissau, already proceeded with the process of gathering basic information on the carbon stored in the forest vegetation in the whole continental territory of Guinea-Bissau.

In fact, in the ambit of the mitigation mechanisms and combat against the effects of climate changes, the regeneration of the degraded forest vegetation that allows the confirming settlement of carbon or the reduction of CO<sub>2</sub> emissions, it can be a financing object. Guinea-Bissau is preparing a project - REDD (Reduced Emissions from Deforestation and Degradation), which seeks the access to the international market of carbon credit, estimated in potential wealth of 89 American dollars *per capita* in benefit of the country. Therefore, the forests will be able, not only to continue providing the multiple goods and associated services, but also generating revenues to the government's safes and to provide a flow of revenues for the local proprietors, contributing directly to the relief of the poverty and for the shared prosperity.

In addition to that, the recent illegal cuts of the forests will affect the sustainability of the forests negatively, as well as to reducing the economic revenue that the country could be able to capture.

It is necessary and urgent that a suspension or closed season for the regeneration of the forest resources is applied in the perspective of assuming efficiently the function of CO<sub>2</sub> drain and important reservoir of carbon in order to allow the participation of the country in the carbon market. With these earnings, it will allow the investment in adaptation actions, mainly, development and technology transfer which can minimize the vulnerability of the country and transform the local economy to be more resilient to the climate changes.

### 1.3.2. Fishing Sector

Thanks to very favorable environmental conditions, resultants of the configuration of the continental platform, which is extensive and very plain, of the innumerable estuaries that supply fresh water, sediments and nutritious and of upwelling phenomenon, resultant of the encounter of cold currents coming from the North and hot currents coming from the South, the coastal zone of Guinea-Bissau has one of the highest primary productivities of the sub-region. With estimation of 305 American dollars *per capita*, the fishing represents the third largest generator of natural potential wealth of the country. Current data indicates that this sector contributed with about 25 to 40% of the State revenues, approximately 12% of GDP in the primary sector and 7, 1% of total GDP (DENARP II, 2011). In 2006, the fishing generated 34% of the State's internal resources, percentile figure which began to decrease later on. According to the World Bank, the fishing licenses between 2009 and 2011 corresponded on average to 15, 5% of the State revenue, having decreased to 4, 9% in 2012 / 2013, in the sequence of the military coup of 2012. The contribution would be much higher if the appropriate government and administration structures were placed in practice.

This sector employs direct and indirectly a very high quantity of labor (about 60.000 people) which is essential for the socioeconomic development of the country.

The results of several studies made in the marine waters of Guinea-Bissau indicated a biomass in the order from 900.000 to 1.100.000 tons, of which 250.000 to 300.000 tons can be captured annually without stock degeneration.

In similarity to almost all the African coastal states, the fishing resources are extracted by handmade and industrial methods, using different techniques to capture fish. The handmade fishing fleet uses motorized and non motorized ships, the industrial fleet uses, for the present, fishing nets and girdles.

#### *1.3.2.1. Commercial handmade fishing*

In 2013, the total estimated number of handmade fishing ships operating in Guinea-Bissau was of 1159. Of these, 730 are Guinean properties, which are also operating, and 429 are properties of foreign migrating fishermen (217 of the Guinea-Conacri and 212 of Senegal).

Relatively to the capture of handmade fishing in the interior and territorial waters; it was estimated in about 21.895 tons in 2011, and 56% of the total were pelagic species, followed by demersal species, with 38%, crustaceans and mollusks with 1% and other species with 4% (CIPA, 2011).

These numbers are, however, underestimated, since the evaluation does not consider the ships operated by non-residents or ships based on Guinea-Conacri and/or Senegal that are operating in the waters of Guinea-Bissau. Although these represent only 10% of the total ships of this subsector, they are however more efficient, more equipped and more productive than the ones of their congener of Guinea-Bissau. Based on different prognostics, it is considered that the potential wealth of handmade fishing *per capita* rounds 132 dollars, 62,9 American dollars for the fishing with non-motorized canoes and 69,1 American dollars for motorized canoes.

Finally, it is important to mention that the statistical covering is limited, since not all the disembarkation places are covered, nor they are included in the evaluation the fishermen who do not use ship.

The principal disembarkation ports in the country are the capital, Bissau, Uraçane, Prabis, Varela and Cacheu. For fishing type, Varela, Caió and Bissau are the most important ports for the demersal species. The disembarkations of oceanic pelagians are concentrated mainly in Buba, while Bissau gathers the disembarkations of small pelagic, and Farim and Ilonde the shrimp ones (González, 2007).

#### *1.3.2.2. Industrial fishing*

The industrial fishing is exercised out of the 12 nautical miles in the whole extension of ZEE of Guinea-Bissau. The participation of the national private sector in this fishing subsector is practically null; this type of fishing is dominated by foreign ship owners whose countries celebrate fishing agreements with Guinea-Bissau. These fishing agreements give place to the payment of financial compensations to the State and the ship owners acquire licenses for the right of fishing in the Exclusive Economic Zone of the country. Between 2008 and 2010, 200 fishing licenses on average were granted to industrial embarkations and 24 authorizations of related operations of fishing for periods that vary among 3 to 12 months, corresponding on average 123 fishing ships and 18 ships of related operations. In 2013, it was estimated that 106

industrial fishing ships had fished in the country through united initiatives or some agreement type.

In reality the number of ships of the industrial fishing operating in ZEE should be much higher because a large portion of ships and canoes circulate and fish illegally, without licenses or they simply violate the restrictions towards the fishing zones and arts authorized by general fishing laws.

The annual medium capture is of 70.000 tons. In 2012 the foreign industrial fleet operating in the waters of ZEE of Guinea-Bissau captured 74.226 tons of fish, with the predominance of pelagic species with 52%, followed by demersal with 29%, mollusks with 6%, crustaceans with 2% and other species with 11% (CIPA, 2013). The estimation of annual production does not include the illegal captures in the waters of Guinea-Bissau. Although the volume of captured fish in an illegal way, undocumented and unregulated (IUU) is unknown, the IUU fishing type is considered very high in the country due to the weak institutional capacity to control the fishing activities effectively in their waters. As a result of lack of execution of the contractual obligations from the licensed fleets, there is not recent data about fishing efforts and the capture levels. This uncertainty is worsened when it is known that there are high numbers of embarkations fishing illegally in the region.

#### *1.3.2.3. Entertaining fishing*

Guinea-Bissau, for diversity and biological importance that it conserves, whether in the national, regional or even international ambit, presents an enormous ecotourism potential, a section now in expansion and with potential to generate a high volume of revenues. This potential depends, fundamentally, on natural and well preserved areas and on group of animals easily observed. More than 50% of the tourists of entertaining fishing commonly designated by sport fishing, that disembark in the country seek the Archipelago of Bijagós for the exercise of their activities. The ichthyofaunistic wealth in the Bijagós water is known thoroughly among entertaining fishermen. The great presence of fishing camps, also known by fishing clubs testifies this fact.

These specialized establishments in the fishing activities have been installed in the Reservation of Biosphere of archipelago of Bolama-Bijagós for 20 years. Now there is in operation in this insular part of the country, a total of Eight (8) of these infrastructures distributed on different islands. It is important to mention that, although they absorb a significant number of youths, the circuit of these tourist initiatives is much closed and it works in an autonomous way in terms of restoration and transport, for that it represents very limited local economic repercussions.

#### *1.3.3. Protected Areas and the development of the (Eco) Tourism*

Guinea-Bissau, for the diversity and biological importance that it conserves, whether in the national domain, whether in regional or internacional domain, it presents an enormous ecotouristic potential, a section now in embryonic phase, but with tendency to expand and with possibilities to generate a high volume of revenues. The tourism and sustainable ecotourism in Guinea-Bissau have the potential of becoming a source of economic growth and of employment. The World Bank estimates the value of the opportunities in protected areas and their integral biodiversity in about 305 American dollars *per capita* (the Total Economic Value is not included

in these estimations, above all the global existence values of the rich ecosystems), therefore, this sector stays in fourth place in the potential creation of wealth to the country.

Now, some small private projects (Varela beach) and demonstration projects for NGOs (Orango and Cantanhez) are emerging in the key places. When taking advantage of the only biodiversity, the net of protected areas and the culture, Guinea-Bissau presents a potential in creating a singular destiny of ecotourism in West Africa. Proceeding this way, it can bring economic benefits to the country, contributing to reduce the poverty, promoting shared prosperity, and increasing the opportunities for the development of small scale businesses.

The natural and cultural assets form crucial parts for the development of future tourism and they should be managed and protected, since this potential depends fundamentally on the well preserved natural areas and on group of animals easily observed.

Along the last years, the tourism has been an important activity in the coastal zone, which has caused proliferation of tourist camps and small hotels, especially in the Archipelago of Bijagós, considered the main tourist resource of Guinea-Bissau. This insular area of the country possesses a variety of marine life, as well as rare mammals (for instance, the hippopotamus which uses the salty, salubrious and fresh waters) and threatened species, such as the marine turtles, dugong, gray parrot, etc. Other advantages of geographical, environmental and cultural characters may, in long or mid term, make the region be an exceptional zone of sub-regional ecotouristic concentration.

The marine and fluvial environments of Guinea-Bissau offer opportunities for the adventure tourism, as canoeing or kayaking. The sport fishing and observation of birds or turtles attract tourists of high revenue and they are willing to pay high prices for the opportunity of seeing certain fish types or birds.

In the continental part, the protected coastal and terrestrial areas of the interior (Natural Park of Mangroves of Cacheu River and of the Cufada Lakes and the National Park of Cantanhez, Dulombi and Boé forests) constitute other potentials tourist poles to value. In each one of these conservation units there are natural landscapes and cultural values of different ecosystems, registered also in the parks of the highly attractive sectors.

The rivers and ecosystems of mangroves that populate the whole coastal zone are important hard winter places for many species of birds that come from Northern Hemisphere to spend the winter there. Ecosystems allow, on one side, the development of entertainment fishing and have narrow contact with the mangroves; on the other side, it is observed a large quantity of birds and some mammals that group on the silt crowns during the low tide to feed themselves there. In the forests of palm trees near by the rivers and wet zones, it is possible to observe the avifauna and several species of mammals (chimpanzee, different species of monkeys, painted gazelles, porcupine, etc.).

Likewise, it is the presence of ecosystems forest, a lot of times considered sacred by the local communities, that enables to observe and to appreciate the exceptional wild flora and fauna of the country.

Still on the coast characteristic of the integral sectors of the tourism, the country has a historical, cultural, and rich properties located in these zones. The several monuments and historical architecture of XIX century also constitute important tourist attractions for the Country.

The tourism can play an important role in valorization of the ecosystem's services and goods in the protected areas, ensuring simultaneously the conservation of biodiversity and the necessary social structures to implement this protection, as well as to create subsistence options and economic benefits for the local communities and for the economy in general.



**Floresta subúmida/PNC;**  
Foto: CBD-Habitat

**Observatório/PNLC**  
Foto: J. BIAI

**Observação de Hippos/PNO**  
Foto: CBD-Habitat

**Picture 11: Ecotourism valorization initiatives in AP's**

#### 1.4. Main ecosystems ecological services in Guinea-Bissau

As it was mentioned previously, the country integrates a diversity of ecological units or biotope and each one of them supplies a range of essential services and goods for the local communities' survival as well as for the economy of the country.

The coastal zone and Guinean marine integrate a variety of ecosystems (marines, of transition and terrestrial) of high productivity and rich in biodiversity resources. Most of the coastal line and the numerous estuaries of Guinea-Bissau serve as the reproduction zones and development zones of stocks of some species of fish which are commercially valueable. Most of those pelagic emigrates along the West African coast, and becomes, consequently, very difficult to specify the potential annual production only for Guinea-Bissau.

This zone, besides its national strategic importance, it also has an international ecological function of great importance, serving as habitat for the reproduction, growth, food and refuge of several species of cultural, emblematic and economic interest, but also of some classified, worldwide, as rare, threatened and/or in extinction way. The following species, in this context, are highlighted: dugond (*Trichechus senegalensis*), hippopotami (*Hippopotamus amphibius*), crocodiles of Nile (*Crocodylus niloticus*), mairne turtles: Leather T. (*coriaceous Dermochelys*), ridley T (*Lepidochelys olivacea*), true T. (*Eretmochelys imbricata*), Green T. (*Chelonia mydas*) and big-headed T. (*Caretta caretta*). Regarding the savannas and coast forests, different species of mammals, particularly primates can be found there. The following animals are: the monkey bijagó (*Cercopithecus petaurista*), "Fatango" (*Poliocolobus badius*), monkey-noble (*Colobus polykomos polykomos*), chimpanzee (*Pan troglodytes versus*), and other mammals, as elephants (*African Loxodonta*), buffalos (*Syncerus sp.*), "boca-branco" (*Hippotragus equinus koba*), "sim-sim" (*Kobus ellipsiprymnus defassa*), etc.

Most of southern beaches of the Archipelago of Bijagós constitute, above all for the turtle-green and T. Ridley, in smaller scale, the privileged place for spawning. In particular, the Marine National Park João Vieira e Poilão represents a center of worldwide importance for this turtle species. The islander of Poilão receives annually about 30.000 nests, representing, this way, the largest colony of the African Continent and 3<sup>rd</sup> of Atlantic Ocean, after Costa Rica and the islands of Ascensão. On the other islands of the Archipelago in general and especially in these parks (Meio, Cavalos, Cabras and João Vieira islands) several thousands of additional nests are counted there. Besides the turtle-green, the Archipelago is frequented by four other species: turtles-of-ridley, which, unlike other species, come to spawn in the dry season; “turtle-true”; “turtle-of-leather”; “turtle-big-headed” (this is, however, rarely seen). All the mentioned species are considered threatened of extinction.

The coastal region still serves of reproduction zone and of migration route, housing, in a certain temporary space, a great number of migratory birds coming from Europe, Asia and from the sub-regions.

The following nesting birds are found: “*mergulhão-serpente*” (*Anhinga rufa*), big-white-heron (*Egretta alba*), white-heron (*Egretta garzetta*), ibis-sacred (*Threskiornis aethiopicus*), colhereiro-African (*Platalea alba*), pelican-gray (*Pelecanus rufescens*), gull-of-gray-head (*Larus cirrocephalus*),



*Esternas*; Foto: H. MONTEIRO

gull-of-sharp-beak (*Larus genei*), Stern-big (*Sterna cáspia*), stern-real (*Sterna maxima*), tagaz (*Sterna nilótica*), parrot-gray (*Psittacus timneh*), etc. A great part of the coastal zone and its habitats are included in the net of Important Bird Areas - IBAs (T. Dodman and J. Sá 2005).

**Picture 12: Settlement of sternal nesting**

The presence of extensive sandbanks and muddy with large quantity of bivalve and gastropods that serve as food for the birds, as well as vast areas of mangroves forests and small islanders for coupling, nesting, relaxing and dormitory are the principal factors that contribute for ornithological importance of the Biosphere Reservation of Bijagós (Limoges & Robillard, 1991).

The roots system of the mangroves forest is very dense and it fastens sediments, limiting this way, the coastal erosion and offering ideal shelter for the organisms of small dimension. This ecosystem of great biological productivity still plays an important role in the food chain and in the repopulating of the marine and coastal resources. In fact, for being located between the dry land and the sea and for being subject to the tides rhythm, this ecocystem presents diferent

occurrence of faunal species with groups of species that are frequent in the low and high tide, and/or in the intertide phase, as well as arboreal species that live on the trees.

Due to its geographical position and the presence of last forest remainders, Guinea-Bissau plays the role of climatic lid and it represents a living barrier (green) to the expansion of the Saharan desertification towards the wet and subwet countries of subregion, located in the south. For possessing this climatic function and for integrating important zones of biological diversity for some essential functions, the country also represents an "ecological lid". In this sense, Guinea-Bissau plays a double climatic-ecological role, for the simultaneous protection against climate change and for the biodiversity protection.

The south of the country and some islands of the Archipelago of Bijagós still lodge some relics of dense subwet "forests". The presence of these forests and of other vegetable formations allows the absorption of a large quantity of solar energy and high evapotranspiration rates, affecting consequently the formation of clouds, rains and temperature, in other words, the local, national and subregional climate. The biomass incorporated in these ecosystems and in the mangroves constitutes without a doubt an important reservoir of carbon.

The mangroves ecosystems, the forests and the arboreous savannas act as regulators of the climate, in the gathering and storage of carbon, in the reduction of the erosion, in the composition of soil fertility, in the pollination, in biological control, in the cycle of water and air, in the guarantee of clean water supply and resilience against the climate changes, etc.



## *Main Threats, Sources of Pressure and Consequences of the Loss of the Biological Diversity*

*Campo preparado para Agricultura itinerante; L. CATARINO*

**Picture 13: Deforested field burned for farming**

## **2. Causes and consequences of the biological diversity depletion**

The biodiversity of Guinea-Bissau is still relatively rich, diversified and unique compared to the neighboring countries in the West Africa. However, in these last years, the pressure has been increasing on the renewable natural assets, impelled not only by natural factors, but mainly by the men's activities, which have been increasing intensively every year due to market demands and the extremely poor people's need for survival.

Some of these pressures already became threats, with visible and future consequences for the subsistence of the majority of Guinean people and of the factors of the country's economic growth.

### **2.1. Direct causes of the biodiversity and the ecosystems services degradation**

Variations of meteorological parameters, such as the decrease of the precipitation, the increase of the temperature and of Medium Level of the Sea (NMM) are seen as the principal natural threats to the rich national biodiversity.

There are however several factors of pressure originated by men's activities, associated to the forest degradation, fragmentation of the habitats and, consequently, the biodiversity loss in the country: the practice of the traditional agriculture with base on cutting and burning of the vegetable biomass; the appearance and the wild expansion of cashew orchards; the growing production and firewood search and vegetable coal for domestic use as source of energy; the galloping exploitation of the wood for export and for the production of furniture; the incessant demand of the “*cibe*” and the natural palm tree for construction of houses; the extensive pasturing, and the emergence of new population agglomerations. In the wet, coastal and marine zones, the incessant urbanization and construction of infrastructures still increase, the flooded agriculture on the mangroves soils, the use of forbidden arts and the fishing of certain species, the appearance of human camps in the handmade fishing, the use of wrenches and the overfishing of species of high commercial value, among other factors.

### 2.1.1. Widespread causes

#### 2.1.1.1. Climate changes

According to studies on vulnerability accomplished in the aspect of implementation of the convention on the climate changes, it was concluded that all the coastal zones are vulnerable to the climate change effects due to particularly the ascent of the medium level of the sea. The climate change effects constitute a source of additional pressure for the need of preserving the natural coastal habitats.

Concerning Guinea-Bissau, these changes are favored: (i) by the coastal geomorphology, namely a ***relief of low altitude***, of which geological nature is constituted essentially of deposits dated of the tertiary period, covered of recent ***sandy sediments of the quaternary***, physically badly consolidated and immature and complex ecologically; (ii) by the configuration of the coast, cut out from north to south with deep interpenetration between the sea and the dry land, facilitating the progression of the tides of which widths are of the most important of the western coast of Africa; (iii) by the marine and estuary dynamics (iii) by the existence of an active marine delta with estuary typology constituted by the estuary of Geba and of the Archipelago of Bijagós.

It is related to a coastline with semi-diurnal tides, of width relatively big, locating among 3 to 7 meters. The united performance of these factors justifies the vulnerability and the fragility of the guinean coast.

The increase of the marine influence, in other words, of the salty water in direction to many rivers, associated to the increase of the areas where the tides occur; it contributes to the saltiness and the growing acidification and an episodic submersion (floods) of the infra coastline along the rivers, inducing the infertility of the cultivation lands, the fall of the productivity, but also the death of the personal micro-organisms that participate in the pedogenesis.

Guinea-Bissau is also highly vulnerable to changes in the pluviometric patterns. The last NAPA (2011) predicts the reduction of the rains in 11,7% up to 2100, this is one of the most severe climatic risks that the country will have to face. The growing irregularity of the rains and the predicted increase of 1,95°C of the temperature can result in an agriculture with less productivity and in the soils degradation due to the evapotranspiration.

In the last decades a late beginning of the rainy season has been verified in the country i) (middle of June) comparatively to the habitual (beginning of May), ii) a distribution of precipitation which is more and more irregular, iii) a reduction of smooth temperature period, passing from three (December to February) to two months only (December to January), iv) hotter and drier environment, v) frequent waves of dusty clouds, vi) more frequent occurrence of high tides with larger amplitude, vii) decrease of the water quality, for intrusion of salty water and devastation of water point for aquatic plants and viii) decrease of the surfaces of wet zones, for resentment and blockage.

The increase of the medium sea level, increased by the reduction of rain and by the increase of the temperature, has provoked, for instance, the degradation of the mangroves soils, the bursting of the rice field dikes, the saltiness and the acidification of the soils. In presence of the higher medium sea level, the wet coastal lands, the swamps, the sandy beaches and with the scarp and delta/estuaries of the rivers are considered as many other coastal ecosystems particularly in risk. Changes in these ecosystems have, by the way, negative effects on the biodiversity, the sources of drinking water and all the economic activities (agriculture, tending a flock, tourism, fishing, energy, infrastructures, etc.) as well as in the population establishment and in the values and cultural systems.

#### *2.1.1.2. Pollution*

In Guinea-Bissau, as in many other countries of the world, the volume of solid residues generated in the urban areas has been increasing with the growth of the population, with the higher consumption levels and with the largest use of packings by the industry. The rates of residues production surpass the capacity installed by the local authorities for their collection, treatment and elimination.

The solid and liquid residues management at the national level constitutes one of the big concerns in terms of environmental health. The country lacks sewers and drainage channels systems, for a responsible solid residues management.

The drainage net of residual waters is confined to “town”, in other words, to the old part of the Bissau city, and to some peripheral neighborhoods that facilitate the drainage of the pluvial waters. These last ones consist of what is called locally “*baletas de melhoramento*”, in other words, it is summarized to the construction of drainage gutters that allow the drainage of the rain waters to open sky. This technique is not sufficiently effective, since when the drainage is interrupted by solid residues, it provokes situations of stagnant water, favorable to the propagation of diseases.

The sewers system is of very restricted territorial inclusion, being limited to the urbanized zones of some cities built at the colonial time, which has already been very degraded, because it is very old and not subject to the maintenance process and regular renewal.

In Bissau city as in the villages of the country they use more the septic sewages and broken wells, but a large majority of the population uses rudimentary traditional latrines and there are some who do not basically have sanitary installation.

The septic sewages, in spite of being appropriate to the existing soil type, with good infiltration and absorption capacity, in case of the lower zones and, above all, in the areas next to the rice

fields, where the level of the groundwater is very high, are usually a focus of diseases, due to their effects on the pollution of the underground waters.

This system of absorbent cesspool with latrine is one of the oldest existing systems. It consists of sewage of great dimensions, paved on the top and it has a hole. There is a fence around it to give some privacy. The latrine has a limited capacity. Therefore, when the sewage is full, this is closed and another one is open in another place; so, the pavement and the fence are moved. This type of sewage presents, besides the inconveniences already mentioned, the danger of not working correctly, since, with consecutive spilling of the whole type of residual waters, the sides and the bottom of the sewage can saturate and quickly become full and overflow.

Many times there is not a drainage net for residual waters, in most of the cases there is in the exterior of the house an absorbent well with a latrine, which means, there is a place not only used for each one's primary needs, but it is also used for taking bath and, at the same time, it serves as drainage for the whole type of waters. These wells are, in many cases, used by residents of two or more houses, mainly when they belong to a “*morança*” (family group), though not all the houses have these wells.

The pollution of water routes by urban sewers is a proven and preoccupying case in Bissau, considering that almost all the urban sewers of the central part of the capital is evacuated directly to the river, as well as more than 70% of the urban garbage during the rainy season is deposited in the sea through the drainages of pluvial waters.

The solid and liquid garbage of domestic origin is also a source of coastal pollution, since the municipal council does not have capacity to deal with the big volume of produced garbage. There are no stations for the treatment of domestic sewers and these end up directly in the lowest zones (on the rice fields and other wet zones), contaminating the waters and creating serious health problems.

In the handmade fishing camps, which is dispersed almost everywhere in the whole coastal zone of the country, the residues of the transformed fish are, in many cases, deposited in the river, creating pollution problems. Similarly, in many places in the continent and on the islands, the backs and the arms of the sea are used as slaughterhouse (cattle slaughtering) causing serious pollution situations.

Due to the inadequacy of the urban infrastructures and due to lack of means and resources, many residues are not collected, treated and eliminated in an appropriate way. For instance, in Bissau, although there is a residues collecting system downtown; this activity is done irregularly, which makes the garbage containers overflow. Guinea-Bissau does not still have sanitary landfill or stations of residual waters treatment. The burning of solid residues is still the only form of eliminating residues, but the toxicant gas originated from such burning contributes to the environment pollution.



Lixo nas zonas húmidas: Foto: J. BIAI



Lixo junto do mangal: Foto: J. BIAI



Principal vasadero de Bissau: Foto: J. BIAI

**Picture 14: Accumulation of solid garbage on the ground on the public streets**

### *2.1.1.3. Exotic and invading species*

It is consensual that the trade and the international transport, the tourism, the migration and the colonization of new lands are the principal vehicles for the passage of exotic and invading species from a country to another one. Guinea-Bissau is not strange to this problem and it registers species that reduce its biodiversity; those which affect the ecological balance and the economic activities and they can harm the public health, through the transmission and dissemination of curses, diseases or parasites.

In spite of the inadequacy and inaccuracy of the available information, it is known about the existence of several exotic, invading species or not, introduced intentionally in the country. In spite of the existence of laws that regulate the introduction and/or the necessary requirements in case of need, these laws continue not being respected and applied.

Among the well known and problematical invading species in our country, stand several acacias (*Acacia spp.*), o “chorão-das-praias” (*Carpobrotus edulis*), which invades the dunes and sandy zones where endemic species arise, the tree-of-sky or Ailanto (*high Ailanthus*) and “arovedo-incenso” (*Pittosporum undulatum*). The “háquias” (*Hakea spp.*) form dense forests quickly; they reduce the availability of water and increase the fire risk. The sour dock (*Oxalis pescaprea*) is known by its capacity of invading agricultural areas and deserts.

The hyacinth-of-water (*Eichornia crassipes*), the azolla (*Azolla spp.*), the fertilizer-new (*Elodea canadensis*) and the pine tree-of-water (*Myriophyllum brasiliensis*) proliferate in the courses of water. The alga-green (*Caulerpa taxifolia*), used in aquariums, was introduced accidentally in estuaries through sewers. Other species which also behave as invading are the cane (*Arundo donax*) and to herb-of-pampas or feathers (*Cortaderia selloana*), much used as ornamental plants.

## 2.1.2. Sectorial causes

### 2.1.2.1. Pressures and threats of the agrarian sector

The fast demographic growth (2,4% - INE, 2010), result from high birth rate, reinforced by a galloping migration, associated to the decrease of the productivity of the "rice field" (reduction and irregularity of the rain and growing saltiness), have more and more implications in the clearing of forests for the itinerant agriculture and, more recently, for the installation of private and family orchards. The deforestation and the use of the fire in the preparation of the fields for the *itinerant* agriculture of subsistence and the appearance of new human fixations, villages, associated to the emergence of new agricultural concessions, commonly known by "pontas", constitute the principal environmental problems and factors of lands degradation in the country. The wild and not ordinate expansion of cashew orchards which has been invading the most fertile lands tendentially is intimately associated to this matter.

As the population grows, it becomes necessary a larger production of food, because rotation index of reutilization of the areas previously cultivated in the plateaus *m'pam-pam* increases, not allowing an appreciable recovery of the soils fertility.

The deforestation of the highest zones for agricultural ends has contributed to the soils adulteration and allowed the erosion and the transport of materials and specks by the waters from the rains to the lowest parts, silting up the bed of the rivers.

Concerning the cultivation system in the ricefields of salty water (soils of the mangroves) a progressive decline in the production and productivity has been registered in this *sub-filière* of rice production. This degradation is resulting of the acidification and salinity of the soils and the insufficient maintenance of traditional hydraulic tasks, as well as of the crescent lack of interest for this culture in benefit of cashew and other cultures of the plateau. The youths' rural exodus influences negatively on the process of maintenance of the dikes, since it causes situations of lack of active labor, taking to its rupture and consequent degradation of the ricefields.

In the last years, the culture of cashew has been coming to substitute the traditional techniques of lands conservation in uncultivated regime, which can have unexpected consequences for Guinean agricultural system in the future. The introduction and the significant expansion of this

revenue monoculture, besides it is substituting the agriculture turned into individual self-consumption and of the family group; they also implicate the simplification and homogenization of the agricultural production. This way, the cycle between the cultivation and the suspension is interrupted by these practices; the lands in regime of natural re-establishment reduce gradually and, in consequence, the deforested areas and areas of ecosystems degradation increase in the whole country. Dry and semidry forests and forests of palm trees are the most affected ones in this context.

The bad cashew nut commercialization campaign of the last two years, caused by the sociopolitical disturbances related to the coup d'état of April 12, 2012, had negative effects very accentuated in the deforestation, since there was an increase in searching for the field for production of dry rice, and consequent increase of deforestation of large extensions of forest areas.

It is to enhance the good campaign that is occurring this year (2015), with the commercial value of cashew nut that rounds 500 F CFA, may also stimulate the opening of new fields, in case no measures have been taken and implemented.

The effects of the extensive *livestock* practiced in the country, mainly in the east and northeast zones, have been visible and preoccupying. The decrease of the natural pastures, in consequence of reduction of rain, has been provoking an over-flock-tending which by the way, has been degrading the soil and modifying the composition of the plants and the structure of the vegetation of the pasture zones. The periods of extended drought, accompanied of the increase of temperature and dry periods, of modification or deterioration of the vegetable cover, besides the alterations provoked in the composition of great part of forest essences, or even the extinction of some species of plants, have been forcing the cattle breeders to appeal to the transhumance. The amount and the incidence of the effective animals' weight which participate in the transhumance are having negative impacts on the pastures and on the soil, causing its erosion. The transhumance effects in the natural vegetation are made to feel especially in the inferior strata, whether for the consumption of herbaceous plants and for small woody plant, whether for the intense trampling and compaction of the soil. This situation is visible mainly in the dry season when the animals travel several kilometers distance.

**Forest burning** is generated in a deliberate way to i) obtain new perennial grass, in order to remove the died biomass, seeking to reduce the risk of accidental fires, favor a better production for the following year, facilitate the men's and cattles' passage and visualize the presence of predators or enemies in a better way; ii) eradicate the vectors of disease and iii) avoid that the herbaceous vegetation that serves as pasture is invaded by woody components.

These fires, sometimes uncontrolled, interfere in the floristic composition and they provoke damages in hundreds of hectares. According to Catarino (2014), "the periodic burning impedes that the forest vegetation recovers after disturbance and it contributes to the maintenance of the vegetation in state of permanent pioneering, selecting, on the other hand, most adapted species to the regime of periodic fire".

The burning effects in the vegetation vary with the period of the year when they occur. When the burning is done soon in the beginning of the dry season (months of December and January), while the soil and the plants are still quite wet, it tends to provoke less disastrous effects in the

vegetation than when it is done at the end of dry season (months of March, April and May). The precocious burning at the beginning of dry season spreads more slowly; it is more easily controlled and it consumes the existing fuel especially on the soil; it does not spread in general to the highest tree-top. On the contrary, the late burning affects the tree-tops in general and also it is of faster propagation and difficult of controlling.

The overpasture and the uncontrolled use of the fire cause the decrease and the disappearance of the biodiversity and of the most valuable species for the cattle, as the *parrenial grass*.

#### *2.1.2.2. Pressures and threats of the forest sub-sector and hunting*

The forest sector, which integrates the extractive industry, is now the aim of strong pressures and threats. The last two years were marked by the abusive and massive exploitation of the forest, resulting in a strong degradation and weakened of: the ecosystems, the sociocultural structures and the country's traditional production systems.

At the present time, Guinea-Bissau's forest formations are under the population's pressure in exponential growth and everytime more urbanized, with growing needs, including the needs of **woody fuel (firewood and coal)**. The rural self-consumption system, formerly dominant, became a more progressively mercantile system with cash flows every time higher and attracts more individual operators for the subsector. As a result, it is obvious, in the last years, the increase of the presence of clandestines who come from the neighboring countries and use the chainsaw to cut firewood; they dedicate their entire time for firewood and coal production.

Due to its efficiency, the wood-of-coal (*African Proposis*) is seen as the most appropriate forest species for the coal extraction. It integrates a good crystallization capacity, contemplated in a slow combustion and of low consumption; therefore, it has suffered great pressures, and as a result, it is now practically in extinction way. In its substitution, the "pau-de-sangue" (*Pterocarpus erinaceus*) are used, the carob (*Dialium guineense*), the wood-of-incense (*Daniella oliveri*), the "bissilão" (*Khaya senegalensis*), the "mancone" (*Erithrophleum guineense*), the mango tree (*Mangifera indica*), the cashew tree (*Anacardium occidentale*) and the mango threes (*Avicennia* and *Rhizophora spp.*) These species present a fast combustion of the coal and they can be reduced into ashes in very less time than the wood-of-coal; therefore, the research for this product still prevails.

The impossibility of assuring the constant availability of wood-of-coal in the forests and the delay that it implicates in terms of punctual supply of the market and the economic profit, leads to outrage situations in the forest cuts. In these circumstances, the woody material is obtained through i) deliberate cuts of trees or mangroves, ii) incision to carve the logs and iii) intentional burning by setting fire around the trunk for obtention of raw material for these extractive processes .

This means the production of coal is no longer made only by dead wood, but also by green wood. Data estimates that more than 15% of the green wood is used for the vegetable coal production.

In the camps the use of adobe ovens is not observed, this means that the open ovens of low revenue is still used, implicating a superior expense of mangroves firewood. Although the exploitation of this firewood was firstly prohibited, it continues to be consumed in high amounts,

especially their logs, since the inclusion of collection norms and use of dry woods doesn't mean that these norms are observed.

In the past, about 80% of the **wood exploitation** was done only to one species, the “bissilão” (*Khaya senegalenses*). The remaining 20% was shared among the “pau-de-conta” (*African Afzelia*), the “pau-de-sangue” (*Pteurocarpus erinaceus*), the “mancone” (*Erytrophleum guineense*), the kapok tree (*Ceiba pentandra*), the “pau-de-incenso” (*Daniella oliveri*) and the “pau-de-bico-amarelo” (*Chrorophora exelsa*). It is pointed out that this kind of exploitation neither turns into the composition of the settlement nor the availability of the volume of trees felled of different known species. It rather works, on the contrary, as a negative selective instrument of wood supply of great commercial value in the forest of the country.

The country counts now with 13 sawmills, with an installed capacity of transformation estimated in about 40.000 to 45.000 m<sup>3</sup>.

In addition to this form of declared exploitation, there are still secret lumbermen, by using chainsaw; they have provoked excessive damages to the forest ecosystem and to the economy of the country. The “pau-de-sangue”, already threatened of extinction in certain forest concessions, is the main objective sought by these piracy actions. The secret cut is motivated above all by the fact of the official lumbermen's products are mainly exported in trunks, so the internal needs of small carpentries for manufacture of furniture are satisfied by the wood exploited secretly (Belemvire, 2010).

The wood exploitation led to a frightening degradation of the forest potential, threatening the own ecosystem with unbalances, it has reached extreme situations, as it happens in the east frontier zones, namely Pirada, Canquelifá, Pitche and surroundings, contributing to the accentuation of the climate change effects, turned into high temperatures, reduction of rain, drought, levels of underground waters much deeper and inaccessible. (In November of 2001, the underground water in traditional wells was captured 35 m of depth, while in Pitche it was 50 m - data supplied by the Development Commission of Pirada, PNGA 2004).

It is considered that approximately 70.000 m<sup>3</sup> of wood have been exported in 2014. Values presented by the Chinese imports of “pau-de-sangue” of Guinea-Bissau, between 2010 to 2014, it indicates 98.000 m<sup>3</sup>, 63.000 m<sup>3</sup> just in 2014.

Two big consequences are visible: the deforestation of considerable areas, including periphery zones of countless protected areas, and an excessive pressure of cut, addressed to only one species, the “pau-de-sangue” (*Pterocarpus erinaceus*).

The search for **construction material** originated from the *cibe* (palm tree) has been intensifying in the last years with the expansion of the villages and cities. The logs of this forest essence are used thoroughly in the construction of houses, both in the rural and in the urban areas. The building construction won an enormous dimension, exercising a remarkable pressure mainly on the forest resources, with disastrous consequences already visible in many ecosystems of the country.

The decrease and/or the disappearance of populations of old and adult *cibes* (palm tree), in a lot of zones, testifies the pressure that is exercised on this species. The cut and the sale of immature *cibes* is also a high indicator of the condition of this place. The existing regenerations are in

majority natural, which implicates they do not have consequent initiatives to the repopulation or replantation of *cibes*, and even these natural buds, for lack of consequent follow up, are frequently decimated by fire.

Some gathering and nonsustainable extraction practices of *nonwoody forest products* (PFNL) have been having a negative impact in some ecosystems and their respective services and some species. The exploitation of central nervures of the natural palm tree leaves *Elaeas guineensis* is an example that deserves to be mentioned. This material was used traditionally among the different Guinean ethnic groups for the manufacture of brooms. Its search in the last years for these and other ends is gaining frightening proportions, above all in the north region of the country. If in the past this subproduct was only used for the subsistence and warranty of minimum revenue by its exploiters, now the central nervures serve for the export purpose essentially to the neighbor Republic of Senegal. This way, its search and commercialization became a lucrative and attractive activity for a lot of families, mainly among the feminine groups of Cacheu region, constituting a big threat to this essence of multiple uses and economic, social and ecological implications. To guarantee a reasonable negotiable quantity, the palm trees' leaves are almost taken off in total, which prevents them from capturing enough solar energy to accomplish the photosynthesis functions.



Picture 15: Illegal hunting and captures of threatened species

In the palm wine extraction process, rudimentary and not durable techniques have also been used, causing even the death of palm trees. With the intention of gaining more sap, some exploiters have been using, on one side, the technique of spitting materials and sharp utensils in

the log of these trees, for other, perforating the flowers directly, instead of waiting for the ripe regimes, and this way they provoke premature death of the trees. In the South zone of the country, the exploitation of the *cibe* wine requires the cut of the tree itself; this is a disastrous action.

Although specific data about activities related to hunting and captures of wild animals is not available; the existence of a considerable market is verified and with a lot of search, supported essentially by hunting and clandestine captures.

### *2.1.2.3. Fishing sector*

Pressures, threats and ecological and social impacts of the fishing sector differ according to the subsector. Margins and arms of rivers and the seas are by excellence the zone of privileged fishing in the ranks of the ***traditional handmade fishing***, also known by coastal or fluvial fishing. The use of monosting nets of small standard, the women's net, screen, and the technique of closing the mouth and the arms of the rivers, "*tadja rio*", constitute the main pressures exercised on the fishing resources. These fishing arts seek capturing the fish of all sizes, even the small one, as well as other species of aquatic fauna, namely dugong. These mammals cross the devices during the high tides in search of drinking fountain or feeding zone. In trying to return to the deepest zones, during the low tide, they are arrested in those traps. In the traditional fishing of the shrimp, done in the coast and in the mangroves zone, seeks capturing the immature shrimp and small fish.

In the subsector of the ***commercial handmade fishing***, the pressure on the resources is associated above all to the fishing camps. The fixation of camps in critical zones for some species and areas which are reserved for multireligious ceremonies, above all of the *bijagós*, is figured as one of the principal environmental problems and focuses of conflict in the coastal zone. More than simple presence, the activities done by these occupants are identified as factors with larger environmental impact, constituting the largest threats to the natural patrimonial values.

These frequented camps, especially by the subregion fishermen (Senegalese, Conakri Guinean, Sierraleonians, Ghanaian, and others) began to be periodic; finally these camps are now inhabited for the whole year. Some of these occupational devices get to house hundreds of people, dependent entirely on the row of the handmade fishing activities (capture, drying or smoking and commercialization). Among the activities done by these groups of fishermen which have negative impacts on the environment, the following is highlighted i) cut of the mangroves (and sometimes of other vegetation types) to obtain woody fuel in order to transform the fish, ii) cut of big-load-trees for the construction of keels of canoes and other parts of embarkations, iii) special fishing, above all cartilaginous species, and in reproduction zones, with impact on the fish reservations and on the food chain, iv) accidental captures and/or fishing of protected and rare species (among the species captured with some frequency - usually drowned in the nets - the following is highlighted: the marine-turtles, the manatee, the dolphins and the crocodiles), v) capture of African fish-hawk for the meat consumption and vi) gathering of turtles' eggs and of adult females in spawning in the beaches.

Pressures and threats done by the subsector of the *industrial fishing* are of generic order and they are present in almost all the neighboring countries. They stand out, among others, i) operations and presence of wrenches in the reserved zones by the handmade fishing, giving place to the degradation of the sea bottoms, of the coastal ecosystems and of the resources that integrate them, ii) overfishing of species of high commercial value and the accessory capture of threatened species, iii) pollution, iv) incursions of pirates' fishing boats.

Concerning the *entertainment or sport fishing*, a constant penetration attempt is marked in the procreation zones of fishing resources and with motors of great power, which implicates a constant sound pollution and the disturbance of the zone. The desire of getting profits has been inciting the operators of sport fishing to sell their fishery products. This situation, besides establishing a disloyal competition relatively to the handmade fishermen, it also constitutes a pressure factor on the fishing resources.

#### *2.1.2.4. Touristic sector*

The Archipelago of Bijagós is recognized broadly as the zone of larger tourist potentialities of the Guinean coastal zone. The largest pressure on this sector, neuralgic for the development of the country, is also felt in this zone. It has been expressed in the need of lands acquisitions, especially of the islanders', for the development of tourist activities. The installation of tourist infrastructures in these places has not been taking into consideration the fragility and the vulnerability of these small islands, their economic, ecological and social importance.

For being of small dimension and of sedimentary origin, the islanders are exposed to the climatic changes phenomena; these facts have already been observed with the progress of the erosion on certain islands.

In the Bijagó mythology, many of those small islands are considered sacred, serving as the places of accomplishment of several mystic-religious acts. It is to enhance that all the sacred islands are of extreme ecological importance or vice-versa. The great majority of the islands or places with this designation have great diversity of animals or they are by excellence occurrence zones of certain animal or vegetable species.

It is to enhance the fact of great majority of these islanders is pointed out to be used periodically for agricultural ends (itinerant agriculture) and of forest extraction (fruit and palm wine, firewood for the production of fuel, construction material, etc.), serving strategically as places of rearguard of the food safety.

However, if the development of the tourism is not well managed, on the natural base, on which the tourism depends, it will probably deteriorate. The coastal forests can be destroyed to open the way for hotels, and the habitat of the species in danger may be lost. With the increase of the tourism, the hunting and the fishing will have to be regulated in order to control the number of tourists and their impact. The wrong management of the tourism has been associated to a variety of noxious effects of social and cultural nature, such as the increase of crime, diffusion of diseases, the increase in the inequality of wealth distribution, the prostitution, and women and children's mistreatments.

## 2.2. Underlying causes (indirect) of the biodiversity degradation

### 2.2.1. Causes related to the sociocultural environment

The high demographic growth, rural exodus and growing concentration around the cities, villages and peri-urban zones have been contributing significantly to the increase of vegetable biomass consumption (wood/coals). In 1990 the urban population represented 20,8% having increased for 30% only in twenty years. The data of PNUD (2009) estimates a rate of natural population growth in the order of 2,4%.

The decrease of the rains and the impoverishment of the plateau soils, caused by climate change effects, have been provoking internal *migrations* from the interior of the country to the coastal zone. Likewise, external migrations (temporary or permanent) from the neighboring countries, refugees due to climate changes or economical problems or youths seeking better life and work conditions, confirms the actual situation in Guinean coastal zone. These migratory phenomena (internal and external) are in the origin of the fast and continuous increase of the population density and, as immediate consequence, seeking for more spaces for house, farming and application of other economical activities.

Another remarkable destructive phenomeon is the installation of *new villages* in the corridors of great mammals' migration.

Equally, the high *poverty index*, which opposes the price of butane gas, forces most of the family groups to use the woody fuel for the preparation of their meals, heating and transformation of their products. It is enhanced that the poverty index, in other words, the number of people living with less than 2 \$American dollars a day, was located in 1991 in 49%, passing for 64,7 in 2002 and reaching 69,3% in 2010 (PNUD 2006, 2009; DENARP, 2011; ILAP 2, 2011).

Relatively to the *gender equality*, the issued is not, most of the times, taken into consideration in the natural resources management, in the fight against the poverty and in the food safety warranty. This negligence has negative repercussions in the biodiversity conservation and in the sustainable use of the natural resources.

In Guinea-Bissau, the women play a crucial role in the agriculture and in the handmade fishing sector. The branch of the agriculture/sylvicultureand/fishing is of great relevance in the labor market, and there the feminine share is superior to the masculine. It is estimated that the women supply more than 55% of the agricultural labor, having a crucial role, above all in the grain and horticultural areas, in the gathering of cachew nuts, raising hutch birds, swine, small ruminant and in the production of milk, agrofood conservation and transformation and its respective commercialization.

Equally, the women are, essentially, in charge of the conservation and transformation processes of several natural and agrofood products (nonwoody forest products, fishery, peeling of cashew nuts and of caschew wine extraction, threshing of rice, extraction of palm oil, salt, etc.). For instance, it was estimated that a woman fom (balanta ethnic group) spends equivalent time from 70-90 days working a year to peel rice. Finally, the women are in charge of sustenance fishing (collection of mollusks, coastal fishing in the mangroves zones and, in the estuaries of the rivers and in their tributaries and lakes, on the rice fields and the inter-sail for the family consumption).

This fishing is specifically practised by women on foot, in neighborhood groups or the women with the same age.

The development of the agrarian sector has been object of insufficient attention, above all in concerning the women from (Pepele ethnic group) and the too weak place they are reserved in the programs.

In the the handmade fishing subsector, it is almost exclusively the feminine stratum that acts in the packing, transformation, distribution and commercialization of the fish, having, this way, an important role. The women who resell fish are commonly called “*bideiras*” and the big fishery which is disembarked in the principal ports is bought directly by them. Many times they are the owners of the embarkations (canoes), employing the fishermen and supplying them with the production instruments (canoes, nets, motors, ice, consumption items, etc.) that are necessary for fishing.

The women have given an important contribution for the economical growth, through: (i) development of the agricultural production (including rice, cachew nut collection and horticulture), livestock and fishing; (ii) development of the informal sector (both in the urban and rural ways, especially in the trade) and (iii) in the homekeeping. According to ILAPII/2010, 77,1% of the active women are busy in the primary sector and about 23,0% in the tertiary sector (services), of which 12% is linked to the trade subsector. Although their activities contribute to the improvement of the family living standard and to increase the GDP, their productivity levels continue weak for several reasons, especially because they face difficulties in accessing the production factors (DENARP II, 2011).

Thanks to the changes that the rural world experiments, the women's contribution for socioeconomic development of the country in general is getting more and more weight. These changes are catalyzed above all by growing phenomenon such as the rural exodus, the husbands' emigration, the children and the youth's education and the growing search for employment, caused by more intensive development of production systems in the agriculture.

In spite of the importance of their contribution, the rural women stay until now at the margin of the group of actions destined to the community's development. The analysis on poverty by gender shows significant disparities against women, in spite of the constants declarations of the principles of equality between men and women before the law. Besides their disadvantage in the education and in the literacy, the women also suffer disadvantage in terms of time of work, due to the combination of family responsibilities and professional activities. Their work is still hindered by the lack of tools, low means to process food and great distance of water points and firewood supply.

The use of spaces, of trees and forests, of animals and of their subproducts and of other biodiversity resources by the human communities results of *traditional and secular knowledge* passed on from generation to generation and acquired in a long interactive and coexistence process between the guinean man and his surrounding environment.

In the past, the communities' knowledge and traditional learning on the natural resources management was not taken sufficiently into consideration. The lack of the local communities'

involvement, of valorization of their knowledge, practice, technologies and lifestyles have been contributing negatively to long term preservation of the ecosystems and biodiversity.

### *2.2.2. Weakness of the policies and judicial actions*

To guarantee the protection, conservation and sustainable use of its ecosystems and its rich biodiversity, Guinea-Bissau joined, signed and ratified several regional and international conventions of the environment protection and of fight against climate changes.

Although the country has several documents on policies and strategies, as well as guideline texts in the domains of the environment and natural resources, some of the international conventions were not still translated into legislative texts and regulating characters that can transform their principles into applicable right at the national level. It is rather a personal interest through participation in trips, without any beneficial results to the country.

Lack of work programs and national follow up activities is obvious. The trips in the aspect of international conventions involve technical meetings, where the country's positions should be defined, and where the deep reflection for the focal points is revealed.

The need to coordinate efforts and to create synergies among the activities of different sectors, seeking the application of the several conventions, should allow assuring a better integration of the world's environmental management objectives in the national strategies of sustainable development. In the past, the incorporation of concerns related with the environment in the sectors and defined development objectives, with view to reach sustainable results in terms of biodiversity and development, was not evident in the country.

The nonregulation of the main national and sectorial environmental legislation (Basic Law of the Environment, Law of Environmental Evaluation, Law of the Earth, etc.) causes a huge impact on the natural resources management, in general and especially on the biodiversity. The weak capacity of the country in managing its natural resources is being exploited, particularly in what concerns to the forests and the fishing.

The indiscriminate cut of forests for extraction of the valuable remaining species has resulted in the loss of important natural wealth and in significant damages on the forest ecosystem, with adverse effects in the local sustenance means, conservation of species and services associated to the ecosystems.

In the fishing sector, the weak institutional capacity to proceed and to apply the fishing agreements is affecting the country's capacity to manage its fishing reservations: the illegal fishing is common, and some species is now under threat and the access to aquatic resources for small scale fishing continues broadly free and open to any guinean with the necessary equipment to begin in the sector.

For the country to protect and reconstruct its fishing reservations and to capture the wealth generated through the exploitation of this resource, an effective and sustainable system of controlling the access and the management for small scale fishing will have to be introduced. The weak regulation leads to the excessive fishing, which destroys the subsistence of the local fishermen progressively, destroying common resources.

The entrance in the industrial fishing is regulated and the fishing ships function in the waters of Guinea-Bissau through compensatory fishing agreements, bilateral agreements, or through united enterprises where the national part is responsible for the obtaining of the license/authorization. However, although the industrial fishing is regulated and licentiate, the small fleets – both local and regional fishermen - are working under nonmonitoring regimes. The practice of free access leads to overexploitation of the fish reservations and to the decrease in the capture rate, in simultaneous with the erosion of the economical and social effects in the fishing communities and in the nation, in general.

In the forest domain, it is important to emphasize the non-existence of an updated inventory on the concessions; neither there is an organization responsible for cutting according to very established portions. Before the attribution of concessions an inspection is foreseen from the zone to be attributed, seeking to evaluate the existence or not of the intended volume. But, due to some difficulties (lack of means of transportation, material means and human resources), this work is, in fact, less applied.

The successive situations of widespread institutional instability have also been having a negative impact in the ecosystems and the biodiversity management. The forest sector, as all the other ones, has suffered structural changes and frequent reorganizations, due to consecutive governments that assumed the destiny of the country and the ministries responsible for the respective sector. Whenever there is a change at the superior level, the substitution of different services personnel is verified at the central and as well as at regional level. This situation doesn't favor the continuity; instead, it causes constant restarts and permanent reconstruction, forgetting the work done in the past.

Yet, what concerns the General Direction of Forest and Fauna, it is obvious that practically only the responsible divisions for the emission/sale of exploitation licenses are functional. The reforest services, of the community forests and of management basically stopped due to the lack of resources to make the seedling-nursery work and to organize field visits in order to structure the communities. This means that, in spite of the great wood volume that is authorized for exploitation every year, nothing was made to preserve/restore the forest resources. The essential of the current concerns of DGFF is summarized to the emission of licenses, organization of taxation, repression and management of the forest funds.

Finally, it is relevant to mention the aggravating inadequacy, under-employment and subuse of the personnel of several public institutions of the country with the mandate of the natural resources management.

### *2.2.3. Weaknesses of the administrative and institutional responses*

Studies and observations indicate that the fishing reservations are reducing due to the insufficient capacity of Guinea-Bissau to govern and to manage the use of resources in a sustainable way and to prevent its overexploitation, specifically preventing and impeding the illegal fishing. It adds the fact that the resources are broadly exploited in an *offshore* economy, by industrial or foreign ships that rarely disembark their capture in the region or participate in the local economy, leading the country to pick just a fraction of the value.

Therefore there are real challenges that are affecting the capacity of the country to capture the wealth that could have been generated in the correct extraction of the national fishing resources.

The DGFF lacks strategy of the personnel's promotion. In certain services, for instance, it is found medium academic personnel who are responsible for services where there are superior academic personnel. At the regional level, the absence of superior academic personnel caused the medium academic ones become Regional Inspectors, and now they sometimes work together with superior academic personnel; this issue contributes to establish a climate of frequent frustrations.

It is also verified weak rectification among the structures: the origin of certain dysfunctional numbers links frequently with the weak adjustment among the actors. For instance, dispersion of the competence, responsibilities and of the main interest between different services and ministries caused some competition that ends up in conflicts sometimes, causing incoherence and dysfunctional treatment of administrative positions.

The DGFF knows the factories' transformation capacity, however, the volumes of cut that are authorized go beyond sawmills' capacity, almost motivating the export of wood logs.

It is important to mention the fact that important quantity of wood logs which cut are left at the place for subsequent transport to sawmilla. Many times those logs end up being destroyed by uncontrolled fire, causing enormous damages and loss; dispersion of fire facilitated by the residues that represent about  $\frac{2}{3}$  of the total volume of the abated trees and left in the place without any use.

The firewood and vegetable coal exploitation in Guinea-Bissau continues to be done completely in a traditional way and without any effective control from the forest services. The access to the woody resources by the professionals/workers of the sector is made basically in a free and disorganized way, without payment of any forest rate. The only official payment made so far to the forest services was the circulation rate: 100 FCFA for small sacks of coal of 24 kg, 200 FCFA for the sacks of 48 kg and 1500 FCFA for ton<sup>1</sup> of firewood. Very recently, the General Direction of Forests and Fauna introduced rates that fall upon the production of coal, keeping the rates on the firewood intact.

### **2.3. Consequences of the biodiversity degradation**

The process of environmental deterioration causes multiple consequences that affect the natural environment, with impact in the accentuation of the erosion phenomenon and in the fertility, saltiness and acidification of the soils, also with consequences for the local societies.

#### *2.3.1. Impact on the ecological environment*

The illegal extraction destroys the natural capital and it has a durable negative effect in the poor people's sustenance. The incentives to the poorest people to support the illegal extraction of wood provided some short term revenue - in despair times - but these incentives harmed long period subsistence, when destroying the natural habitats, with concomitant effects in the function of the ecosystem and resilience to the climate change. This does not just affect the nutrition, health and firewood readiness and construction material, but it also affects the future revenue

flows that could come through the forests. Although the wood is a renewable resource, one of the most sought species, *Pterocarpus erinaceus*, takes about 50 years, the equivalent to two generations, to become ripen.

In the last years, several factors, that came above all from the effects of the global growing and of the regionalization of the economy, has contributed to break the established secular balance between the coastal communities and the surrounding ecosystems. Though, the wild exploitation of the natural resources, as it is seen now in the coastline of the country, has not been contributing in an expressive way to the improvement of the social and economical conditions of the local populations.

In this chapter, it is relevant to approach the economical and ecological consequences that come as a result of nonsustainable use of the natural resources, associated above all to the agriculture, to the exploitation of woody forest resources and fishing, while main economical activities of the Guinean coastal zone. As for now, the pluvial agriculture of the plateau, in association with the exploitation of woody fuel, contributes strongly to the savannization and sahelization of the country, as it happens with mangroves agriculture or rice field of salty water which tend to compete, together with activities associated to the fishing sector, for the increase of tanes surface in the ecosystem of Guinean transition.

#### 2.3.1.1. Increase of savannas surface (savannization)

According to data of the last forest census, accomplished in 1985 by ATLANTA CONSULT, the forests occupied a surface of 2,1 million hectares, corresponding to the approximately 56% of the national territory. Comparing these results with the inventory accomplished in 1978 by SCET INTERNATIONAL, that indicates for a surface forest in the total of 2,3 million of ha, a reduction of the forest surface is verified in about 13% only in seven years. Elapsed fifteen years of the last forest inventory, and considering the deforestation rhythm which is seen, and it is considered a drastic reduction of the forest surface of the country.

**Table 8:** Occupation of soils in hectares.

Protected areas	Surface in hectares	
	1978 (SCET INTERNATIONAL)	1993 (CUQ <i>et al.</i> )
Palm trees	111.800	109.389,5
Forest gallery	74.800	67.624,8
Subwet forest	129.000	126.278,4
Dry and semidry forests	859.000	647.985,4
Degraded and/or secondary forests	614.300	472.093,8
Coastal shrubby savannas	51.400	56.231,7

**Source:** SCET INTERNATIONAL (1978), CUQ, F. *et al.* (1993); data compiled starting from PNGA.

The forests are retreating and the savannas are moving forward. Being a biotope that houses several animal organisms (from the big to the small fauna, going by microorganisms that participate in the food chain net and in biogeochemical processes that occur in the forest

ecosystems), the degradation of the vegetation in the sense of the growing sahelization of our climate is reflected directly in the mixed ecological processes that it contains.

In the forest sector, the growing savannization of the vegetable cover is the visible impact, particularly in the more lasting drought periods, namely in some in the north, the east and the northeast regions. The increase of the temperature, the drought, the modification or deterioration of the vegetable cover led to alterations in the composition of great part of the forest essences, or even to the extinction of some species of plants and migrations of animals. In what refers to the cattle-raising sector, the decrease of the rainy months and consequent increase of the dry season, associated to the increase of the temperature, affects negatively the availability of pastures and natural water points, the animal productivity and the exercise of the activity in general.

### 2.3.1.2. Substitution of mangroves surface for tanes “tannification”

Of the 50.000 ha of rice field cultivation surface complained by the farmers, it is estimated that about 20.000 ha have been successively abandoned or never used entirely, due to broken dikes or inappropriate land preparation. The abandonment of these rice fields without their respective planting for mangroves has been provoking acidification and salinization of the soils and tanes emergence. Although the rehabilitation of these areas can be made manually, it seems to be little probable that there is available agricultural labor in enough quantity to satisfy the needs, due to the costs of opportunity of such labor, especially in the cachew production.

**Table 9:** Occupation of soils in hectares

Protected areas	Surface in hectares	
	1978 (SCET International)	1993 (CUQ <i>et al.</i> )
Mangroves	287.000	250.761
Forest gallery	37.600	94.201

**Source:** SCET INTERNATIONAL (1978), CUQ, F. *et al.* (1993), data compiled starting from PNGA.

The statistics of “The Word’s mangroves” indicate a reduction in about 66.000 ha of the mangroves



*Antigo arrozal tanificado;* Foto: J. BIAI

forest in Guinea-Bissau, for 25 years (1980-2005). The mangroves situation could have been extrapolated to the other types of forest formation, since aggravating of this kind is subject to even stronger pressures.

In aspect of the process of elaborating a follow up plan on mangroves, an analysis of the evolutionary dynamics of this ecosystem was held in three protected areas, between 1978 and 2007.

**Picture 17: Abandoned rice field and appearance of tanes**

It was verified in this temporary space that there was retreat of the mangroves surface in all the analyzed areas, namely 3,9% for PNTC, 12,5% for PNC and 13% for PNO. Considering that there is a great diversity of databases and of cartography methods used for the inventory of the

mangroves, there should be prudence in the analysis and interpretation of the data concerning the variations of the surface.

Beyond the tannification (acidification) process, the destruction and degradation of the mangroves soils mangroves, due to the disruption of dikes also has immediate and future consequences, favoring erosive phenomena in the tides' influence zones.

### *2.3.2. Impacts on the social well-being*

The fact which is verified every year is a decrease of the rainfall and its concentration in only five months of the year, (June to October), contrarily to what was seen in previous years (rains from May to November). These circumstances are translated into the water shortage, of which consequences are felt in the rice production (of small valleys and dryland) and in the production of other cereals. Nowadays, the rains are always accompanied of strong winds, mainly in the months of August and September; therefore the loss on the production caused by falling of cereal culture at this time is high. In the low lands (*bas-fond*) the damages caused by floods can be significant, as well as in the rice fields implanted in hydromorphic soils colonized by the mangroves. In this ecosystem, with the ascent of the medium level of the sea in the last times, the invasion of living tides has been verified in the rice fields, destroying waist dikes, and affecting the lands' working power for the rice cultivation negatively.



## *Biodiversity Management: constitutional, juridical and institutional aspect*

*Sede do Instituto da Biodiversidade e das Áreas Protegidas*, Foto: U.C. QUETA

**Picture 18: Current image of the head office of IBAPI**

### **3. Legal and institutional aspect**

In the last decades, a growing concern was verified mainly with current global environmental problems caused mainly by the environmental degradation due to unsustainable practices on the use of natural resources which lead to the accelerated loss of the biological diversity.

The unsustainable practice which was already mentioned has been seen in many countries; it is the result of existing incoherence in the documents of the public and private policies, associated to the weak institutional and juridical capacity.

Because of the rhythm and dynamics of the current development, as well as the complexity and transversality of the sector, several initiatives are being undertaken, including the elaboration and negotiation of several documents on the policies related to environment, both at the international and the at the regional level. The examples are: the Convention about Biological Diversity (1992), the Convention on Climate Changes (1992), the convention of Bamaco, among others. Regarding the national documents, the following is mentioned: Plan of Environmental Management (2004), National Strategy and Action Plan for Biodiversity conservation, 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> National Communications and National Action Plan of Climate Change Adaptation, etc..

From the rest, in the last ten years there was a new dynamics in the institutional and juridical aspect, for instance, the establishment of an independent State's Main Office of Environment, with seat in the Ministers' Council, the establishment of IBAP and of the CAIA (designated actualmente by Authority of Competent Environmental Evaluation - AAAC), besides some innovations in the sectorial policies.

### 3.1. Political aspect

Guinea-Bissau has adopted some rules of public policies, of national and regional character, regarding the conservation of the biological diversity. In spite of that, the deforestation rates and habitats fragmentation, the extinction of species, the illegal use of biological resources, the loss or weak valorization of associated traditional knowledge are alarming.

The maximization of the social well-being requires the elaboration of strategies, plans and programs that seek the promotion of good practices and mitigation of disastrous effects (conflicts), for the gaining of benefits for all the involved ones.

The formulation of policies, especially the public ones, does not just consider national conditions, but it has in consideration its international inclusion and implication at the local level, as it is described ahead.

#### 3.1.1. At the international level

The environmental issues have been traditionally treated in an isolated way, however, the environmental problems are many times interrelated and their effects transpose geopolitical borders. In response to these challenges, it fits the United Nations to lead the debate on global environmental issues.

The Conference of the United Nations about the environment, accomplished in 1972, in Stockholm, was seen as the core of the political and world strategies in the environment domain. In spite of that, the issues on the environmental concerns became more relevant with the conference of Brazil (Rio de Janeiro), in 1992. In this conference, it was defined, through *Agenda 21*, the objectives and activities to be developed in order to improve the conservation of the biological diversity and the sustainable use of the biological resources.

Beyond defining world's environment policies, of the *Agenda 21* still emerged the three great conventions: the one about the Biodiversity, the one about the Climate Changes and the one about the Fight Against the Drought and Desertification. It was still elaborated the strategy of the durable development, where the promotion of good practices is extolled in the the natural resources management, mechanism of the clean development and the green economy, instrument of the environmental policies improvement.

#### 3.1.2. At the regional and community level

##### 3.1.2.1. UEMOA's common policies for the improvement of environment

Economic Community Of West African States (CEDEAO) and the West African Economic and Monetary Union (UEMOA) adopted the regional/community environmental policies at the global and the regional level.

The vision of CEDEAO Global policies up to 2025 extols “*a pacific West Africa, worthy and prosperous, of which natural resources and productive diversity are conserved and managed durably for the development and the special balance in the subregion*”. It is clear the pretention of inverting the degradation tendencies and exhaustion of the natural resources, of the means and life quality, in order to guarantee a healthy and productive environment, improving population’s life conditions in the subregional space.

The Additional Protocol no. II of the Agreement defines the orientations of a Common Policies for the Improvement of the environment (PCMA):

- » The protection of the natural resources and of the biodiversity
- » Fight against desertification
- » The improvement of the environment in the rural and urban area
- » The exploitation of the renewable energies, particularly of the solar energy
- » Fight against the coastal erosion.

These policies integrate the preservation of the ecosystems, of the biodiversity and of the climate; the forest resources and the wild fauna management; pollutant and risks management and the water resources management.

#### *3.1.2.2. Organization for Valorization of Rio Gambia*

Guinea-Bissau adhered, together with Senegal, Gambia and the Guinea-Conacri, to the organization for the Valorization and Use of The Gambia River (OMVG). The main objective of the organization is the valorization of the natural resources of the hydrographics basins of the Gambia, Geba/Kayanga and Corubal / Koliba Rivers, in an aspect of integration activities undertaken in the subregion and in order to improve the life of the populations in the affiliate countries.

Concerning the Economical Community of West African States (CEDEAO), made by 15 countries, it is a priority to reach the objectives of Millennium for the Development up to 2015, especially in what concerns the improvement of the access to the modern energy services while the measure to combat the poverty, expressed in the White Book of CEDEAO/UEMOA about energy. The objective is to allow that more than half of the population, more than 36 million families, and 49 million places, have access to these services by the year 2015.

The access to the energy is a constant priority in the national and regional plans and, in this ambit, the partners of the development assumed commitments to help reach this aim.

#### *Coastal Marine Regional Partnership*

This initiative is encouraged by six subregion countries of West Africa (Cape Verde, The Gambia, Guinea-Conacri, Guinea-Bissau, Mauritania and Senegal) in the ambit of the program PRCM (Regional Programs of Marine Conservation), supported by four of the organizations that intervene in the environmental domain, in West Africa: UICN, WWF, FIBA and International *Wetlands*. A strategic document was elaborated; such document outlines orientations destined to

guide the intervening of the coastal zone, in what concerns the marine protected areas of the subregional countries, for the next 20 years.

Guinea-Bissau, through its government, signed a declaration of general policies that commit the countries to participate altogether in the management of the protected areas, biodiversity and of the resources shared at the subregional level.

### *3.1.2.3. New Partnership for the Development of Africa*

Guinea-Bissau is part of this continental initiative, a new partnership for the development in which ambit grew a plan of environmental action that intends:

- » To contribute for the NEPAD implementation through the execution of its environmental initiative;
- » To promote the durable use of the resources, to reinforce the public and political support to the regional and subregional environmental initiatives.

On the other hand, the additional memorandum no. 01/2008/CCEG/UEMOA, about the adoption of the common policies for improving the environment in the UEMOA space, seeks to guarantee and to assure the durable management of the natural resources, the preservation of the ecosystems, of the biodiversity and of the climate and control of pollution and its harmfulness.

### *3.1.3. At the national level*

Guinea-Bissau, though it is part of the United Nations countries, it could not be hostage of international policies that would not totally adapt to its reality. It is imperative that synergies are built and the technical, juridical and administrative procedures and norms are harmonized both at the national as well as at the international level.

It was in this context that Guinea-Bissau, through of the Government's departments responsible for the environment issues led the elaboration process and adoption of policies and national laws and recommended the signature and ratification of several conventions, protocols and international agreements. The following guiding documents are emphasized:

#### *3.1.3.1. National Plan of Environmental Management*

PNGA was institutionalized and legitimated as principal document of the national global policies of the environment through the ordinance no. 03/2004 of February 21. This document seeks, as general objective, the optimization of the existing resources in order to guarantee the economical growth and the improvement of the life quality of the present generation.

The idea is to assure the conservation of the natural resources for the future generation, contributing so that the the country's socioeconomic development is durable and sustainable. Beyond this, it supports the search of solutions that seek to guarantee the food safety, the eradication of the poverty, control of pollution and harmfulness and sanitation of the environment, the conservation of the natural resources and control of the desertification progress (sahelization), as well as the minimization of the anthropic impacts that influence on the climate change.

The main guidelines, vectors, orders, strategic lines, vision and objectives that sustain and regulate the national policies on the protection and the sustainable and durable development are established and defined in the Plan. The policies previously mentioned are based on the principles of equality and justness, precaution, sustainable development, preservation, protection and valorization of the natural and constituted properties, responsibility of the whole society, because the environment does not recognize borders. There is a strategy for the efficient management of the natural resources, including the Biodiversity.

In spite of possessing a 10 years temporary vision, the triennial evaluation of the Plan was proposed. When evaluating the implementation of these policies systematically in different institutions and actors that intervene in the sector, the level of the effectiveness and efficiency of the defined strategies can be analyzed and understood, in order to assure and to guarantee a continuous improvement according to the current demands.

### *3.1.3.2. Strategy and National Action Plan of Biodiversity Conservation*

This document of the policies the biodiversity subsector establishes in a detailed way the national guidelines, themes and areas of national intervention relatively to the conservation and sustainable use of the biological diversity in the aspect of the implementation of the Convention about Biological Diversity. It also establishes as national objectives the protection of the ecosystems, arborization and forest repopulating, optimization of the water resources, exploitation of new energy sources, fight against the erosion of the soils and coastal erosion, reinforcement of the participation of the civil society, having as a base, the education and training in the the environment domain.

### *3.1.3.3. National Action Plan of Climate Changes Adaptation*

PANA was financed by the World Fund for the Environment and United Nations Development Program (FMA/PNUD) in order to support the Less Advanced Countries in the identification of the priority activities to respond to their immediate needs and more urgent concerns, in what concerns the adaptation to the negative effects of the climate changes.

Associated to this document of the policies, there are the ones of the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> National Communication on the climate changes. For the elaboration of the Third National Communication on the Climate Changes, a vigorous technical aspect was formed, that in your first period, it elaborated the inventory of Gases Emissions with Greenhouse Effect (GEE), now it is leaned over the study of Vulnerability and Adaptation to the negative effects of the Climate Changes in the economical, social and environmental life and in the Analysis of the Attenuation of (GEE), as well as the Technology Transfer (TT).

By the disposition, the General Direction of the Atmosphere formed nine strategic sectors, where it will focalize efforts on the identification of impacts and definition of adaptation measures in relation to which will be developed, of priority form, evaluation actions of the vulnerabilidade and adaptive capacity of the following sectors: forests; water resources; biodiversity and natural ecosystems; coastal zone; tourism; fishing; energy; health; and agriculture.

#### *3.1.3.4. Mentor Plan of Coastal Planning*

The mentor plan of the Coastal Zone, elaborated in the aspect of the Program of the Coastal Planning (UICN/MDRA-DGFC, 1993), which has as an objective to define guidelines that lead to a durable development of the coastal zone, guaranteeing a correct and durable exploitation of the natural resources and of the environment, preserving coastal ecosystems and their biological diversity.

This Plan has been guiding the following actions:

- » Analysis of the soil and the space occupation with view to the follow up and evolution of the different ecosystems
- » Creation and management proposal of protected areas with view to the conservation of the biodiversity and the preservation of the genetic resources
- » Communication and environmental education of the populations
- » Exchange of information through the specialist nets (Coastal Planning, Protected Areas, and Fishing).

The mentor plan of the Coastal Zone was implemented in the aspect of the Program of the Coastal Planning, in partnership with UICN and public institutions, namely: Ministry of the Agriculture, Forests and Livestock; Ministry of the Natural Resources and Energy; Ministry of the Fishing and the Sea; INEP; INITA; National ONG's.

#### *3.1.3.5. Plan of fighting against the desertification*

Guinea-Bissau is one of the countries signatories of the United Nations Convention to Combat Desertification. This document, originated from the Conference of Rio 1992, invites the contracting parties to elaborate National Action Action of Fighting Against Desertification (PAN/LCD). Guinéa-Bissau is in the completion and validation period of its action plan, since the political and institutional instability, as well as the lack of financial resources, caused delays.

The PAN/LCD elaboration process was participatory, involving all the levels of the guinean society (state institutions, NGO's, base associations). The first stage consisted of the diagnosis of four natural regions of the country (North, South, East and the Archipelago of Bijagós), allowing to rather the populations' main concerns relatively to the natural resources management and the threat of land's degradation. Similarly to this diagnosis, socioeconomic, juridical, and institutional studies were accomplished.

The first forum for releasing of PAN/LCD elaboration was accomplished in Bissau, in September of 2004 and it had the following objectives:

- » Obtaining of a consent on the signs, the reasons, causes and underlying consequences to the degradation of the lands in Guinéa-Bissau;
- » Identification of important and priority domains for the PAN/LCD elaboration and relationship between these domains and strategic programs or consultation aspect and of pertinent dialogue;

- » Definition of appropriate methodologies to the PAN/LCD elaboration participatory way, implicating all the actors.

Several sectorial plans were also elaborated; these plans are:

#### *3.1.3.6. Forest Mentor Plan*

It establishes an analysis on the situation where the policies, the strategies, and the objectives to reach for a durable use of the forest resources are defined, but it also defines the necessary ways for its application.

The Forest mentor plan still recommends the principal support for durable policies; it recommends specific measures for reinforcement of the institutional capacity of the sector, as well as the creation, in the ambit of the national organization of the territory, of the representative conservation units of the different biogeographical zones of Guinea-Bissau.

The priority supports of the forest policies recommended by the Forest Mentor Plan are:

- » Agrarian management, legal definition of the forest space, independently of its status, its delimitation, establishment of an agrarian observatory
- » Elaboration and implementation of a mentor plan of community forest development participatory and decentralized, for the benefit of the local collectivities;
- » Reduction of the pressure on the forests by the intensification of the agriculture and cattle breeding, stimulating the improvement of the soils;
- » Improvement of the forest management through its conservation, valorization and the regeneration;
- » Attribution of a more representative value in wood not yet cut, implementing fiscal dispositions and customs
- » Implementation of a pragmatic program of long term investigation on the fragile ecosystems.

#### *3.1.3.7. Fishing Mentor Plan*

The fishing sector, besides this pan, possesses an entire legal aspect (laws, decrees...) that allows a good management of one of the most important natural resources of the country.

This Plan foresees, in the exploitation aspect of fishing resources, the improvement of control and fiscalization system of fishing, a scientific follow up and management system of these resources and some rules that seek its durable use.

#### *3.1.3.8. Mentor Plan of Tourism*

This document does not foresee a planning of the sector, but it contains a set of suggestions for extension of tourist infrastructures, some of these infrastructures are in risk location since they are in very sensitive and susceptible areas of creating conflicts with the sacred forest, what justifies the imperative of their updating.

It is important to emphasize that the mentor plan of Tourism evidences the dangers that a mass tourism practice can represent for the biodiversity, in particular and for the environment, in general.

#### *3.1.3.9. General Urban Plan of Bissau city*

The green areas, proportionate by the climate conditions of Guinea-Bissau, are some of the factors of the populations' life quality. The General urban Plan of Bissau city (PGUB) is the only available plan and it refers to this larger city of the coastal zone of the country. It proposes the establishment and preservation of green zones, areas formed by a wide range of forest diversity and plants.

PGUB recommends that the wet zones and the low lands (rice fields), within or outside of the restrictions of the city, are occupied with vocational cultures and the green zone of the city, with mangroves of Bissau coast, for instance. It also recommends the preservation, the planning of the existing green space (farms and other) and the establishment of zones, should be insisted on the rigorous protection of the existing tree and in the rigorous plantation of new trees along the avenues and streets.

#### *3.1.3.10. Letter of Agricultural Development Policies*

Elaborated in 1997, it establishes the strategy and priorities in the domains of the agrosilvopastoral production and of the agrarian research. The main objectives for the sectors are: to guarantee the food safety, to increase and to diversify the agricultural exports, to assure the rational management of the resources and to improve the populations' life quality.

This document presents, in a coherent way, the policies of different subsector (agriculture, livestock and forests) and the interactions with the other sectors, namely fishing, public works, natural resources, environment, education, gender promotion and business. By analyzing this document, we verified that the agriculture is the sector that maintains a more narrow relationship with desertification, because of the forest pressures caused by itinerant agriculture and deforestation for the plantation of cashew trees.

The new forest policies translated in CPDA, updated in 2002, seeks essentially the responsibility of the population and the rural communities, especially in the management of the resources and the areas.

#### *3.1.3.11. Document of the National Strategy of Poverty Reduction*

The strategy of fighting against poverty (DENARP) elapses of the decisions that resulted from the prospective study in long term, with horizon fixed in 2025, in comparison to what happens in the remaining country-members of CILSS.

The document emphasizes that the development of Guinea-Bissau will depend on the eradication of the poverty and for that, it will be necessary to take into consideration, not only the macroeconomic aspects, but also the social, human, environmental and institutional aspects. This involves considering issues regarding the government, fighting against corruption, respect to the man's rights, equality between the genders, reinforcement of the institutional capacities,

improvement of the social services, increase of the agricultural fishing production, preservation of the environment, etc.

Their long term objectives are based on the international and national commitments defined during several meetings, including the Declaration of Millenium, the Conference of Less Advanced Countries, the World Conference on the Sustainable Development, etc.

The consideration and integration of development of socioenvironmental issues in all the sectorial policies, including genders, is essential. There are, however, many sectors of economic, social, and national development of which policies were not still integrated, in explicit way, environmental and social concerns. Some of these sectors do not have even their own policies.

Actually, in the ambit of the regional and sectorial management, and in spite of the diversity of wealth, both natural as well as social, not all the administrative units possess documents of development policies (development plans) and none of them has a specific program for implantation of CDB.

#### **3.1.4. Legal and legislative aspect**

##### *3.1.5. At the international, regional and community level*

In searching for better ways of natural resources management, several multilateral agreements were elaborated in the environment domain, at the international and regional level, later adopted and transcribed for the national juridical planning.

Guinea-Bissau is signatory of the Convention about the Biological Diversity, but it is also a contracting party of several other conventions, protocols, agreements and organizations, international and regional, important for the conservation of the ecosystems and sustainable use of the biodiversity and natural resources, namely:

- » Convention for the Cooperation in the Protection of Development of the Marine and Coastal Environment of the Central and West Region of Africa and its protocols, Abidjan, 1981;
- » International Convention for the Prevention of Pollution Caused by Ships, MARPOL and its protocols, London, 1973;
- » Convention of Rio and its respective protocols: Climate Changes, Fight Against Drought, Desertification and the Biological Diversity, Cartagena, Nagoya and Supplemental Protocols of Nagoya - Kuala Lumpur, Quioto Protocol;
- » Convention on the Right of the Use of the Water Courses for Several Navigation Ends;
- » Convention on the Protection and the Use of transboundary water Courses and International Lakes, UN/ECE, Helsinquia, March of 1992;
- » Convention of Vienna for the Protection of the ozone layer, UN/UNEP, March of 1985. And (i) “Montreal Protocol on the Substances that Impoverish the Ozone layer”, UN/UNEP, Montreal, September of 1987; (ii) “Montreal Protocol on the Substances that Impoverish the Ozone layer - Amendments of London”, UN/UNEP, London, June of 1990; (iii) “Montreal Protocol on the Substances that Impoverish the Ozone layer -

Amendments of Copenhaga”, UN/UNEP, Copenhaga, November of 1992 and (iv) “Montreal Protocol on the Substances that Impoverish the Ozone layer – Amendments of Peking”, UN/UNEP, Peking, 1999;

- » Convention about the Cross-border and Long Distance Environmental Pollution, UN/ECE, Geneva, November of 1979. And “EMEP Protocol: Program of Surveillance of the Environmental Pollution in Long Distance ”, UN/ECE, Geneva, September of 1984;
- » Convention about the Wet Zones of International Importance, especially Habitat of Aquatic Birds (Ramsar), UN/UNESCO, Ramsar, February of 1971. And “The Protocol of 1982 ”, UN/UNESCO, Paris, December of 1982;
- » Convention about International Trade of Wild Fauna and Flora Species Threatened of Extinction (CITES), UN/UNEP, Washington, March of 1973;
- » Convention that establishes the International Union for the Conservation of the Nature and its Resources (IUCN), Fontainebleau, October of 1948;
- » Convention about Wildlife Conservation and of the Natural Habitats of Europe, FILTER, Berna, September of 1979;
- » Convention about the Conservation of the Wild Migratory Species (CM), UN/UNEP, Bona, June of 1979;
- » Convention about the Cross-border Moviment of Dangerous Residues and their Elimination, UN/UNEP, Basileia, March of 1989;
- » Convention of Stockholm, on the commercialization and use of organic-chlorinated products considered persistent pollutant, Stockholm 2001;
- » Convention of Rotterdam, on the procedure of previous and informed consent applied to certain pesticides and dangerous chemical substance, the object of international trade - PIC, adopted in September of 1998;
- » Convention about the Cross-border Moviment Controls of Dangerous Residues and their Elimination, 1989;
- » Convention of Bamako, on the interdiction of the import of dangerous garbage to Africa and to the control of the cross-border moviment and the management of this garbage in Africa;
- » Convention about the Evaluation of the Environmental Impact in a Cross-border context, UN/ECE, Espoo, February of 1991;
- » Convention about the Access to the Information, Participation in the Process of Taking Decision and Access to the Justice in the environmental regards ”, UN/ECE, Arhus, June of 1998;
- » Convention about the Cross-border effects of Industrial Accidents, UN/ECE, Helsínquia, March of 1992;
- » Convention for the Protection of the World’s, Cultural and Natural Properties, UN/UNESCO.

### 3.1.6. At the national level

In the last decades, a variety of laws in the environmental domain was legislated in the country. Some of these laws, regarding the protection and management of the biological diversity and control of pollution are highlighted: Basic Law of the environment, Law of the Land, Law of the Environmental Evaluation, Forest Law, Law of the Protected Areas, General Law of Fishing and Regulation of the Handmade Fishing, Law by decree on Biosafety, Law that prevents the import, production, distribution and commercialization of plastic sacks nonbiodegradable, and Code of waters, petroleum, mines, etc.

#### 3.1.6.1. Regarding environment

**The Basic Law of environment (LBA)** (Law no. 01/2011 of March 2) is considered the fundamental and general law of the Environment, supplying the great lines of political orientation of the Guinean environment sector. The article 2<sup>nd</sup> presents the object of the law, defining the legal bases for correct use and management of the environment and its components, with view to the materialization of the policies of durable development of the country. The article 6<sup>th</sup> defines the great measures of the Guinean environmental policies, the article 7<sup>th</sup> and 16<sup>th</sup> the environmental components and the 28<sup>th</sup> the instruments of environmental management.

In 2010 the **Law of Environmental Evaluation** was published (Law no. 10/2010, of September 24). In its article 1<sup>st</sup>, the following was established: the norms and the administrative procedures of Environmental Evaluation applied to all the projects, programs, plans and the policies of socioeconomic development, public and private, of which implementation is susceptible of causing disastrous impact to the human health and the natural and built environment. The following was also regulated: the general rules of the administrative management of the environmental evaluation process, and the general and the specific principles, the methodologies and the applicable techniques in these processes were also established.

In the biodiversity domain, Guinea-Bissau defined the guidelines for the establishment of the Protected Areas. The country counts on the Law of the Protected Areas (LQAP) updated through the Decree-law no. 5-A - 2011 of March 01, Published in the Official Bulletin no. 9 of 01/03/2009.

In spite of its especificity and limitations, this law regarthers the rules of establishment, desqualification and management of the Protected Areas, with view to the conservation and valorization of the biodiversity in Guinea-Bissau.

The Law of the Protected Areas recommends, in its article 2<sup>nd</sup>, the following objectives:

- a) Safeguards of the animal species, vegetables and threatened habitats;
- b) Safeguards of the biotype and natural formations of recognized interest and of the places of cultural interest;
- c) Conservation and recovery of the habitat of the migratory fauna and of their corridors;
- d) Promotion of the investigation and scientific researches and of the actions of Environmental Education;

- e) Defense, conservation and valorization of traditional life form activities not harmful to the ecological property;
- f) Protection and valorization of the unique, rare or typical landscapes of which scenic value confers special interest;
- g) Promotion and support to the development and durable use of the natural resources, seeking the economical development and the communities' well-being.

This law approves the Juridical Regime of the Protected Areas, which seeks to safeguard the ecosystems and the animal and vegetable populations that shelter in them, their biological diversity, as well as to promote the durable social and economical use of parts of the national territory, including the courses of water, the lakes and the sea.

In 2005, with the Decree 2/2005, the Institute of Biodiversity of the Protected Areas (IBAP) was created; the institute has as attributions to propose, to coordinate and to execute the policies and the relative actions to the biodiversity and the protected areas in the whole extension of the national territory, to promote and to safeguard the ecosystems, the biodiversity and the protected areas, as well as, by all possible human and technical means available, the durable social and economic use of these resources inside the national territory, including the courses of continental and sea waters.

The following parks are officially created: the National Park of the Group of Orango Islands (Decree 11/2000), the Natural Park of Mangroves of Cacheu River (Decree 12/2000), the Natural Park of Cufada Lakes (Decree 13/2000), the Marine National Park João Vieira e Poilão (Decree 6-A/2000), a Marine Community Protected Area on the Formosa, Nago and Chediã (Urok) Island (Decree 8/2005) of community management, the National Park of the Cantanhez Forest (Decree 14/2011 of 22.02) yet, to be officialized, the National Parks of Dulombé and Boé and their respective corridors of migration of the wild fauna. In addition to that, the country defined protection plans for chimpanzees, red, white, black and western colubus, as well as for the marine turtles.

The decree 2/2013, about the *Juridical Regime of the biotechnology use Circulation, Manipulation, Commercialization and Dissemination of Genetically Modified Organisms* in Guinea-Bissau is inclusive and strict. Its development took into consideration the precautionary principle mentioned in many reference texts papers, in particular in the African Law about Biotechnology Safety.

With the base on the analysis done in the legislation on the Biodiversity field (flora and terrestrial and aquatic fauna, aquatic biological resources, environmental protection areas, genetic resources, biosafety and pollution control), it can be concluded that the legal aspect of the country in the domain of the environment, in general and of the biodiversity, in particular is innovative and modern regarding to the principles of conservation and sustainable use of the biological resources.

### 3.1.6.2. Regarding waters

The water sector has a Water Code approved by the Decree 5-A/92. This Code is based on the water concept, in all its forms, as a very public wealth of which valorization, management and

the right use should be planned by the State. Although respecting the common law the State is responsible for the conservation and qualitative and quantitative protection of the water resources.

The code stipulates the implantation of protection perimeters of reception of underground water for the human consumption and its restrictions. It also establishes the principles of the respect of the quality fighting against the water pollution, contemplating obligations in regards to environmental protection in rural and urban areas, including the prohibition of sewages construction close to a hole or water source and it still establishes rules for the interactions among the different public and private intervening. However, the fact that the code is not regulated it prevents the appropriate organization of the sector.

The decree 52/92 also created the National Council of Waters (CNA), as an organ, it is responsible for formulating the general orientations of the policies related to the water resources and mobilize all the active forces of the nation, public or privates. It also created interdepartmental council of Waters (TOP), responsible organ to elaborate, to execute and to guarantee the good operation of coherent policies of the waters of Guinea-Bissau. However, the discussion on the updating of the mentor outline of the water and sanitation took place very recently in partnership with the Ministry of Energy and of the Natural Resources.

#### *3.1.6.3. Regarding lands*

The Law of the Land, promulgated in 1998 (Law 5/98), recommends that this property is the State's wealth, which can be of private use in the zone of uses and habits (especially rural zone) or in the portions that were object of concession contract between the State and the natural person. The concessions are two types: rural, destined to the agriculture, and urban, destined to building of houses, industrial, commercial or cultural activities. This law also stipulates that the whole use of the land should have in in consideration the ecological value and care for the protection of the soils and their regeneration.

The Law of the Land, regulating the juridical regime of the private use of the land, integrated in the public regard of the State, considers mechanism of tax that seeks to increase the effectiveness of the use of the land, to discourage the constitution or maintenance of great land portions of which the owner does not get to extract the economic profitability. Besides this, it still provides the expropriation for the State, on behalf of the public interest.

#### *3.1.6.4. Mining sector*

The Law 1/2000, about Mines and Minerals, of July 24<sup>th</sup>, 2000, with the composition given by the Decree-Law 6/2006 (alteration of the taxation rate) establishes dispositions that regulate the rights on the mineral resources of the Country, the regimes of use and the competence for execution and fiscalization of the execution of their objectives in what concerns the search, mining, treatment and commercialization of the mineral resources in the territory of Guinea-Bissau.

Most of the minerals included in this law occur in the forest areas that are susceptible to the degradation in case of bad management. In the chapter 12, the law includes environmental concerns, requirements of a study on environmental and social impact, before the beginning of

the activity, as well as a plan of environmental management to avoid, ease, to control, to rehabilitate and to compensate the environmental and social effects derived from its activities.

#### *3.1.6.5. Regarding fauna and flora*

The **Law of the Forest**, Decree 4-A/1991, seeks to optimize the contribution of the forest resources for the economic, social, cultural and scientific development of the Country, in agreement with the national, regional and local interest, and the population's life quality. Because this law has come into observance for more than two decades, several attempts have been accomplished to establish a new juridical aspect and, in August of 2010, the new technical validation of the new Faunal and Forest Legislation, under the auspices of the General Direction of the Forests and Fauna. The new law approaches the forest management in the enlarged optics of management of the renewable natural resources and of the territory planning.

The new Forest Law, instituted by the Decree-law no. 5/2011, of February 22, published in the supplement of the Official Bulletin no. 8, revokes the decrees of 1999 and 1991 and defines the management and the different forest regimes; it institutes the forest funds (especially the forest rates), the sales of the products, and the protection of the forest zone in the proximity of sources, along the water courses, lakes and ponds.

This new law considers the environmental evaluation for the wood industries, which constitutes an innovation. Other positive aspects are the expression of the will, intensifying the management decentralization, to reinforce the community management of the forest, to rationalize the forest management and to reform the taxation of the forest to make it socially and economically more reasonable and efficient. The forest regulation, Decree 44531 of November 12, 1962, date before the independence.

The Decree-law 2/2004 establishes the bases for the protection, the promotion and the exploitation of the Wild **Fauna**. This decree-law makes progress relatively towards the previous hunting regulation (Decree no. 21/80), since it seeks the rationalization of hunt and a larger implication of the population in the management of the faunal resources. The article 16<sup>th</sup> prohibits hunting in burned zones and adjoining lands, in a surface of 500m, as far as the fire still lasts and ten days afterwards. This diploma also defines the species of which hunt is authorized and interdicts, the opening and the closing period for hunting, the different types of licenses and the zones declared as hunt reservations.

#### *3.1.6.6. Fishing sector*

The fishing legislation has been improved and regulated frequently. In addition to this, there is a plan of fishing management. The Law of Fishing, Decree 6-A/2000, was altered by the Decree 1-A/2005, in order to strengthen the sanctions against the activities of unauthorized ships.

In 2006 the Linking Dispatch was published 01/GMPEM/2006 that establishes the conditions in which the related fishing operations can be accomplished, defined in the article 3<sup>o</sup> of the General Law of Fishing, in the Exclusive Economic Zone of Guinea-Bissau, including the collection of fish of handmade fishermen.

It is to emphasize that the pressure of the fishing activities, namely handmade fishing practiced by foreign ships, have been provoking great environmental damages, especially the cut down of mangroves to smoke fish.

#### *3.1.6.7. Tourism sector*

Regarding the tourism sector, there is not any effective legislative environmental consideration on it yet; however, the Decree 28/94, that defines the general lines of the Mentor Plan of Tourism, refer that the harmful impacts in the environment should be avoided and to promote the development of natural parks and their reserve.

#### *3.1.6.8. Energy*

The Decree-law 3/2007 seeks to regulate the production, transport, distribution, import and export of electric power in the country. The Article 11<sup>o</sup>, concerning the environment protection, recommends that the reequipment and the reconstruction of important thermal units of production of electricity are subject to the actual legislative dispositions the facilities that can represent danger or may have incidences in the neighboring community, whether for the health, the safety, the public salubrity, the agriculture, the protection of the nature and the environment (water, air and soils) or for the conservation of the amusement and historical places and the places of monuments.

Thus, the facilities should be subject, according to their characteristics, to a declaration and premature authorization. The legal diplomas will need the circumstances, the declaration modalities and solicitation of the authorization, as well as, in case of need, in procedures of declaration of public usefulness.

The legislation on the domestic energy, renewable energies and efficiency energy is omitted.

#### *3.1.6.9. Transport*

In the transports sector only the Decree 9/90, General Bases of the Terrestrial Transports System, registers the principles that in the definition and execution of the global policies of terrestrial transports, the defined politics for the planning and development of the territory and of protection of the environment should be taken into consideration. Only environmental consideration in the legislation of the industry is the need for auscultation from the authority on the environment for the emission of License and of industrial Permits (Linking Dispatch 2/GM/1996).

In spite of some inadequacies, the environmental and sectorial legislation offers a certain protection degree to the Guinean biodiversity, although the regulation of the main environmental legislation (Basic Law of the Environment, Law of Environmental Evaluation, etc.) sectorial (Law of the Land) is still supposed to happen, causing enormous consequences consequently on the natural resources management, in general and on the biodiversity, in particular.

## **3.2. Institutional aspect**

The materialization of the policies in general sends necessarily for the analysis of the existence and operation of the political institutions of certain State or society. The public policies are the

actions taken by the State to assist several sectors of the civil society and they count many times on the NGOs (Non-Government Organization) support, associations and Groups of Base (AAB), private companies and individual people.

In Guinea-Bissau, the Environmental sector began to structure from 1992, with the institutionalization of the former National Council of the environment, dependent on the President of the Republic and it is constituted by three fundamental organs, one piloting and executive ones. Nowadays, the environmental sector is entrusted institutionally to the State's General Office of Environment (SEA). It has two General Directions; the first one is of the Environment and another one of the Durable Development, with their own services. In their direct dependence are the National Fund of the Environment, the Cell of Evaluation of Environmental Impacts (CAIA) and the Coastal Planning Office (GPC). Besides IBAP, SEA still houses different departments, services, conventions, programs and projects that interact in direct or indirect way with the threatened biodiversity problem.

The SEA, by the way, depends directly on the Prime Minister and it has its own jurisdiction, like a ministry.

# *Lessons and Good Practice in Implementation of the Convention about the Biological Diversity*



Picture 16: Active Participation of the communities in the replanting of the mangroves

## **4. Teachings taken from the strategies and national action plans of previous biological diversity and their updating processes**

### **4.1. Establishment and intervention of new structures**

#### *4.1.1. The State's General Office of the Environment*

In January of 2009, State's General Office of Environment and of the Durable Development (SEADD) was established by the 4<sup>th</sup> Constitutional Government of the country, through the Presidential Decree n.º 2/2009. This institution has as global mission to define, to execute and to coordinate the policies and actions addressed to the conservation and durable use of the biological diversity. The institutionalization of this public organ entrusted of the prosecution of the environmental policies reflects the concerns and importance of the environmental sector to the country, as well as its place in the policies of sustainable development of Guinean state.

The establishment of SEADD, designated, by the new government resulted of the last elections of 2014, simply by the Environment Secretary of State (SEA), tried to meet the existing institutional matters, creating synergies and impelling a larger coherence between the sectorial

policies and linked aspects, direct or indirectly, with the management of the environment and the natural resources.

With the publication, on March 11<sup>th</sup>, 2011, of the new organic of the government, IBAP, which previously was under tutors of the Minister of the Agriculture and of the Rural Development, it started being tutored by SEADD. In addition, IBAP still houses two General Directions (Environment and Durable Development), the Coastal Planning Office, the Cell of Evaluation of Environmental Impacts, different departments, services, conventions, programs and projects that interact in direct or indirect way with the biodiversity problem. Belonging to the same institutions of guardianship aimed for the environmental domain, it served as a stimulating lever to improve the coordination and the consultation among them.

#### *4.1.1.1. General Direction of Durable Development*

Since 2014, with the starting of the new government, the State's General Office of Environment holds two general directions: the General Direction of the Environment (which always existed) and the General Direction of the Durable Development (new). The new-established General Direction of the Durable Development (DGDD) should create and develop collaborations with all the other departments of the public management and the private sector so that the principles of the durable development are integrated in the different sectorial public policies.

While the productive sectorial Ministries take the responsibility and dedicate to the exploitation of the resources, the DGDD of the State's General Office of Environment has the mandate for studying and suggesting the rules and exploitation forms that reconcile the imperatives of the economic and social development of the country with the needs to guarantee the durability of management of these same resources and it seeks the conservation and preservation of the biodiversity and the ecosystems services.

In this aspect, DGDD will lead for the planning and connection of policies concerning the sustainable development, seeking to study, to propose and to accompany the execution of rules and of referring actions to the balanced and sustainable management of the natural resources.

It presents now, in a summarized way, the tasks that DGDD is responsible for:

- » To organize, suggest and run the policies and the State's strategy concerning promotion policies of sustainable development and the management of the natural resources;
- » To organize plans and strategies of valorization of the natural resources, of prevention and fighting against all forms of natural resources degradation;
- » To organize and promote studies and actions with view to the durable management of the natural resources;
- » To support IBAP technically in the implementation of programs concerning support for the durable development of the Protected Areas and in taking decisions;
- » To participate in the identification and classification process of protected and degraded areas;
- » To participate in the elaboration of policies and strategies of sensitive zones conservation and of recovery of degraded zones;

- » To promote basic studies and suggest the designation for places of world's property, biosphere reservations, biogenetics reservations, and others;
- » To follow the implementation and to evaluate the execution of the dispositions and international conventions, regulations and guidelines in observance relating the protection of habitats and of fauna and flora species;
- » To cooperate in the fiscalization actions, of the trade, circulation and of the detention of wild species in risk;
- » To cooperate with other vocational departments.

#### *4.1.1.2. Environmental Impacts Evaluation Cell*

The Environmental Impacts Evaluation Cell (CAIA) was conceived and instituted with the objective of creating conditions so that environmental and social considerations are taken into consideration the processes of political decision regarding the plans and activities of development of the country. Likewise, this cell should contribute for the promotion of durable development, in other words, to guarantee an investment economically viable, socially acceptable and ecologically balanced for Guinean, in particular for the humanity, in general. In long term, the CAIA should foresee, determine, evaluate, and contribute to reduce the potential impacts of a project, program or strategy about the human beings, the fauna, the flora and about the biodiversity and the ecosystems services, in general.

The Basic Law of the Environment (approved and published on March 2<sup>nd</sup>, through the Law no. 1/2011, BO no. 9) and the Law of Environmental Evaluation (approved and published under the Law no. 10/2010, BO no. 38) are important legislative devices which regulate the CAIA operation. In these laws the obligation for accomplishment of evaluations and previous environmental licensing are announced for all the projects, programs, plans and policies, potential natural resources users that are susceptible to provoke effects in the human health. The technical and administrative procedures are also established for the environmental evaluation (AA) and Environmental Licensing (LA).

Since the establishment of the CAIA, the number of investors that conformed with the legal demands on the environment is in constant growth. However, if the building enterprises and the small and averages enterprises in the domain of services embraced the demands of EIA and the solicitations of authorization of Environmental Conformity immediately, the same had not happened with the mining industry, which had reacted with a certain reservation. In order to sensitize the contributors of this sector, several actions were carried out, namely the National Conference about Extractive Industries, in March of 2010, organized by CAIA under impulse of the Work Group about Extractive Industries.

The accomplishment of Strategic Environmental Estudios/Evaluation (AIA) in all levels of development of mining and oil projects, including analysis of the associated infrastructures, as well as the respect for the environmental norms internationally instituted and assumed by the country, they were the main recommendations resulting from this Conference.

#### *4.1.1.3. Institute of the Biodiversity and Protected Areas*

The Institute of the Biodiversity and Protected Areas (IBAP) was created by the Decree 2/2005 and published in Official Bulletin no. 11 of March 14, 2005. Its mandate consists essentially in recommending, coordinating and running the policies and actions concerning the biodiversity and the protected areas in the whole extension of the national territory. This institute is, in consequence, responsible for the management of the parks and for the management and monitoring of the principal values of the biodiversity (species and threatened habitats) in Guinea-Bissau.

In 2006, IBAP, in collaboration with its partners, identified its vision and mandate. In order to define its purposes clearly and to establish realistic goals and objectives, compatible with its mission and vision, this institution insisted in the elaboration of its fifth planning strategic (2007-2011). This first strategic document that was intended to be valid up to 2011 would only be updated in elapsing of 2014, due to the political and social instability in the country in 2012 and 2013.

During the implementation of the IBAP Strategy 2007-2011, besides the elaboration and edition of the Strategy, a specific administrative building for IBAP was created and inaugurated; the new Law about the protected areas was reviewed and approved; the Foundation Bio Guinea was established and officially registered; the National Park of Cantanhez was made official and the process of extension of the national net of APs in the forest area was initiated. These initiatives marked, in a decisive way, the pillars of the conservation process in Guinea-Bissau, above all in what concerns its administrative, institutional, financial and ecological durability.

#### *4.1.1.4. Biodiversity's National Committee*

Similarity to what happens all over the world, the national biodiversity is managed by a multitude of departments and specific organs. Among them the Environment Department, which coordinates and supervises the process and the Agriculture and Forests, in fighting against the desertification, but also Water, Fishing, Infrastructures and Transports, Foreign Affairs and Cooperation and institutions of Scientific Investigation, among others, to mention just those that are directly involved.

In order to carry out the implementation of CBD successfully, it is necessary the collaboration of the different organs and the coordination among the different departments. Therefore, it is demanded by the convention the establishment of National Committee of the Biodiversity and CHM's National Committee of Biodiversity. The CNB, in similarity to Piloting Committee, includes in its composition the representatives of different public and private institutions, namely representatives of the government departments, research/training institutions and nongovernment organizations (civil society) related to the biodiversity. The CNB's objective is to provide information, consultation, adjustment and coordination of the actions taken for the implementation of CDB.

#### *4.1.1.5. National Committee of Information Exchanging Mechanism concerning the Biodiversity*

The National Center of Information Exchange (The National Clearing House Mecanism) (CHM - Guinea-Bissau) is a platform of Internet for information, communication and flow of information about the Guinean biological diversity and it was introduced as a result of the development process and adoption of the National Strategy and Action Plan about the Biodiversity.

This Committee has as main tasks to increase the performance of CHM to motivate the technical and scientific communication about biodiversity, through the supply and validation of data to be harmonized, standardized and shared in the platform, updating useful information for the users, namely investigators, managers of national biological properties and people, in general.

#### *4.1.2. Work Group on the Petroleum and other Extractive Industries*

Guinea-Bissau aims to exploit the mineral resources that the country disposes, namely phosphate, in the sector of Farim, bauxite, in the sector of Boé, petroleum, in the territorial waters, among other mines.

In order to sensitize public for the problem of the petroleum and other extractive industries, to incite the decision takers to choose and use more effective technologies in their exploitation, treatment and transport, to enable the local populations to have access to the information and provide them with capacities to negotiate and to understand the challenges for the defense of their interests, Group of Work on the Petroleum and other Extractive Industries (GTP-IE/GB)<sup>7</sup> was established. This association integrates different State's institutions, national and international NGOs, and it is coordinated by the Director of IBAP.

In March of 2010 the first Conference about the Extractive Industries and Durable Development was organized, presided by the Excellency, Sr. Carlos Gomes Júnior, the prime -minister of Guinea-Bissau.

In execution of its work program, the GTP-IE restored the results of this conference in i) Farim and Djalicunda, identified zone for the exploitation of phosphate; ii) Gabú, the region where the deposits of Bauxite are being already exploited iii) Buba, the zone projected for the construction of the port for evacuation of the bauxite by the sea iv) Bubaque, the region potentially rich in petroleum. The restitution meetings counted with the presense of the deputies of the nation, governors of the regions, representatives of the traditional power, responsible of the decentralized structures of the State, associations and base groups, and people, in general.

Thanks to this group's stimulation, many activities have already been accomplished, emphasizing i) the accomplishment of the 1<sup>st</sup> and 2<sup>nd</sup> National Conference about Extractive Industries; ii) the support to the updating of the Mining Code; iii) the elaboration of laws, policies and strategies on the environmental regards (Law of Evaluation of Environmental Impact, Mining Code, Law of the Petroleum, MARPOL Convention); iv) the accomplishment of several training sessions and the capacity building for the local actors on the risks and benefits of the Extractive Industries in Farim, Boé, Varela, Buba and Bubaque (2009, 2010, 2011, 2012 and 2013); v) the animation of information sessions about mines and petroleum (2009 and 2011) in the Popular National Assembly; vi) the animation of a sub-regional net about extractive

industries (awareness and case studies), in Senegal, Guinea-Conacri and Sierra Leone; vii) the establishment of an informative bulletin about extractive industries and viii) the preparation of a synthesis of all the available documents about the sector (internal Report of activities, training and awareness - not published).

During 2013, the GTP-IE organized a visit of exchanging of experience in the mining site of Taïba, in Senegal. In regard of the wood sector, several land missions were organized with SEAT, where the woods cut illegally were arrested. In consequence of these acts, the group supported the organization of a conference-debate about the problem of cutting the wood in Guinea-Bissau. This conference, organized on July 11<sup>th</sup>, 2013, counted with the participation of more than 150 guests, in representation of structures of the State, parliamentary, NGOs, private sector, wood companies and basic and communities associations it enabled the exhibition of a film with duration of 18 minutes regarding the theme. On the other hand, members of this group also participated actively in discussions on the issues regarding lands on the Bijagós islands for tourist ends.

In the sequence of the first conference-debate, a joining press report was produced and signed among the partners - UE, IUCN and IBAP - denouncing the destruction of the forest (see attachment 5). Later on, the news was broadcast in the radio programs by RDN, RFI, RDP Africa and the national private radio stations. Later, radiophonic debates about the problem of abusive wood exploitation were organized in the national and international communication means (RFI, RDP Africa).

Through the co-financing of IBAP, IUCN, Swissaid and GTP-IE, a group of musicians launched a musical project called “No Matu” (our forest). In the aspect of this project, besides the music and respective video, a 40 minute documentary on the wood issues was also produced. The themes of the film and the music are linked with the need of preserving the ecosystem, the perception of the local population, the effects of the deforestation and the measures to stop the phenomenon of deforestation. The film emphasizes the forests areas which were devastated by the chainsaws. The launching of the project “No Matu” was accomplished in September of 2014 in the Cultural Center franc-guineense. In the aspect of this project, performances were accomplished in the cities of Bafatá, Gabú, Buba, Mansaba and Bissau, where the documentary and the music were presented, with the respective video.

A second conference on the issues relating to cut of the woods in Guinea-Bissau was accomplished in the installation of IBAP, on February 4<sup>th</sup>, 2015. In the debates of this conference several themes were covered, such as: the impunity; threatened species of extinction; the value of the wood; the sanitary implications of the deforestation; the economic and social alternatives for the populations that suffer and support the deforestation costs, etc

### *4.1.3. Wet zones of the international importance*

#### *4.1.3.1. Ramsar National Committee*

In June of 2012, the representation of UICN in the country and their particular partners in the conservation and sustainable management of the wet zones decided to relaunch the process of the establishment of the National Committee RAMSAR Guinea-Bissau. The united intervention of DGA, GPC and IBAP and the technical support of UICN allowed accomplishing, on

November 20<sup>th</sup>, 2012, the first meeting for the reactivation of this Committee, where the representatives of different institutions discussed and validated their status.

Five days after the constitution of Committee in epigraph, the first training session about the Ramsar Convention and the importance of the wet zones took place in Cacheu; this training was meant for the designated member.

The second training session given to the partners, agents and members of the Council of APs management was accomplished in Buba, in the PNLC headquarters, from 11<sup>th</sup> to 13<sup>th</sup> of December of the same year. In this session three new themes were discussed, namely i) the Plaidoyer role in the conservation process and sustainable valorization of the wet zones, ii) the operation and importance of the coastal zone and iii) the Education and Environmental Communication in the wet zones.

Both the committee reactivation process as well as the two training sessions were supported technical and financially by the Initiative for the Reduction of Poverty and management of the Environment “PRESSED” (Poverty Reduction and Environment Management Initiative), of the West and Central Africa Program (PACO) of the International Union for the Nature (internal reports - not published).

#### 4.1.3.2. Classification of RBABB as Ramsar Site

Guinea-Bissau indicated, on January 21<sup>st</sup>, 2014, the great archipelago of Bijagós (1.046.950 ha; 11 ° 14'N 16 ° 02'W), as its second Ramsar Site. The archipelago, which is also a reservation of the Biosphere, has the only active deltaic islands of West Africa Atlantic coast and it is considered as the second most important site of West Africa in terms of aquatic migratory birds. Its intertidal muds house one of the largest populations of migratory marine birds of East Atlantic migratory route in the world (more than 870.000 were registered in 2001). The aquatic birds that use this site, they build nests mainly in the northern of Europe and Siberia. These visitors include the Curlew-real *Numenius arquata*, the “pilrito-de-bico-comprido” *Calidris ferruginea*, the Oyster-catcher *Haematopus ostralegus* and the “seixoeira” *Calidris canutus*.

At the same time that Bijagós have clear importance at the international and subregional level for their limicoline birds, they also have similar importance in what concerns other populations of aquatic birds. Among them, the following is included: nesting population of several species of heron, of gray-pelican (*Rufescens Pelicans*), of the sacred-ibis (*Threskiornis aethiopicus*), of African spoonbill (*Platalea alba*), of the seagull-of-gray-head (*Larus cirrocephalus*), of the seagull-of-fine-beak (*Larus genei*), of the tern-big (*Sterna caspia*) and of the royal tern (*Sterna maxim*).

Also the reproduction and the initial period of growth of a great number of species of fish are favored by the influence of coastal resurgence and for the estuaries, as well as for the presence of great mangroves surfaces. The place still shelters the largest colony of green turtles (*Chelonia mydas*) in Africa and it is the home of more than 15 vulnerable species, including the hippopotamus (*Hippopotamus amphibius*), the west-African Manatee (*Trichechus senegalensis*), the parrot Timneh (*Psittacus timneh*), the humped dolphin of Atlantic Ocean (*Sousa teuszii*), the leather turtle (*coriaceous Dermochelys*) and the green turtle (*Lepidochelys olivacea*).

The archipelago also ensures the livelihoods of more than 32.000 inhabitants that practice, partly of the territory, the rice cultivation, the exploitation of the natural palm tree and the subsistence fishing, besides the use other areas for cultural and spiritual purposes.

The principal threats to the site are overfishing, the tourism and the exploitation of petroleum around the coast, expected to begin in region.

#### 4.1.3.3. Natural Park of Mangroves of the Cacheu River

This park has been accepted as the wet zone of international importance on May 22<sup>nd</sup>, 2015. For its classification criteria from 1 to 4 and 6<sup>th</sup> 8<sup>th</sup> were produced.

The Natural Park of mangroves of Cacheu River is a representative example of “The Rivers of the south”, rivers curved by the forests of mangroves, characteristics of West African coast. This wet zone is covered of great hydrologic, biological and ecological importance, serving as protection of the coast, quality of the water, regulation of the regional climate and biological productivity of the important natural resources for the national economy and for the food safety.

Regarding the 2<sup>nd</sup> criterion, it is emphasized the occurrence of several communities of threatened species of extinction. Among the aquatic mammals the relative abundance of hippo is verified (*Amphibius Hippos*), the manatee (*Senegalese Trichechus*) and the humped dolphin of Atlantic Ocean (*Sousa teuszii*), three species classified as vulnerable by IUCN. The park houses a great community of migratory birds, including several species of aquatic birds and a discharge density of migratory passerines. The waters and the ecosystem of the mangroves of the Park are considered rich in fish and they represent a privileged area of reproduction and of youth growth (“Barracuda”, “Polydactyl”, “Corvina”, several species of rays and sharks, many of them are classified as threatened of extinction in the Red List of IUCN). The mangroves are also important for the populace of shrimps of the **Penaeidae** family, feeding the industrial fishing out of the Cacheu River and the oysters that grow in a large quantity in the aerial Rhizophoras roots.

Regarding the 3<sup>rd</sup> criterion, it is emphasized the fact of the site contains a range of biological diversity characteristic of the ecosystems of mangroves of the African West coast. It also houses a community of aquatic mammals representative of the ecoregion and classified as vulnerable or threatened of extinction, including the amphibious hippos, the Manatee and the humped dolphin. In this group of resident species the migratory species of birds and fish are increased (particularly communities of **Mugilidae**, **Sciaenidae** and **Polynemidae**). The unit constitutes a representative sample of the coastal biodiversity well protected by the mangroves of West African Coast.

In the 4<sup>th</sup> criterion it is emphasized the fact of this park houses several species in a critical period of life cycle. This is obvious for several species of migratory birds of Palearctic Ocidental in hard winter, as it is the case (*Godwit Godwit*), (*Pandion haliaetus*) and a lot of species of sparrows. Among the 248 identified species in the park, seven are globally threatened or almost threatened: *Smaller Phoeniconaias* (almost threatened), *Necrosyrtes monachus* (in danger), *Gyps africanus* (in danger), *Trigonoceps occipitalis* (vulnerable), *Balearica pavonina* (vulnerable) *Godwit Godwit* (almost threatened) and *Numenius arquata* (almost threatened). The place is also the home for 15 of the 31 species of biome of sudano-guinean savannas that have been registered in Guinea-Bissau and 19 of the 58 species of the biome forest Congolese-guinean (Dodman et

al., 2004). The same happens with many species of fish that enter the mangroves in reproduction time to spawn and of which youths find favorable conditions (thanks to the productivity of the mangroves) and safety (difficulties of access from the predators) to accomplish with their ecological demands.

The 6<sup>th</sup> criterion is associated to the presence of a great concentration of dwarfish flamingos (*Phoeniconaias minor*), could reach up to 2000 individuals in the hard winter period (Dodman *et al.* 2004, Campredon et Catry obs. pes).

Finally, the 8<sup>th</sup> criterion refers to the function of this park, as reproduction zone and of growth for some species of crustaceans (*Callinectes Penaeus sp.*) and of fish, in particular the (*Polydactylus quadrifilis*), the (*Arius parkii*), the (*Arius laticutatus*), (*Sphyræna afra*), the (*Pseudolithus senegalus*) and the (*Rhinobatos rhinobatos*).

#### 4.1.3.4. Wendu Tcham Lake

On May 22<sup>nd</sup>, 2015, the Wendu Tcham Lake and its adjacent zones, located in the Dulombi-Boé-Tehtche (Complexe DBT) compound, it was also classified as wet zone of international importance by the Ramsar Convention of the United Nations. The criteria 2 and 3 served as argument for the acceptance of this wet zone in that category. The first criterion (2) refers to the occurrence of vulnerable species, threatened of extinction or seriously threatened of extinction or of threatened ecological communities.

The place houses rare and threatened species of extinction that use the aquatic environment, as well as terrestrial species that use the lake as drinking fountain. It is noticed, among the carnivores, the nandinia (*Nandinia binotata*-LC), the wild cat (*Felis sylvestris*-LC), the leopard (*Panthera pardus*-NT), the hyena (*Hyaena hyaena*-NT) and even the lion (*Panthera leo*-VU). The area is also frequented regularly by elephants (*Loxodonta African*-VU), hippos (*Hmphibius Hippos*-VU), gazelle of water (*Tragelaphus spekeii*) and buffon kob (*Kobus kob*-LC). It is Supposed that there is also a small populace of Bubal (*Alecelaphus buselaphus*) (*Damaliscus lunatus*), but this information is to be confirmed. The site is more the north part of the expansion of chimpanzee (*Pan troglodytes*-PT) in Guinea-Bissau. In the gallery forests different species of (*Cercophitecus sp*) and (*Colobus sp.*) are observed. The following species are still identified in the Lake: crocodiles (*Crocodylus niloticus* and *Osteolaemus tetraspis*-Vu), turtles of fresh water (*Pelusios sp.*) and several species of aquatic birds present in the ciliary forests around the lake and along the several rivers. Finally, a diversity of fresh water fish species: (*Guinean Tilapia*), (*Clarias angularis*), (*Auchenolotis occidentalis*), (*Hemichromis fasciatus*), (*Labeo senegalensis*), (*Lates niloticus*), (*Malapterurus electricus*), (*Marcusenius senegalensis*), (*Plectrocephalus bovei*), (*Sarotherodon galileus*), (*Schilbe Mystus*), (*Tilapia zillii*), etc, are still registered.

A lot of species of animals, emphasizing viable populations of rare and threatened primate, carnivorous, hoofed and reptiles' species visit the Lake and its surrounding area. The area is still rich in several species of birds of savannas and of forest zones, as well as aquatic African migratory birds. Therefore, different species of vultures can be seen, for instance, (*Neophron percnopterus*-EN, *Trigonoceps occipitalis*-VU *Gyps africanus*-EN) and eagles (*Terathopius ecaudatus*-NT, *Circaetus beaudouini*-VU *Stephanoaetus coronatus* - NT and *Polemaetus bellicosus* -VU).

Concerning the 3<sup>th</sup> criterion, it refers the populace of animal and/or important plants species for the conservation of biological diversity of particular biogeographic region.

The Lake and its adjacent areas are part of the Dulombi-Boe-Techtche complex (complex DBT), that extends along the Corubal, Celi and Fefine River, and starting from the Cofra island, to the Natural Park of the Cufada Lakes and Corridor Bolana-Guiledje; it constitutes a seasonal zone of migration of great mammals (especially hoofed) of Guinea-Bissau and of neighboring countries - Republic of Guinea and Senegal. The complex is particularly important for the border migration of mammals between the parks of Nhokolo-Koba and Badiar, in Senegal and in the Republic of Guinea, respectively, and the coastal parks of Guinea-Bissau (National Park of Cantanhez and the Natural Park of the Cufada Lakes).

#### *4.1.4. RBABB's Application for mixed site of the Humanity's Property*

In 2012, Guinea-Bissau deposited application of Bolama-Bijagós archipelago on the Committee of UNESCO with the proposal of its classification as natural and cultural mixed site of the World Property.

After the submission of the classification proposal, a mission of evaluation composed by specialists for the natural property of UICN and specialists for the ICOMOS cultural property visited the Archipelago in order to examine the conformity of the realities on the field. The conclusions of the evaluation confirmed the site's exceptional universal value about the natural plan. However, the evaluators emitted reservations about the cultural dimension, observing that Guinean State and the implicated actors do not have enough capacities to preserve the property in long term. Furthermore, according to the specialists, the scientific data that sustain the cultural arguments are not convincing enough to the point of showing the exceptionality of this application part.

In consequence of the above exposed and other secondary issues which were brought up, the mission issued an unfavorable opinion and it advocated a group of necessary measures, before presenting a new application of the site.

In its annual meeting of 2013, the Committee of the World property followed the recommendations of the evaluation mission and it did not accept the request, but it urged the country to present application again, after having adopted all the recommended measures.

It is still recommended that Guinea-Bissau moves forward, in a first phase, with the natural perspective of the application and then, when it is convenient, with the cultural perspective. Studies and deep investigations that can sustain the cultural perspective sufficiently with convincing arguments would be previous conditions for the 2<sup>nd</sup> phase. A third phase would be therefore proposing RBABB as mixed site, after the independent classifications as natural and cultural site. XXXXXX

#### *4.1.5. Actions of fighting against the deforestation and for reduction of the forest degradation*

The deforestation process and the forest degradation and changes in the use of the soils are considered as the principal risks and threats for the coastal and terrestrial biological diversity, deserving a particular attention of the competent entities of Guinea-Bissau. In this ambit, several

initiatives were undertaken with view to the reduction and the combat of the phenomenon, emphasizing the following actions and initiatives:

#### *4.5.1.1. Countryside Federation KAFO*

It was officially established in 1996 and registered as nonprofit national association (NGO) in December of 2000. KAFO has as a fundamental mission Community Self-promotion, and the Durable Rural Development and it supports the process of personal and organizational competence reinforcement that assures the local populations the participation in the definition and execution of their development options.

Through information, education, awareness and exchange promotion activities among farmers, above all through the Community Radio of Djalicunda, research actions in the forest area, agriculture and traditional knowledge, training and on going capacity building for the the farmers, promotion of the apiculture and establishment of the seed banks, the KAFO Federation which has been contributing positively to the conservation process and durable management of the forest resources in their intervention zones has noted the following results, obtained between 2012 and 2013:

- » Populations of 150 villages involved in the practice dynamics of the community forest exploitation dominate four methods of forest exploitation (fighting against burning, rational production of vegetable coal, production of seeds of forest trees and application of reforestation techniques);
- » Training and empowering of 300 farmers, which follows 120 agents of community forests and 180 members of the committee of forest management;
- » Consolidation of the community's efforts to manage the forest area and regularization of 30 forests polarized around 150 villages, benefitting 2.550 farmers' families;
- » Local framing of the community forest dynamics, insured for an endogenous device, constituted by 384 farmers women and men, and 120 Community Forest Agents, 180 Members of the Council of Community Forests Management, 24 professionals gardeners and 60 Coalmen;
- » Effective operation of six nurseries in different villages (*tabancas*) and annual production average of 47.136 forest plants and agroforestry;
- » Reduction of the secret practice of production of coal and rationalization of the use of firewood in the row of coal production, thanks to the vulgarization of appropriate technologies and the introduction of 25 experimental ovens;
- » Reduction of forest species extinction in the forests of Oio, Cacheu and Bafatá, thanks to the preservation of *Borassus aethiopicum*, *Pterocarpus erinaceus*, *African Afzelia* (all among the six threatened species of extinction).

#### *4.5.1.2. Farming and cattle raising cooperative of Young Experts*

Founded on June 15<sup>th</sup>, 2000, by Guinean technicians with training in Agronomy, Livestock and Forest, this cooperative has as concentration area and of priority intervention the agricultural services rendered to the communities. The Agricultural Cooperative of Young Expert

(COAJQ) lets machines and agricultural equipment to the population, from motor ploughing the rice peelers and presses of palm oil.

It was already emphasized that a progressive decline of the production and of the productivity in the main row of “mangroves” rice has been registered. This decline is resulting of the acidification and of the salinization of the soils and of the insufficient maintenance of the traditional hydraulic work, caused by the youths' rural exodus (lack of job) and by the growing indifference for this culture, in benefit of cashew and of other cultures of the plateau. This situation created a vicious circle, because the increase of the value of cashew motivated more people to dedicate to this culture in detriment of the rice culture. The abandonment of the rice field, by the way, caused by the emigration for work to the urban centers and to the neighboring countries, even worsens the deforestation process for the establishment of new agricultural lands for the culture of cashew.

The intervention of COAJOC intends precisely to put an end to this social and environmental distortion, providing the community with machines, that, in another way, they would not have access to them. These machines have been having a great impact in the production, in the environment and even in the populations' health.

With the introduction of the motor ploughing, the medium farming time of the rice field was reduced drastically. For instance, the field that was cultivated traditionally for two weeks, now it only takes two hours; therefore, there is now a considerable increase of revenue and of the agricultural productivity. On the other hand, this intervention allowed the recovery of rice fields which were formerly abandoned and it is expected positive future impacts in the decrease of the pressure on the forests and savannas.

#### *4.5.1.3. Spanish Non-government Organization CBD-Habitat*

The intervention of Spanish NGO CBD-habitat, in partnership with IBAP, aimed to protect the habitats of the hippos and at the same time to contribute for the warranty of food safety of the resident human communities, reducing the conflicts and guaranteeing survival and revenue means of the local populations.

All the rice fields located in the wet coastal zones, habitually frequented by the hippos (*Amphibiu Hippos*) became a preferential aim of these species since the rice, in all the cultivation and growth periods – the first days of transplants, flowering, and even harvest - it is appreciated largely by the species. The attack to other food cultures, although in less scale, is also witnessed in other places of the country.

In the Natural Park of Mangroves of the Cacheu River, a great part of ricefield is located in the islets among the small intrigues of the Basin of Cacheu River, whereupon cultivated rice stays at the favor of the hippos. Because of the severe loss, provoked by the presence and damages caused by these animals, many agricultural fields stopped being cultivated. This situation of abandonment is verified almost everywhere in the whole country, PNO, Uno, Bissorã, Carantaba, etc, the places where this species inhabits. To illustrate the magnitude of the conflict, in 2008, an inventory of the rice field was accomplished in PNO and it was concluded that 82% had been total or partially abandoned in the last years and the attack of the hippos had been enumerated as main cause for that abandonment.

This conflict has provoked the increase of unsustainable alternative cultivations, for instance, the *m'pam-pam*, that requires cutting and to burning of important forests and savannas surfaces, with implications in the loss of habitats for the biodiversity and larger liberation of carbon.

The installation of electric fences served to protect the cultivation of rice fields, increasing the production of rice fields, and reducing the cultivation of the plateau. On the other hand, this initiative allowed to improve the people's safety and to reduce the carbon emissions. The rice cultivation in the wet coastal zones is accomplished essentially by women, whereby this enterprise also came to motivate the female employment.

**Picture 20: Duck-stings found in the temporary ponds of Anghôr and Imbone (PNO)**

## *Elements of the National Strategy for the Biological Diversity*

Foto: JMP



*Plectropterus gambensis (Pato ferron)*, Foto

## 5. National strategy for Biological Diversity: principles, priorities and objectives

### 5.1. Components of the National Strategy

#### 5.1.1. Long term vision

*Up to 2025 Guinea-Bissau will be a model of sustainable development, whose biodiversity will be preserved and regenerated to maintain in a durable way the potential of value creation of its precious and its renewed resources, offering services to the local communities, to the country and the whole subregion group and contributing significantly to the great environmental balances of the planet.*

#### 5.1.2. Principles that guide the Strategy

The National Strategy for the Biodiversity obeys the principles of the Basic Law of the Environment which is part of the national policies of the environment management, seeking the sustainable and durable socio-economic development of Guinea-Bissau. Thus, the EPAN-BD adopts the defined principles in these guideline documents, which in turn are part of the regional and international guidelines and the system of values contemplated in the management instruments and in the planning of the territory and its resources, emphasizing the following:

### ***1. Biological diversity: A common property and an intergenerational legacy***

The natural ecosystems and the biological resources should be considered as national global property in ecological and sociocultural terms and at the same time the principal base of the development of Guinea-Bissau. For contributing for the well-being, both for the present and future generations, the biodiversity is considered a delegated intergenerational, whereby its ecological functions and values should be kept and considered in the national accountings;

### ***2. Preventive and Precautionary action***

To improve and ensure a conservation and performances with instant effects or the term in the ecosystems and in their components, the risks should be considered in a premature way, privileging, this way, the logic of preventing and not of remedying, compensate or repair damages;

If the precautionary principles are adopted – *in dubio pro natura* – where the environment management should prioritize the establishment of prevention systems of harmful acts to the ecosystems and to the biodiversity, risks of negative, significant or irreversible environmental alterations are avoided, such as the illicit extraction and the reduction or loss of the biological diversity. Doubts or lack of evident scientific proofs should not be used as reason to delay effective measures that avoid or lessen their effects;

### ***3. Pollutant-pay***

The parties responsible for the damages should be forced to correct or to recover the ecosystems and the biodiversity, bearing the responsibilities resultant from the damages, blocking, suppressing or reducing the damages; such parties should not be allowed to continue the pollutant action;

### ***4. Accountability of the whole society***

A conservação da diversidade biológica e o uso sustentável dos seus elementos deve criar um sentimento de responsabilidade partilhada da sociedade civil, em geral e de todos os agentes e grupos de interesses envolvidos, em particular. Uma política da conservação da biodiversidade só é possível e eficaz se não se limitar a ser tarefa do Estado, mas for antes assumida por toda a sociedade;

### ***5. Respect and reinforce the principles of democracy, inclusion and participation***

To involve different sectores of the local communities (representatives of traditional power, youth and women, associations and basic group, professional groups, etc.) and other present actors (The State power structures, decision makers, private sector, civil society, etc.) in all the training processes, taking decision and execution of policies about the conservation and management of the ecosystems and their natural resources;

## ***6. Fair and equitable distribution of costs and benefits of conservation and use of biodiversity***

The costs and benefits of the biological diversity and of the services supplied by the ecosystems should be valued, reinforced and shared in fair and equal way among all the stakeholders or beneficiaries of those services and those that contributed or contribute for their maintenance;

## ***7. Managing based on traditional knowledge***

Traditional knowledge concerning the biological resources, practice, traditional, and sociocultural values of the environment conservation should be respected, protected, valued and used, based on the previous consent of their holders;

## ***8. Sectoral and intersectoral integration***

The problems related to the ecosystems services, conservation and sustainable use of the biodiversity are taken into consideration in all planning and in the process of taking important decisions on the policies of the sectorial ou intersectorial development, including strategies, legislative process, plans, national and sectorial programs.

## ***9. Systematic Approach***

The ecosystem focus allows the biodiversity conservation to be approached in the base of a global and an integrate overview. The application of this approach should assure the preservation of ecological processes in larger scales and in good condition, allowing the ecosystems to recover before external disturbances and be better adapted for the eventual changes;

## ***10. Scientific and technical Support***

A suitable management that facilitates a gradual process of adjustments in function of the evolution of the problems and of the knowledge should be taken into consideration. This implies the need of a solid scientific base relatively to the biodiversity and the ecosystems of Guinea-Bissau. The existent knowledge should be compiled and broadly published and broadcast with different actors;

## ***11. Subsidy***

Problems associated to the management and conservation of the ecosystems and of the biological diversity, should be treated in a lower level (local, regional or national), that are in conditions of acting with larger effectiveness;

## ***12. Better know, understand and share information about biodiversity and ecosystem services***

All the involved parties have right of access to the information. The information and the awereness should therefore reach the whole society, from the base communities to the public in general, the private sector and the political makers. The biodiversity and the ecosystems conservation will be much more accepted as far as the people notice the true value of the services rendered by the nature to the generality of the country;

### ***13. Capacity building***

The individual, collective and institutional capacity building for all the intervening is without a doubt a decisive perspective in the conservation and management of the biological diversity and it should therefore be widely promoted;

### ***14. Internacional Cooperation***

The bilateral and multilateral cooperation, as well as the technical, financial and scientific support is important for the search of approaches and solutions with other countries or national, subregional and international organizations for the approach of global problems related to the biodiversity and the management of the natural resources.

#### ***5.1.3. National Priorities***

In consistency with the vision and the main principles identified and with view to manage and to reduce the principal causes of the biodiversity erosion, contributing to the improvement of the current condition of key-ecosystems conservation and of integral natural resources, Guinea-Bissau designates the following six intervention priorities in the aspect of this EPAN-GB:

1. To Continue and to strengthen ongoing action of the biodiversity conservation and of the representative ecosystems, through an effective and coherent net of protected areas and of other mechanisms and conservation systems;
2. To restore areas and degraded ecosystems and improve the productivity of the lands and their durability through the fight against the burning, the coastal erosion and water, the salinization and acidification of the soils, the management of the superficial and underground waters;
3. To strengthen and to enhance the advantages derived from the BD and from the ecosystems services, base on the principles of a durable development and equal share of the benefits;
4. To ensure greater participation, effort, interconnection and intersectorial coordination to strengthen entails and to promote actions with all implicated parties in the conservation, management and durable use of the biodiversity at the local and the national level, dissipating contradictions in the development strategies and of the territory planning;
5. To improve the knowledge about the values of the biodiversity, wealth and services rendered by the ecosystems, to integrate these services in the planning process, strategies, policies and sustainable socioeconomic development programs of the country and to promote the introduction of the economy and environmental accounting in the public and national policy sector;
6. To establish and to implement simple national, effective and integrated system of ecological and socio-economic monitoring to accompany the use, the condition and the status of the species, the health of the ecosystems and the tendencies of the biodiversity resources;

#### ***5.1.4. Objective***

In the base of the priorities outlined above, Guinea-Bissau targets the following objectives:

***Preserving and preventing the biodiversity loss, reducing the ecosystems degradation through sustainable use of their components, in continuous process of participation and of united***

*action of all the sector of the society, with view to guarantee the well-being for the current and future Guinean generations.*

#### *5.1.5. Strategic order and national aims (objectives)*

The national objectives for the biological diversity respect the objectives of Aichi. These objectives should be strategic, specific, commensurable and ambitious, however realists and fixed in the time (in general for 2020) and they can be grouped in the following strategic objectives.

##### *5.1.5.1. Main causes of biodiversity loss (strategic aim A)*

***To deal with the fundamental causes of the biodiversity loss, making sure that concerns about the biodiversity are integrated and appropriate by the government and the society in general.***

***Goal 1: Up to 2020, at the latest, 50% of the Bissau-Guinean population will have knowledge on the biodiversity values and on the measures that should be taken to conserve and use it in a sustainable way.***

The current biodiversity loss can only be interrupted or minimized if the most of the citizens and decision makers familiarize and have conscience of the great human dependence (individual and collective) on the wealth and services supplied by the ecosystems. The existence of a national net of the protected areas, that will shortly cover about 26% of the national territory, is just by itself a starting point and a vehicle for a larger diffusion of knowledge about the importance of the biodiversity and the natural resources.

In order to achieve this awareness level, the knowledge about the biodiversity and awareness and traditional local practice should firstly be strengthened through the research, collection and systematization of information. Then, establishing educational, awareness and training program that would allow people to know the values and services of the ecosystems and to adopt good practices of use of species, habitats and ecosystems that unique, rare or in danger of extinction. Ecosystems, species and genetic material that are covered of social, economic or scientific importance in particular, should deserve an additional attention. The net of the Parliamentarians, of environmental journalists, of the community radios, of the Teachers and of the schools EVA's, as well as of the Environment houses and Culture should be valued for the effect.

The artistic world, above all musicians, theater actors and documentary film producers will have an important role to carry out in this aspect of the great public's understanding about the needs of changing behaviors in what concerns the use of the ecosystems and the biodiversity resources. In this context, it is important to establish and to understand the unequivocal relationship among our individual and private actions, and the public and collective interest of the whole society.

***Goal 2: Up to 2018, the values of the biodiversity will be integrated into national and local strategies of development and of poverty reduction and in the planning procedures and incorporated into the national counting, according to the case.***

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The integration of the economic value of the biodiversity/environment is essential in the different policies and sectorial plans, such as the agriculture and the fishing, planning of the territory and infrastructures, tourism, industry, government and human development.

The lack of knowledge of the economic value of the biodiversity and of the environment so far leads to its degradation and loss. An initiate study was undertaken in 2011 by IBAP. The was on the evaluation of the economic value of the environmental wet zones; it allowed a characterization of products and services of different ecosystems of the wet zones of PNTC and it attributed values, with base in market prices, taking into consideration the different functions of the ecosystem. An exhaustive study should be undertaken besides the wet zones in order to take into consideration the ecosystem services of terrestrial zones. The results of this study on economic value and on the ecosystems services can serve as azimuth for political decisions about the poles of economic growth. On the other hand, they can also help in strengthening of the actors' awareness about the economic, social, and cultural value in the health and even in the biodiversity and the environment policies, benefits of its conservation and costs generated by its degradation.

***Goal 3: by the year 2018, the country will have a diagnosis and an updated and available inventory on incentives and harmful subsidies to the biodiversity and the country will elaborate an action plan that seeks correcting, reducing or eliminating these negative incentives and promoting the positive ones for the conservation and sustainable use of the biodiversity and the ecosystems services.***

Over the past few years, Guinea-Bissau has promoted and motivated the monoculture of cachew, allowing a wild exploitation wood and other forest resources, granting dragging fishing licenses and accepted the installation of handmade fishing camps in the national territory and associated to illicit activities, without taking into consideration the negative impacts of these economic practices on the equity resources of the country.

To reduce and/or to eliminate the harmful incentives to the biodiversity, fiscal reform should be proceeded, prioritizing economic instruments that can contribute to the sustainable development and to have as objective: i) to induce a certain social behavior, creating incentives that seek to encourage, to motivate or to reward good practices, for the maximization of the social well-being; ii) to set up taxation rates in order to discourage and to punish the bad practices; iii) to raise funds that can cover the costs of environmental impacts or funds to be redistributed in order to promote prevention and recovery activities of the environmental quality or funds meant for development and research.

The principles of *Pollutant-pay* or *users-pay*, that tend to motivate the continuous technological innovation and to improve the environmental performance, seeking to reduce the cost of use or of pollution to be paid by the users/polluter.

***Goal 4: By the year of 2020, the Government of Guinea-Bissau, the private sector and the groups of interest at all levels will have taken measures or will develop plans for production and sustainable consumption and they will have restricted the impacts of the development sectors with higher pressure on the biodiversity and natural resources.***

The first step to take appropriate actions, dedicated to searching sustainability in the production and in the consumption, is to recognize the pressures, to understand their causes and the environmental impacts that we, individually or in a collective way, have been producing with our actions.

Actions of the sustainability evaluation of the main economic activities of the country, namely of the itinerant agriculture and of income, of fishing (continental, coastal/estuarine and, marine), of the forest sector (wood exploitation and extraction of other forest products), of hunt, of the tourism and of the extractive industries should be undertaken in order to know the real impacts about the biodiversity and the natural resources.

Then, the measures and actions “friends” of the biodiversity (with less impact) should be identified, promoted, proceed and evaluated. There is a diversified range of these measures experienced with satisfactory results, both at the local and national level, as well as within the subregion and worldwide.

#### *5.1.5.2.Reduction of threatening elements of the biodiversity (strategic aim B*

#### ***Reducing the direct pressures on the biodiversity and promoting the sustainable use***

***Goal 5: By the year 2020, to reduce more than half the degradation and fragmentation of the habitats and ecosystems, mainly, forests and more sensitive ecosystems, provoked by illegal activities***

The chapter 2 of this EPAN, relatively to the diagnosis about the biodiversity was dedicated to the analysis of the principal causes that threaten or are susceptible of provoking the degradation of the biodiversity degradation, of the habitats and of the ecosystems services. The process and activities that have a direct impact on the biodiversity should be the object of serious studies and of a consequent follow up.

It is relevant to emphasize in this context the exponential increase of the uncontrolled and excessive cut of trees for the production of the wood, happened on these last years, after the change of the constitutional order in the country from April 12 of 2012. The search and the ambition of easy enrichment, conjugated with the international search of wood and the desorganization of the forest sector, favored a wild and anarchical exploitation of the Guinean forests. It is estimated that approximately 70.000 wood m<sup>3</sup> were exported in 2014. This number shows the flagrant violation of the laws in vigor in the forest sector. Two great consequences are visible: i) the considerable deforestation of sensitive areas and in the peripheral zones of countless protected areas and, ii) an excessive pressure of cut, addressed to an only species, the “Pau-de-Sangue” (*Pterocarpus erinaceus*).

To reduce the degradation and the fragmentation of the habitats and of the forest and other ecosystems equally sensitive, efforts should be adjusted in several perspective, namely i) in the accomplishment of a national inventory of the flora, fauna, orchards of perennial cultures of revenue and of community forests; ii) in the establishment of a mentor plan of the forest planning and Ecological agriculture; iii) in the restoration of the ecosystems and degraded habitats of the wild fauna; iv) in the establishment of “systems of applicable protection” applicable to the rights of some lands (including the margins of the rivers); v) in the

improvement of the efficiency of control, patrol, supervision and follow up of faunal migratory species; Iv) in the promotion of alternative techniques and technologies friend of the environment; vii) in the scrupulous respect of the moratorium instituted by the government, relatively to the wood export in trunk, etc.

***Goal 6: By the year 2020, the management and the capture of any fish and invertebrates reservations will be sustainable, legal and done with the ecosystem application approaches and within the safe ecological limits; plans and recovery measures for more sensitive and/or threatened species will be put in practice.***

An effective and efficient supervision of the fishing activities is revealed indispensable instrument for control and follow up of the fishing resources and for fight against the illicit, not regulated and not declared (IUU) fishing. In terms of the protected areas, without surveillance and supervision, it would just be a simple declaration of good intentions on the paper.

The results already obtained in Guinea-Bissau, in the domain of the participatory monitoring of AMPs, are encouraging. In the last few years, in good measure, thanks to the support of specialized projects in this domain, IBAP got very remarkable results, especially in the marine environment. From one side, it was possible to dismantle all the camps of illicit handmade fishing installed in their territories or in their contiguous zones, for other, it was possible to implement the guidelines contained in the internal regulations of these management structures and of the biodiversity conservation.

IBAP created a Central Unit of Supervision and all the relative information to this sector are compiled in a databases created for the effect. However there are some fears about decelerating in this domain, related to the reduction in the investments. The marine surveillance is extraordinarily onerous (fuel, fleets and their maintenance services), and mind working to make it more efficient, adopting innovative strategies and reinforcing the partnership with other present actors on the field (responsible for the fishing and hunt, resident populations, tourist operators, etc.). With these partnerships, to create procedures of united management of sanctions, treatment of confiscated equipment and their eventual liberation or destruction, as well as the regulation of balanced distribution of the funds resulted of fine.

With the construction of monitoring centers and advanced bases of supervision in the strategic zones, namely, Bubaque, Cacheu, Cacine and Caravela, with the acquisition of new supervision and reinforcement of the technical capabilities, significant improvements in the controlling activities and in combating IUU fishing were introduced by the services responsible for the fishing in ZEE of Guinea-Bissau.

Between 2004 and 2009, the Project of the Biodiversity and the Coastal Zone Management was implemented Guinea-Bissau (PGBZCGB); it was financed by the World Bank. The fishing component, the integral part of this project, built the establishment of Reserved Fishing Zones (ZPR) in the principal estuary rivers of the country, fish spawning zones of critical importance for the coastal ecosystem. In parallel with this initiative, the satellite of monitoring system of industrial fishing ships (VMS) was set up to control their entrance in ZPR, among other objectives.

Concerning ZPRs, some initial work was accomplished, namely the identification, delimitation, establishment and regulation of ZPRs of great River of Buba/Cufada lakes, Cacine River/Canafaque islands and Melo and Cacheu River. Some basic biological and socioeconomics studies, which interfere in the delimitations and the regulation of ZPRs, were equally accomplished. Unfortunately, after the project this dynamic did not see continuity.

In perspective of guaranteeing a durable development of the handmade fishing sector, the project designated by “Rias do Sul”, was financed by UEMOA; the project seeks to test new models and approaches of the handmade fishing management in the three rivers of Guinea-Bissau (Cacheu, Buba and Cacine). This approach intends simultaneously to value the local knowledge, to protect the sensitive habitats for the reproduction of fishing resources and to limit the impact of the migrating fisheries, in view the reinforcement of the food safety of the riverine populations and the poverty reduction. This time, the project was elaborated to solve the three main problems identified in this key sector, namely: i) diagnosis of obstacles related with the inadequacy and/or lack of application of principles of sustainable and participatory management of the halieutics resources, which can be overcome with the support of the scientific investigation, supervision of the fishing activities and the local communities' participation in the process of taking decision; ii) to reduce and/or to eliminate the identified obstacles through the establishment of fishing confederations and support to the access to the sustainable means of capture and means to transform and to market their products; (iii) to reduce the presence of the illegal migrating fishermen to guarantee the priority access to the fishing resources for the local communities that live in the three rivers (Cacheu, Buba and Cacine).

The project “Rias do Sul” was originated from the capitalization of the experiences of the project “Riquezas em partilha, (Wealth in share); a partnership for the natural resources of Cacheu River”. This project, financed by the Swiss Foundation MAVVA, had as global objective to implement, in a coordinated form, measures of national training of management of Natural Park of Cacheu River and its hydrographic base to guarantee, in a sustainable way, its functions in relation to the biodiversity and to the food safety of the populations.

The following results and impacts are marked: i) during a provisional period of one year, measures for a durable co-management of fishery resources, essential to guarantee the durability of the ecosystems resources and services in the long term, were defined and implemented; ii) the knowledge of ecological and socioeconomic aspects was improved, namely aspects relatively to the specific diversity of fish and crustaceans, data about the state of sexual maturity, reproduction period, the physical-chemical parameters evolution and about the fishing effort - the sum of this information, added to the local knowledge of the fishermen, women fish processors and other actors, contributed jointly to the definition of the fishing rules; iii) the capacities of CIPA have been improved; iv) the capacities of the structures of local government were reinforced - this innovative approach allowed to create an aspect of consultation and of negotiations among structures of management of the park, administrative authorities and fishermen, resulting in the united definition of the zones and of the consensual fishing rules to be applied in Cacheu River; v) living conditions have been improved and the productivity and the sanity have been increased through the support and implementation of microproject of economic activities; VI) the following was also reinforced: education actions, awareness and environmental communication of journalists' training, through the radio, establishment and

operation of a community radio, teachers training and training for the guards of PNTC park, establishment and distribution of supports (palmeirinha bulletins, t-shirts, posters, notebooks for students and sacks made with biodegradable materials); vii) a documentary film was accomplished; it presents the results of the project intervention; viii) a grocery store of fishing materials and a rotative founts was established.

During this year, the government resulted of the last elections of 2014 embraced two decisive initiatives for the follow up, control and supervision of illicit activities on the handmade and industrial fishing. In addition to that, all the illegal fishing camps placed in the insular zone, coastal and continental interior were dismantled. In the industrial fishing, the installation of the satellite system of ships monitoring (VMS) was established. This system is based on a ships finder, or “*transceiver*” (blue box), which is installed in all ships that possess license of industrial fishing (as well as ships of the fishing support, etc.), using the system of global positioning (GPS) to communicate automatically their position to a Fishing Monitoring Center (CMP). VMS can also support the patrol ships to assure that all the ships inside of ZEE possess fishing licenses.

The positive aspects of each one of these approaches and the obtained results should be capitalized, published and replied, according to the cases, allowing a conduct of responsible fishing.

***Goal 7: By the year 2020, areas under agriculture, aquaculture and forest exploration will be managed in a sustainable way, assuring the biodiversity conservation, maintaining the essential ecological processes and the link among the different ecosystems***

To assure the sustainable use of the ecosystems, their services and of the biodiversity, it is considered as the principal objective of CBD and of the National Strategy for the Biodiversity. It is recognized that the humans' largest dependence and the strongest interactions between the man and the biodiversity is manifested in the primary reproductive sectors, namely agriculture, forests, livestock and fishing. This dependence is still larger in the countries like Guinea-Bissau, and it is noticeable in the rural zones and in the urban zones, playing a decisive role both at the microeconomic level, near the family group individually, as well as in the macroeconomics of the country in general. For these reasons, the sustainable use of the biodiversity in these sectors is recognized by the government of the country as principal motor of economic and sustainable growth and, consequently, the main driving agent for the future prosperity of the country and of its population.

It is also at the level of these sectors that the biodiversity has been suffering most pressures; therefore, the good practices should be identified, compiled, classified and implemented with view to reduce, to correct, or to invert (where it is possible), the erosion tendencies, fragmentation, degradation and loss of the biodiversity. Then, applied an ecosystematic approach, favoring the integration and the improvement of knowledge, practices and experience already existent (agrosilvopastoral, management of the territories of the village, community forests, EIAS, Fishing Reserved Zones, Protected Areas, etc.). Finally, to enlarge the system to integrate agrossilvopastoral to the creation domain and fish management, making it more integrator of the four neuralgic sectors of the economy of the country.

In the process of restoration and of reduction of the degradation rate emphasis should be given to the ecosystems and sensitive and fragile habitats.

It is imposed a need of identifying, mapping and integrating zones with different agricultural, pastoral, forestry and fishery vocations in the national plans and regional outline ecological agriculture planning and hydroagricultural of the territory. In this context, the updating of the forest inventory, of cashew trees and of the herding zones is an imperative fixture.

***Goal 8: By the year 2018, to identify the pollutant and the main pollution sources and to create the juridical-institutional mechanisms for its management and reduction at non harmful levels to the operation of ecosystems and biodiversity.***

It is evident that the country lacks, in all its extension, a drainage, sewer and urban system of treating treatment domestic, and hospital residues, constituting this way a problem of management of solid and liquid residues which is one of the greatest concerns in terms of the environmental, animal and human health. Because of lack of infrastructures for the treatment of the domestic sewers, the whole garbage ends up accumulating in the wet and lower zones, particularly on the ricefield, coastal zones, lakes and ponds, big and small rivers, and in the sea, contaminating the waters and provoking significant impacts in the ecosystems, in the biodiversity and in the human health. Even at the level of the few existing transformation industries (feeding, energetics,..) all the used waters, oils and other fuels are directly lying in the courses of closer water. The wet zone and the estuaries are, in consequence, the ecosystems and more affected natural habitats by these disastrous practices. Rest of fish and other products of the sea and hydrocarbons of the handmade and industrial fishing still constitute a supplemental source of pollution.

The cargo of fuel sailing in the territorial waters of Guinea-Bissau and also selling fuels are evident threats for the coastal and marine biodiversity.

The problem of the persistent organic pollutant and heavy applied metals in the dielectrics fluids, insulating liquids, condensers, transmitters of heat, lubricants, plasticizers of inks, varnishes, glues, lacquers, waxes, fluorescent lamps, quimic and press paper, pesticides, among others, lied down freely in the ecosystems; they also deserve a private attention.

Besides the exposed, it is emphasized that the possible construction of the port of deep waters of Large River of Buba and of the railway, that will establish the connection between the miner deposits of bauxite of Boé and the port of Buba, may come to constitute a serious threat for the forest ecosystem of the interior, of the wet zones as for the coastal and marine ecosystem.

Measures and urgent actions to prevent and to lessen these impacts of pollutant substances and of solid and liquid residues are revealed necessary. The compulsory nature of accomplishment of Evaluations of Environmental and Social Impacts for all the development projects is one of the preventive approaches that should be prioritized. The Decree no. 16/2013, of July 11<sup>th</sup>, regards to the plastic sacks, was approved in Ministers Council on January 30<sup>th</sup>, 2013 and promulgated on July 7<sup>th</sup>, 2013 by the President of Republic of Transition. It is urgent the implimentation of this device that forbides the production, import, commercialization and distribution of plastic sacks of which chemical compositions have based on the polyethylene, the propylene and the polypropylene.

Other measures should exist in order to i) make studies to know the level of water and soil pollution, above all in the hidrographic basin of the Geba and Corubal Rivers; ii) to identify and

clean up the critical sites; iii) to demand to the emergent industries the placement of pretreatment units of the residues; iv) to create water purification stations; v) to manage the whole garbage system in an effective and efficient way and to inform, train and to sensitize the different actors about the need of the reduction of the effects about the environment; VI) to create mechanisms that seek the garbage appreciation; vii) to implement a system of ecological surveillance of the low and wet zones, etc.

***Goal 9: By the year 2020, to identify exotic and invading species and their respective vectorial and to establish mechanisms for their control in order to prevent their introduction and establishment.***

The intentional introduction of species, during centuries, in Guinea-Bissau was made essentially to ornament and redecorate cities and gardens, for use in the agriculture, livestock and forestation, as alternative and subsistence income for populations of low income or, for obtaining of woody material, with species of fast growth. It should be emphasized that the country does not have a well delineated strategy for the management of this problem, being exotic species more and more introduced without any control. Recently the bennet also known by sesame (*Sesamum indicum*), for example, with tendency to the monoculture, in substitution of the cashew, without previous studies have been made.

Guinea-Bissau is confronted with problems of introduction of exotic species and systematic attack of curses, but no systematic decisions have been taken yet to put end to this subject; it has just been verified punctual interventions of the Vegetable Protection Services of the Ministry of the Agriculture. To put end to this situation, the country, in collaboration with its partners should: i) designate or create a unique supporting structure to coordinate and assure a good application of the policies about foreign species, in what concerns the phytosanitary control, health and animal well-being, trade of species, biosafety initiatives, etc.; ii) accomplish diagnoses, seeking to identify the principal introduction roads, the occurrence and the distribution of invasive exotic species and evaluate their impacts in the environment and in the human health; iii) elaborate, publish and review the Official List of the Exotic Species periodically Invasive of the flora, of fauna and of microorganisms that threaten the terrestrial ecosystems, the marine environment, the continental waters, the production systems and the human health; iv) create, implement and manage a database that allows the accompaniment of the situation of each species; v) delineate strategies for a monitoring system, prevention, control, mitigation and eradication of the invasive exotic species in the national territory, with the effective participation of different institutions; vi) review, enlarge and update the existing legislation with view to improve legal framework of this issue and vii) train, inform and sensitize all the implicated sectors, in order to assure a good understanding of the problems associated to the invasive species and their consequences on the biodiversity, habitats, ecosystems and national well-being.

***Goal 10: By the year 2020, to identify the multiple anthropogenetic pressures on the mangroves, mud and sand banks and, moreover, marine and coastal ecosystems affected by the climate change or oceanic acidification and to establish strategies and programs so that their integrity and operation are maintained.***

Guinea-Bissau is vulnerable to the disastrous effects of the climate changes in almost all the productive sectors of the national life, particularly its population and its marine, estuarine and

coastal ecosystems. As mentioned in chapter 2, some current threats of the changes and climate alterations are already evident in Guinea-Bissau, constituting direct threats to the biodiversity and the ecosystems services. The biodiversity loss and degradation, the reduction of the agrosilvopastoral productivity, the loss in human lives due to bad nutrition and food insecurity and the increase of risks of endemic diseases are the main consequences of these phenomena in country.

The surface covered by the mangroves (9% of the total area of the country) places Guinea-Bissau in the second position among the coastal countries of the subregion with the largest mangroves surface, and it places Guinea-Bissau, in proportional relationship to its size and coast line, among the first countries with the largest vegetation of the mangroves in the world. The wood exploitation for commercial purposes, the use of firewood for smoking fish, the exploitation and transformation of the salt and the unsustainable methods of exploitation of oysters that grow in roots mangroves roots constitutes the principal threats now to the mangroves ecosystem. On the other hand, mangroves areas, in the perimeter of the cities, are used as garbage dumps and of used waters. Equally, it is to take into consideration the fact that a lot of infrastructures are being built in their proximity, without doing previous studies of environmental impact.

The islands of the country are from the small dimensions and almost exclusively of sedimentary origin; therefore, they are exposed to the climate change phenomenon. With the progress of the erosion and the ascent of the medium level of the sea, the disappearance and/or dislocation of some islanders and more exposed sandbanks has been verified. In this context, it urges to delineate strategies and to take measures that seek: i) to reinforce the adaptation capacities and attenuation and to reduce the vulnerability of the sea and coastal ecosystems for the climate change effects; ii) to identify opportunities for the obtaining of derived benefits of mitigation and adaptation mechanisms in favor of the biological diversity, REDD, PSA, carbon taxes, etc.; iii) to establish mechanisms of coordination and of united work to assure the reciprocal coherence between the planning instruments and the derived actions of the biodiversity conservation policies and of fighting against the climate changes.

#### *5.1.5.3. Reinforcement of the biodiversity protection (strategic aim C)*

#### **To improve the biodiversity situation, protecting ecosystems, species and genetic diversity**

***Goal 11: By the year 2020, to strengthen and to consolidate the National System of the Protected Areas and to extend it to 26% of the national territory, covering the areas of special importance for biodiversity and ecosystem services, managed in an effective and equitable way, representative ecologically and satisfactorily interlinked, and to propose other special measures of conservation, integrated in larger terrestrial and marine landscapes.***

Guinea-Bissau led in an exemplary way its national strategy of conservation. In the first moment, this strategy was guided to the marine and coastal zone. Actually, SNAP counts with six protected areas that cover a terrestrial surface of 495.510 ha (13.75% of the terrestrial surface of the country) and marine of 456.617 ha (equivalent to 12.63% of the terrestrial surface). Recognizing this unbalance, the government of Guinea-Bissau committed itself in Nagoya, in Japan, to extend this system for the interior of the country, in order to cover ecosystems and representative habitats of the continental zone.

The expansion will be made through the creation of two new parks in Boé and Dulombi and three corridors of the Fauna, respectively Tchétché, Salifo-Xitole and Cuntabane-Forrea, designated here as the compound of DBT.

These corridors will guarantee the ecological connectivity, not only inside of the DBT compound, but also among the ones located inside the continent with the coastal parks, and this way, to sustain the significant and inherent ecological processes to the National System of the Protected Areas in as a whole.

This strategical vision is based on the need of assuring a great representativeness of the ecosystems to maintain the important ecological processes, to assure the ecological connectivity in SNAP, protect and allow the border migration of a lot of threatened or species in danger of extinction, inside and around the SNAP, and increase the resilience capacity of the system to the climate change effects and the expansion of the desertification. The SNAP will start to represent 26,3% of the national territory.

The process of SNAP consolidation, with the establishment of the Dulombi-Boé-Tchétché compound, is already in an advanced phase; the EIAS has already been accomplished, but still lacking the publication of the creation decrees and other necessary juridical instruments. Later on, it will be necessary the formal conducting conservators and remaining staffing, the definitive constitution of the administrative council, and the preparation and approval of management plans. It will follow the later implementation period of the management plans.

Although there is already a good representation of protected spaces, yet, the country has not classified small sites of interest for the biodiversity or sites of valued landscape and exceptional culture. Many small sites could receive an additional protection and relatively easy to implement, simply, if they were classified. Several islanders (many of them sacred), that were identified as of interest at the designation of RBABB, are granted today for tourist operators for hotel facilities, or even particular houses, which have changed them in an irremediably way. Besides the archipelago, other places of interest, as for instance the Bandim Island (at the gates of Bissau) are of considered to be important, but vulnerable for not having a status of official protection. It would be pertinent to accomplish a systematic inventory of these opportunities (that could be updated) and to move forward for the legalization of small AP's, on what the circumstances indicate that the intervention is priority. Likewise, it would be important to evaluate the pertinence or not of continuing the process of proposition of the group of the continental islands Jeta and Pexice as Biosphere Reserve of UNESCO.

It is verified that, in the current configuration, SNAP does not fill out the essential conditions to protect all the representative of ecosystems and necessary critical habitats for the renewal of the fishery resources, restoration of the critical habitats and the biodiversity preservation. In other words, the marine areas of ecological and biological importance should still be integrated into the system, above all herbs, mounds and submarine pits that should be protected in the high sea and in the habitats of large sea bottoms.

***Goal 12: By the year 2020, the extinction risk of the known threatened species will be reduced significantly, stopping the decline of the most threatened ones***

Some action plans were already prepared for some threatened species (turtles, primates, mangroves, some aquatic migratory birds, manatee, etc); others are almost ready (hippopotami). A particular attention will be given to the species that consist in the Red Book of UICN about the Threatened Species (except those that already occur in Guinea-Bissau with unviable and marginate populations). The priority will also be given to vegetable species (some deserve little attention until now) of importance in the national context, although not globally threatened for instance, the “*cibes*” (*Borassus aethiopum*) or “pó-di-sangui” (*Pterocarpus erinaceus*). Among the priority animal species, several sharks, marine-turtles, parrots, vultures, several primates (with prominence for the chimpanzee), manatees and some great charismatic mammals (particularly the hippopotamus and the elephant) can be referred. The varieties of vegetables used in the agriculture could also be studied and, if relevant.

The preparation and elaboration process of a Red List of the principal groups of plants and threatened animals of Guinea-Bissau (National Red List) should be continued and concluded. The use of this book as instrument for evaluations of environmental impacts and management of the biodiversity should be strengthened.

The long tradition of international partnerships should be kept (for instance, with the nations of the Wadden Sea or with Wetlands International), created with the purpose of monitoring and conservation of migratory birds that link Guinea-Bissau directly to most of the European countries, as well as to the countries of the Atlantic boarder of the African coast.

***Goal 13: By the year 2020, to maintain, through elaboration and execution of appropriate strategies, the conservation of cultivated species, of domestic animals, sylvan species and of other species of socioeconomic and/or cultural value***

To accomplish this goal, it is necessary to accomplish and/or update inventory of the genetic species of cultures and of the threatened animals, inclusively of close wild relatives, of PFNL and of the species with potential of being marketed. Threatened species of extinction should be studied and restored. Equally, an expansion and a preservation program of local races should be elaborated and executed through the collection and reservation of sperms or embryos, as well as the conservation or preservation *in situ* of the genetic property. As it has already been done at the INPA level and within some NGOs, it is important to continue constituting local collections and banks of genes and seeds and create conservation, exchange, and quick alert nets of animal races and vegetable species in risk.

In order to make all this be viable, it is imperative the implication and the local involvement of community and the respective safeguards and valorization of their knowledge and traditional knowledge. On the other hand, it is revealed necessary the application of the legislative aspect and the regulation with view to protect cultivated plants and domestic animals.

#### *5.1.5.4. Sustainable use of the ecosystems services (strategic aim D)*

***To increase the biodiversity benefits and ecosystem services for all***

***Goal 14: By year 2020, supplying ecosystems of essential services, including services related to water and which contribute to the health, life and well-being means will be preserved, taking***

*into consideration the needs of women, poor, of the most vulnerable people and of the local ethnic communities in relation to their sociocultural and religious reproduction.*

The first generations of protected areas created in the country concentrate on their totality in the coastal and marine zone and they are isolated from each other. However, the specificity of the marine environment incites no existence of the borders among insular AMPs of Archipelago of Bolama-Bijagós, above all among PNO and PNMJVP, which are interlinked by species migration channel.

With the intention of assuring the connectivity and the maintenance of ecological integrators process of SNAP as a whole, the integration of migration corridors is pointed with the design and establishment of protected areas of second generation. This is what is intended for instance with the terrestrial compound of Dulombi-Boé-Tchéché that, besides guaranteeing the connectivity among each other, it will also assure the interconnection of these with the conservation units of the coastal protected areas of Cantanhez and Cufada.

To meet with the need of the terrestrial species that are characterized by its great mobility, only a complex system of protection, including Conservation Units defined for the Law of the Protected Areas, fauna corridors and countless areas of community forests, including the sacred forests) can guarantee better efficiency in the conservation efforts. The corridors are destined essentially to assure the connectivity among the several critical zones for the present terrestrial species, above all in their migration periods inside these zones. With the sacred forests and the community forests, more effective participation can be assured, and at the low cost, of the populations in general conservation effort and at the same time to assure that the benefits of this effort can be equitably shared by the community, above all for the more disadvantaged and vulnerable people.

The DBT compound is, therefore, very recognized by its faunal and floristic resources. Due to its isolation and congestion, a concentration and refuge zone of the great fauna known in west Africa has been constituted, and it has served as recruitment zone not only for the coastal parks of Guinea-Bissau but also for the immediate parks of the neighboring countries like Niokolo Koba, in Senegal, and the National Parks of the Republic of Guinea, especially Badiar, Boké and Kumbia and the Forest Reservations of Ndama, of Fello Digue and of Kogon. The wet zones of this complex and several national marine parks and of the subregion are in the birds' migration route.

Urgent measures of protection are revealed necessary. The connection with the critical zones of neighboring countries is evident and it consequently lacks more inclusive measures and with a transnational and cross-border character of the ecosystems management, habitats and the shared resources, without them, the national actions only by itself, will not have any impact.

In the areas under these management systems, several departments of the State (education, health, agriculture, etc.) and NGOs are requested for a more effective intervention, with projects and programs that are more effective and that benefit in a such possible way the different villages and the several social groups (youth, women, etc.). It is equally important that the several interventions are complemented instead of giving origin the overlap and competition.

***Goal 15: By the year 2020, the resilience of ecosystems and the contribution of the biodiversity for reservations of carbon will have been increased through conservation actions and recovery, through the recovery of at least 15% of the most sensitive and degraded forest ecosystems, thus contributing to the mitigation and adaptation to the climate change and to combat the desertification.***

The abandonment of practices that cause the degradation of the terrestrial forests can be enough to promote the natural regeneration, above all, if the degraded areas are relatively small and are surrounded by zones in better condition, from where seeds can be disseminated. In this sense, the promotion of the good practices together with the different implicated actors will be one of the first measures to take.

As it has already been mentioned, the late and uncontrolled burning represent as one of the factors that contributes significantly to the degradation of the vegetation of Guinean forest. The decrease of these disastrous practices only by itself and the promotion of the precocious burning, where it is necessary, will be an important contribution for the regeneration of the forest vegetation and for the retention of carbon.

Inside some protected areas, the regeneration of the degraded areas of larger dimension is done through the plantation or sowing of the most important species, such as “cibe” (*Borassus aethiopum*), “cite malgos” (*Carapa procera*), and “bissilon” (*Khaya senegalensis*) “farroba” (*Parkia biglobosa*) or “pau-carvão” (*African Prosopis*). For that, the trees which produce seeds were identified and were created nursery areas, for germination and growth of the species that will be planted later (check the case of PNTC). These measures should be extended to the whole national territory, above all in the areas where, in the last years, there were intensive cut, uncontrolled and destructor of trees.

In the last decades, a growing degradation of mangroves vegetation has been verified in many places of the country. Degraded mangroves areas should be identified and they should be studied the appropriate measures with view to its regeneration. The “rice field”, cultivation sites of the rice in the mangroves soils, should be identified and maintained in equal way; therefore, they allow reducing the discount pressure on the terrestrial forest vegetation. In the requalified mangroves areas, youth plants of the present species in those areas are already being replanted.

As it is known, the sustainable management of the forest resources is considered an alternative to the carbon market. In the ambit of the mitigation mechanisms and fight to the climate change effects, the regeneration of degraded forest vegetation that allows the verifiable fixing of carbon or the reduction of CO<sub>2</sub> emissions can be financing object, through projects submitted, for instance, to BioCarbon Fund of the World Bank (with the objective of reducing the CO<sub>2</sub> emissions and, simultaneously, to promote the biodiversity and reduce the poverty) or through the REDD mechanism (Reducing Emissions from Deforestation and Forest Degradation in Developing Countries) of the United Nations. This action is indispensable to invert the short/medium period the situation of degradation where Guinean forests is found.

***Goal 16: By the end of 2016, to assure the formation, adoption and function of a simple and efficient juridical-legal aspect which allows the execution of Nagoya Protocol, especially in***

***terms of Access to Genetic Resources and the Fair and Equal Partition of the Derived Benefits of its Use, in conformity with the national legislation***

The additional protocol of Kuala Lumpur, about the partition and accountability, and the Protocol of Nagoya, about the access to the genetic resources and fair and equal share of the resulting from its use were ratified in simultaneous on September 24<sup>th</sup>, 2013. With the ratification of Nagoya Protocol, Guinea-Bissau positioned itself in the list of the first 20 countries of the world to follow this instrument.

The training, divulgation and awareness about the Nagoya Protocol at the national level was one of the first actions accomplished by the secretary and focal point of this protocol. The objective of the Protocol and its importance for the traditional healers of the countries signatories were broadly discussed. Afterwards, the proposal of Decree for the Organization of the Valorization of the Biological Diversity, Traditional Knowledge and of Handmade and Artistic Work of Guinea-Bissau was validated.

To translate in an effective way the recommendations and guidelines of this protocol at the national level, build up the necessary conditions for the preparation and implementation of juridical, institutional and regulatory instruments relative to ABS (initials in English: Access and Benefits Sharing), as well as elaborate and apply programs of capacity building of information and awareness about the subject. For this, should be created and operate to the National Center of change on the ABS should be established and functioned.

*5.1.5.5. Research and biodiversity administration mechanisms (strategic aim E*

***To increase the implementation through participating planning, knowledge and training management***

***Goal 17: By the end of 2015, to update and to adopt, through participating methods, the strategy and the action plan for biodiversity as the instrument of biodiversity conservation policies and the national application of dispositions of biodiversity convention.***

The success on the implementation of the National Strategy for the Biodiversity will depend on the understanding of the civil society, private organisms and public authorities about the importance of the biodiversity protection and the necessary measures for the effect. In this context, a lot of information, communication and environmental education initiatives were already undertaken by different implicated and committed actors. The effort of integration of the Environmental Education in the school programs is, in this context, merit of mention. It can be mentioned, among other, the Regional Program for the Environmental Education (PREE - Education Programme Régional Environnementale), that implicates seven coastal countries of PRCM, of Mauritania to the Sierra Leone, and that has been really supporting the process of integration of the environmental education in the school programs, elaborating pedagogic tools, training the trainers in the use of those tools and supporting field projects in different countries.

***Goal 18: By the year 2020, to respect and to make them be respected, according to the national legislation and the international obligations, the traditional knowledge, innovations and local ethnic communities' important practices for the conservation and the sustainable use of biodiversity, as well as the common use of these biological resources, integrating and making***

*them reflect in execution of the Convention dispositions, with the full and effective participation from the local ethnic communities at all the levels.*

In 2010, FIBA, through RAMP AO, financed a study about the Sacred Natural Sites (SNS). In the case of Guinea-Bissau, this study concluded that the designated Sites have, as the main function, the social reproduction and the accomplishment of traditional sociocultural activities. According to the authors (SAID et al., 2011), there is a very important collection of knowledge about the traditional forms of the space and natural resources management that extend to the whole ethnic territory or the villages and in which SNS is the main element. The rules of access and use of the inherent resources for SNS are well respected by the communities and they are composed by histories, myths, taboos and traditions that are learnt by each member of the community along the different period of their life, until the initial period in SNS.

For the access restrictions and the instituted use, the SNS studied present higher conservation levels than the spaces around it. This fact demonstrates equally its importance for the ecological functions and different ecosystem services that render the communities. In general, they present larger biodiversity and landscape wealth and they can help to combat the climate change effects, especially when it is about the carbon sequestration or protection of the coast in the remarkable islanders' environment. But the SNS, although well protected by the traditional rules, are threatened by several interests and in general they are not protected in an effective way by the effective sectorial laws, above all when located out of the onservation units. The conservation units, once delimited, can be, according to the law of the protected areas, made official by order of service of the State's institution, guardianship the environment.

The study mentioned still aims the need of knowing SNS better, its characteristics, the existing types, its management forms and its ecological and economic value, in way to develop juridical-legal and institutional mechanisms more adapted to its protection.

Financed since 2012 by the Swiss Foundation MAV A (initially through FIBA, that now melted with this first one), the project denominat ed PACT-Biodiv. (Valorisation du Patrimoine Culturel et Traditionnel pour la conservation de la Biodiversité) seeks to contribute for the reinforcement of the durability conservation actions of the marine and coastal biodiversity of AMPs of RAMP AO. This contribution should be given through the valorization of the cultural property, of its integration in the management systems of AMP, of the relative juridical aspect for the management of these spaces, of the conciliation of the objectives of the biodiversity conservation and the needs of a sustainable development.

This project is articulated around three complementary strategic components: i) the first component that has as attribution, the publication of the importance of traditional management methods, through the identification and publication of knowledge, norms and endogenous cultural practices (SENEP) and management modes of the associated biodiversity; ii) the second component has as objective support actions of promotion of these practices; the management of pilot-sites selected at the national level, through the reinforcement of capacities; and the supply of technical support; iii) the third component tries to influence the national policies related to the AMP management, through information, awareness, training and support for the involved decision makers in the management of the coastal and marine resources.

Recently, it is launched a consulting that is framed in the component 3 of the project, regarding the outlook of SENEP integration in the juridical, institutional and political tools, in general. This consulting served as reference aspect so that SENEP was taken into consideration in laws and regulations related to the conservation of the natural resources, especially of the marine and coastal ecosystems.

For the country to accomplish this goal, these concerns should not only be limited to the protected areas, but they should be extensive the the whole territory and national ethnic groups that maintain proximity coexistence and of reciprocity to their natural resources.

For this, knowledge, techniques and traditional practices linked to the biodiversity should be inventoried in the base of mutual agreements with the communities holders, seeking the best protection, maintenance, recovery and integration in the national efforts of the conservation and of the biodiversity valorization and of the ecosystems services.

***Goal19: By the year 2020, to get better shares, to transfer and to apply the knowledge, on scientific base and the linked technologies to the biodiversity, their values, operation, situation and tendencies and the consequences of its loss.***

The process of establishment of protected areas in Guinea-Bissau based on the results of rigorous inventories that identified the “hotspot” of the biodiversity of the country that allowed the selection and delimitation of the proposed areas for the classification. It was also thanks to pioneering scientific studies that documented the connection of the coastal zone of Guinea-Bissau to other regions and countries of the world, through the movements of birds, turtles and others animals.

To improve the knowledge about the biodiversity, their values, operation, situation, tendencies and consequences of their loss; valid scientific supports and credible should continue to be used. For that, scientific studies (namely integrated and leaning in international partnerships) that contribute for better knowledge of the biodiversity and of the operation of the ecosystems should be promoted. The studies should also help to understand the use of the spaces and of the resources for the populations, which will support the search of sustainable exploitation manners. In order to be valued properly, the results of the studies should have a wide diffusion, namely together with decision makers, population and all the other implicated actors.

***Goal 20: By the year 2020, to assure and to mobilize the necessary financial resources progressively to the effective execution of the Strategy and Action Plan for the Biodiversity, inclusively through the incorporation of innovative and more durable financing mechanisms.***

The difficulties faced in the execution of EPAN-BD are not exclusively financial, but lack of these resources is one of the principal fetters for these plans to reach the objectives of the predictable goals. Therefore, the search of the financial sustainability for the implementation of EPAN is one of the great challenges to be faced.

Financial sustainability is understood as the capacity of obtain stable and enough resources, of long period, to cover the necessary costs for an efficient management, allowing the reach of the social, economic and environmental objectives of EPAN. The financial sustainability does not

only depend on financial resources, but also on qualified human resources and on enough quantities to apply an action strategy (environmental policies) well defined.

Now, the management and the conservation of the biodiversity and the ecosystems services in the protected areas is still, in great measure, dependent on the support of projects of limited duration. The current financing of the protected areas and the biodiversity is based on projects of short duration, with resources to international donors.

To create more favorable conditions for the growth and consolidation of the EPAN recommendations, it is today necessary the increase of the financing of the sources already used and the search for new sources of resources. The establishment, implementation and consolidation of structures for the management and the biodiversity conservation and the maintenance of the ecosystems services request a stable financial flow, diversified and proportional to the needs of costs and investments.

There is a diversity of instruments in the world that can create resources for the implementation of EPANs. Some are already in use in Guinea-Bissau, others possess potential for, in the short, medium or long period; they also contribute to the financing of the actions and elected activities.

It is espectral that in the medium or long term the political and economic situation of Guinea-Bissau develops, opening the financing supporters for the implementation of this EPAN. In this context, the public budget can come to be an important source of resources, in spite of the present difficulties. The Expected economic growth can strengthen the private sector in the country, giving it the opportunity to come and share with the government and the society the bonus and onus of the conservation.

A tool that is contributing globally to the financial sustentainability of EPANs is the use of funds (financial mechanisms) environmental destined to the conservation, and, some of them, specifically for protected areas.

An environmental funds can be capitalized by the most several sources of resources, whether national, international, public, privates, volunteers, compensatory, regular or puntual. The funds can allow a great social control, visibility, transparency and cooperation among several actors.

In this context, Guinea-Bissau gave an important step when it created the Foundation Bioguiné. The challenge now is to capitalize it to perform a great function for which it was created.

Concerning the financing sources, due to the current economic context, in short and, possibly, medium period, the public budget is not shown as an expressive financing source for the implementation of EPAN. Due to the same political and financial fragility of the country, where the private sector, in a general way, does not possess a presence economically strong, it seems to be distant to count with that national sector as financing source for the conservation. An important exception to this case can be the mining sector.

In this context, the international cooperation appears as one of the main sources of resources capable to match with the demands of the execution of EPAN in Guinea-Bissau, namely with the GEF and bilateral cooperations.

Besides the bilateral and multilateral agencies, they possess an important function in the financing of the protected areas and in the conservation of the biodiversity in the developing

countries, the private foundations and international NGOs. Putting a part the use of own resources, they also collaborate with the management and with the leverage of the other international sources, giving credibility and visibility to the projects.

Among the possibilities of the international cooperation, there are two perspectives that can be interesting and they will be analyzed for the case of Guinea-Bissau. The first is the carbon market, mainly the volunteer. To access the great volumes of resources, a program should be structured based on the national scale and not going back to another specific area.

Another perspective of the international cooperation is the debt exchange by the nature. It is treated of an agreement among the creditors and debtors countries in which the debt is crushed and transformed in conservation projects. In spite of recent agreements result in a significant reduction of the external debt of Guinea-Bissau, it is believed that there is still space for the financing of the protected areas and conservation of the biodiversity of that instrument. Brazil and Portugal appear as potentials partners for schemes of debt exchange.

In a strategy of long period, in the expectation of a future political and financial stability, it can be expected that the public budget gradually pass to contribute with resources to the protected areas and the conservation of the biodiversity, habitats and ecosystems.

The same future can enable that the tourism becomes an important source of exchange value for the protected areas, once there are several attractives that can be offered to the visitors.

In the same way, the effective and efficient management of natural resources can generate exchange value for the protected areas and for the local economy. The sustainable wood extraction is an example, but it also necessary to think about non-woody forest products. It is necessary to elaborate businesses plans for these alternatives.

A focused strategy in direct use (management) and indirect (visitation) has high international appeal, for allying the conservation with the economic development. The government of Guinea-Bissau can structure a strategy or even national policies of conservation and development. Following the example of Costa Rica, it can enclose the conservation to the economic benefits resulting from the activities that can be practiced in the protected areas.

These policies can be centered in the international cooperation, in the reduction of emissions for deforestation and degradation (REDD+), visit and sustainable use of natural resources. The protected areas would be then a vector of economic growth, mobilizing the local and regional economy with the contribution of external resources and with the economic feasibility of local activities.

It is through REDD+ outlines (projects or programs) that the protected areas can be benefitted by the voluntary carbon market. The eligibility is justified for the importance of the protection system while barrier against the deforestation and conservation of the biodiversity. The protected areas do not just inhibit the deforestation in their limits, they also exert a reducer effect in the regional deforestation, above all in the areas on strong anthropic pressure with threat to the integrity of the forest in progress. It is particularly interesting that Guinea-Bissau develops a government program for the control of the deforestation, involving their group of protected areas, opting to motivate the development of isolated projects of REDD+ in other situations.

An innovative and ambitious strategy like this would need strong political support, not only of the sectors related to the environment, but of the national government's high step. Just with a strong sponsorship that will be able to have strategy with enough strength to move forward.

An aerial photograph showing a coastal wetland area. In the foreground, there is a village with many small, traditional houses with thatched roofs. The village is surrounded by lush green vegetation and interspersed with water bodies. In the background, there are large, interconnected water bodies and more green land. The sky is clear and blue.

*National Action Plan for Biological Diversity:  
2015 - 2020*

IBAP/PNTC

## 6. National Action Plan of Biological Diversity 2015 – 2020

<b>Global objective A: To deal with the fundamental causes of the biodiversity loss, making sure that concerns about the biodiversity are integrated and appropriate for the government and for the society in general</b>						
<b><i>National goal 1: Up to 2020, at the latest, 50% of the Bissau-Guinean population will have knowledge on the biodiversity values and on the measures that should be taken to conserve and use it in a sustainable way</i></b>						
<b>Action/Measure</b>	<b>Indicators</b>	<b>Responsible</b>	<b>Involved</b>	<b>Period</b>	<b>Indicative Cost</b>	<b>USD</b>
1. Establishment and operationalization of National Committee of Biodiversity	- Dispatch and notes of creation - Reports of the activities	SEA	MRN, MADR, SEP, MECD, MAT, MNECI, ONGs	By the end of 2 <sup>nd</sup> Semester 2016	18.000.000	30.441
2. Operationalization of exchanging mechanisms and exchanging of information on the (CHM) biodiversity and Access and Fair Shares of the Benefits	- Formed and operational institutional focal points - Available portal - Number of site users - Information, Education, Communication and Sensitization Programs	SEA	MADR, MRN, MTCU, MECD, ONGs	The end of 2 <sup>nd</sup> Semester 2016	30.705.000	52.000
3. To evaluate, to update and to publish in public, the policies, strategies, plans and the national programs related to environment (NPEM, NAPA, NAMA, PAN LCD, National Communications on climate change, ENAPCBD, etc.)	- Reports, evaluation syntheses - Number of published programs	SEA	MADR, National meteorology service, CHM, National media	2 <sup>nd</sup> Semester 2016	21.300.000	36.000
4. To present and to diffuse EPAN to decision makers, the large public and international organisms of cooperation	- Number of programs and different means used (newspapers, radios, TV, social nets, EVA's schools, Houses of Environment and Culture, etc.)	SEA	CHM, National media	1 <sup>st</sup> Semester 2016 The end of 2016	15.000.000	25.368
5. To elaborate and to implement information, education and communication strategies to the large public and to the specific sectors about	- Strategic plan of available communication - Nature and number of communication materials	SEA	PF, CNB e CHM-CDB	From the beginning of 2016	60.000.000	101.500

the Guinean biological diversity, its value, tendencies and consequences of its loss or degradation (exhibitions on BD)	elaborated and available - Number of accomplished campings					
6. To accomplish an inquiry to get different actors' understanding on the importance of the biological diversity	- Inquiry report - % of the population with knowledge on DB	SEA	PF, CNB e CHM-CDB	2 <sup>nd</sup> Semester 2016 e 2 <sup>nd</sup> Semester of 2020	12.000.000	21.000
<b><i>National goal 2: Up to 2018, the values of the biodiversity will be integrated into national and local strategies of development and of poverty reduction and in the planning procedures and incorporated into the national counting, according to the case.</i></b>						
7. To integrate and to perform the Policy and National Strategy of Biological Diversity in the public institutions and Non Government Organizations with competences in the conciliation among the ecosystems and the biological diversity management with the needs of a sustainable development	- Signed agreements and validated agendas with institutions and pertinent organizations; - Number of public institutions documents, NGOs and private sector that integrate environmental issues; - Level of incorporation of ENDB into the programs, policies and strategies of different sectors and organizations	SEA	MATPL, MRN, MADR, SEP, MECD, MAT, MNECI, MICA, NGOs	The end of 2017	7.000.000	12.000
8. To evaluate and to present the key ecosystems services and main values of the national critical biodiversity	- Systematization of information (database) regarding the uses and services of the biological diversity - Accomplished publications	SEA	MADR, MRN, MECD, SEP, National and international ONGs, universities, partnership	2 <sup>nd</sup> Semester of 2017	80.000.000	134.000
9. To qualify the institutional managers and leaders of public opinion for a better knowledge on the environmental, economic and social values of the biological diversity	- Training program consolidated and implemented - Number of training sessions - Number of trained people	SEA	Government Structure, the Parliament, National NGOs	From 2 <sup>nd</sup> Semester of 2016	30.000.000	50.000
10. Reinforcement of demands for previous studies for the installation of	- N° of reports of EIA - N° of plans of Environmental and		IBAP, CNB, CAIS	From 2 <sup>nd</sup> Semester of	2.000.000	3.350

infrastructures, in order to avoid negative impacts on the natural environment or the introduction of the compensation principle of degraded areas in the impossibility of outlining damages on the natural environment	Social Management			2015		
11. To integrate orientations to apply or to reinforce the valorization of the biodiversity in the Studies of Environmental Impact (SEI) and Strategic Environmental Evaluation (SEE)	- Instruments of environmental impact management updated (EIA's, AAE's) - % of programs, projects and strategies that consider the biodiversity and ecosystem services		CAIA, CNB, SPB	From 2 <sup>nd</sup> Semester of 2016	2.000.000	3.350
12. Reinforcement of capacities on the use of tools for the national accountancy of the environmental, economic and social services of the biodiversity and ecosystems	- Consolidated and implemented training program - Number of training sessions - Number of trained specialists		IBAP, MEF, CNB	From 2 <sup>nd</sup> Semester of 2016	20.000.000	33.500
13. Study about the economical evaluation of the biodiversity and the ecosystems payment services and development of instruments for its integration into the national accounting system	- Number of accomplished studies - Valorization and identification instruments of benefits of biological diversity identified and adapted in an inclusive way		IBAP, MEF, CNB	From 2016	180.000.000	300.000
14. To incorporate the biological diversity into the national accounting	- The level of considering the revenues originated of the biological diversity in the national accounts; - Part of public investments designated for safeguards of the biodiversity and ecosystems services		IBAP, MEF, CNB, ANP, DGA	From 2018	21.000.000	35.000
15. To evaluate the degree of taking into consideration the biodiversity and its impacts on the growth and in the reduction of poverty	- Rates of growth and reduction of imputable poverty of biodiversity		IBAP, CNB, DGA	2017	15.000.000	25.000

***National goal 3: by the year 2018, the country will have a diagnosis and an updated and available inventory on incentives and harmful subsidies to the biodiversity and the country will elaborate an action plan that seeks correcting, reducing or eliminating these negative incentives and promoting the positive ones for the conservation and sustainable use of the biodiversity and the ecosystems services.***

16. To accomplish incentives inventory and national subsidies in the different sectors and to analyze their efficiencies and impacts on the biodiversity and the maintenance of the ecosystems services	- Report of analysis on the beneficial and harmful incentives for the biodiversity	SEA	IBAP, CNB, MEF, DGT	1 <sup>st</sup> Semester of 2017	15.500.000	26.000
17. To elaborate a national action plan in order to reduce, reform and eliminate the harmful incentives and subsidies to biodiversity	- National Action Plan - List of incentives and harmful subsidies	SEA	IBAP, CNB, DGT	2 <sup>nd</sup> Semester of 2017	5.500.000	9.200
18. To develop and to publish incentives for the positive environmental externality	- List of positive incentives	SEA	IBAP, CNB, DGT, CHM-CBD	From 2 <sup>nd</sup> Semester of 2017	4.000.000	6.670
19. To promote the application of the orientations and CBD guides concerning the Strategic Environmental evaluations and to strengthen analyses on the biodiversity in EIA	- N° of applied guidelines	SEA	IBAP, CNB, CAIA, DGT	From 2017	12.000.000	21.000
20. To introduce environmental taxes and economic instruments as part of an Aspect of Environmental Fiscal Reform	- Study report on favorable fiscal mechanisms of the biodiversity conservation	SEA	IBAP, CNB, DGT, DGA	Financial year 2018	17.000.000	28.500

***National goal 4: By the year of 2020, the Government of Guinea-Bissau, the private sector and the groups of interest at all levels will have taken measures or will develop plans for production and sustainable consumption and they will have restricted the impacts of the development sectors with higher pressure on the biodiversity and natural resources.***

21. To identify and to promote good practices of durable use of biodiversity in different economic sectors and productive activities	- Study report on the good practices	SEA	IBAP, CNB, CHM-CDB	End of 2017	63.900.000	108.600
22. To value and to promote the production and consumption places,	- Systematized and registered			2 <sup>nd</sup> Semester	48.000.000	80.000

resorting to the campaign “Consume locally! What is from the country is ours”	valorization experiences, at the local, regional and national level	SEA	IBAP, DGA, CNB, CHM-CDB	of 2017		
23. To develop, in a participating form, guidelines and policies for the implementation of reducing/mitigating actions (NAMA, LEDS and MRV) appropriate to the country relatively to the three principal economic activities (agriculture, exploration of forest resources, livestock), associated to the deforestation and to the forest degradation	- N° of guidelines and policies	SEA	IBAP, DGFF, DGA, CNB, CHM-CDB	From 2016	25.000.000	42.000
24. To develop productive models that promote the sustainable use of the biodiversity components and the ecosystem services	- N° of synthesis document - N° of proposed and adopted models	SEA	IBAP, DGA, GPC, CNB, CHM-CDB	1 <sup>st</sup> Semester of 2019	32.840.000	55.000
25. To strengthen the conservation and the management of fishing biological resources	- N° of PMA and ZEEIB - N° of zones of reserved fishing - Management plans, focalization and evaluations	SEA	IBAP, CNB, CHM-CDB	From 2 <sup>nd</sup> Semester of 2015	80.000.000	134.000
26. To create and/or to rehabilitate specialized arboretum in order to manage, in a better way, different kinds of climate and vegetation’s and to operate seeds collection stations and the proliferation centers of useful plants	- No. of stations - Total no. of species - Total no. of produced plants	SEA	IBAP, DGFF, MADR, CNB, CHM-CDB	From 2016	110.000.000	185.000
27. To publish, to recommend and to implement the guidelines of good environmental and social practices for extractive industries	- Synthesis documents of good practices - N° of restitution sessions	SEA	IBAP, CNB, CHM-CDB	From 2 <sup>nd</sup> Semester of 2015	35.000.000	58.600

**Strategic Goal B. to Reduce the direct pressures on biodiversity and to promote its sustainable use**

***National goal 5: By the year 2020, to reduce more than half the degradation and fragmentation of the habitats and ecosystems, mainly, forests and more sensitive ecosystems, provoked by illegal activities***

28. To list the degraded areas and their respective causes in order to elaborate specific plans of prevention and recovery	- N° of work plan for the inventory - N° of inventory report	SEA	IBAP, CNB	The end of 2016	50.000.000	85.000
29. To elaborate and to implement sectorial, regional and local fiscalization strategies to reduce the degradation of ecosystems	- N° of strategy and fiscalization plan - Catalog of measures	SEA	IBAP, CNB, DGP	The end of 2017	20.000.000	33.500
30. To promote incentives that allow the participation of all the social stratum in the process of degraded ecosystems recovery	- % of the population who uses forms and rational methods of using the natural resources	SEA	IBAP, CNB, DGT, CHM-CBD	From 2 <sup>nd</sup> Semester of 2016	65.000.000	108.900
31. To implement compensation mechanisms in order to match the efforts gathered in the aspect of forest ecosystems conservation (REDD, REDD+,...)	- N° of mechanisms and projects	SEA	IBAP, MEF, CNB,	From 2 <sup>nd</sup> Semester of 2016	315.000.000	528.000
32. To elaborate a national strategy of ecological restoration of ecosystems and habitats in disappearance danger or which include threatened species	- Existence of a National Program of Ecosystems and Habitats Restoration - Existence of restoration protocols for ecosystems and/or identified strategic populations	SEA	IBAP, CNB,	From 2 <sup>nd</sup> Semester of 2016	15.000.000	25.000
33. To implement conservation activities as well as the activities to restore the ecosystems and degraded habitats	- Surface of restored spaces	SEA	IBAP, DGFF, CIPA, CNB,	From 2 <sup>nd</sup> Semester 2015	1.500.000.000	2.550.000
34. To identify and to intensify programs and susceptible actions of minimizing the repercussions for using the woody material, promoting the use of alternative energies sources	- N° of identified actions - index of implementation	SEA	IBAP, CNB,	From 2 <sup>nd</sup> Semester of 2015	280.000.000	469.000
35. To identify, to compile, to capitalize and to publish good and bad exploration practices and durable management of land and biodiversity in the several activity domains (agriculture, fishing, forestation, hunting, tourism, etc.)	- Synthesis document - N° of records of good practices - N° of good published practices - Percentage of good capitalized practices	SEA	IBAP, CNB, CHM-CBD	By the end of 2017	65.000.000	110.000

***National goal 6: By the year 2020, the management and the capture of any fish and invertebrates reservations will be sustainable, legal and done with the ecosystem application approaches and within the safe ecological limits; plans and recovery measures for more sensitive and/or threatened species will be put in practice***

36. To guarantee the conformity with the regulations as regards to fishing, reinforcing the activity of controlling, combating the illegal fishing, not declared and not regulated, and application of the appropriated sanctions regime	- N° of fiscalization missions - Index of applied sanctions	SEA	IBAP, CNB, CIPA, DGPA	From 2 <sup>nd</sup> Semester of 2015	896.000.000	1.500.000
37. To promote the territorial approach for handmade fishing for the right of access to the national citizens and the residents, especially in the zones of strategic interest for the environmental and food safety (including estuaries and islands)	- N° of approved despatch - N° of IEC meetings - N° of management plans - Follow up and evaluation report	SEA	IBAP, CNB, FISCAP, CIPA, DGPA	From 2 <sup>nd</sup> Semester of 2015	150.000.000	251.300
38. To reinforce the fiscalization, demolishing, and relocation of the illegal handmade fishing camps	- N° and results of fiscalization departure - N° of demolished and relocated camps	SEA	IBAP, CNB, FISCAP, DGPA	By the end of 1 <sup>st</sup> Semester of 2016	254.500.000	426.000
39. To reduce and to modify fishing activities that harm the sustainability of the populations and the conservation of marine and aquatic species	- Document of identification of harmful activities - Catalog of measures and actions - Follow up and evaluation report	SEA	IBAP, CNB, FISCAP, CIPA, DGPA	By the end of 2017	60.000.000	101.000
40. To establish measures to improve the fishing methods, in order to minimize the losses, accidental captures of whale, birds and turtles and negative impacts on the habitats and ecosystems, with the participation of the implicated sector and groups	- EIA of different kinds of fishing - Environmental management plan of different fishing business - Catalog of measures	SEA	IBAP, CNB, FISCAP, DGPA	By the beginning of 2018	20.000.000	33.500
41. To increase knowledge on the marine environment and its ecosystems	- N° of accomplished studies	SEA	IBAP, CNB, CHM-CDB, CIPA, DGPA	Until 2020	280.000.000	469.000

42. To demand the introduction of exclusion system (TED) for shrimp embarkations	- N° of embarkations that adopt TED - Inspection report	SEA	IBAP, CNB, FISCAP, IMP,	2 <sup>nd</sup> Semester 2017	4.000.000	6. 670
<b><i>National goal 7: By the year 2020, areas under agriculture, aquaculture and forest exploration will be managed in a sustainable way, assuring the biodiversity conservation, maintaining the essential ecological processes and the link among the different ecosystems</i></b>						
43. To incorporate the criteria of projects sustainability, agricultural, sylvan, and piscicultural programs into EIAS	- N° of EIAS that incorporate sustainability criteria	SEA	IBAP, CNB, CAIA, MADR, DGPA	By the end of 2017	12.000.000	20.000
44. To draw maps of agricultural and sylvan lands, and the lands which are meant for shepherd activities with view to their durable management	- Cartography of lands with different purposes - % of lands for each purpose	SEA	IBAP, GPC/SIG, CNB, MADR,	The end of 1 <sup>st</sup> Semester 2017	280.000.000	469.000
45. To review the national, regional and community plans for the arrangement and management of the territory, integrating zones consecrated to the agriculture, aquaculture and exploration use	- N° of reviewed plans - N° of plans that integrate those zones	SEA	IBAP, CNB, SEOT, GPC, MADR, SEPEN	By the end of 2017	30.000.000	50.000
46. To apply the principles of ecosystem approach in the agriculture, livestock, silviculture and aquaculture	- N° of places which will have applied the principles of ecosystem approach	SEA	IBAP, CNB, MADR, SEPEC	Until 2019	75.000.000	126.000
<b><i>National goal 8: By the year 2018, to identify the pollutant and the main pollution sources and to create the juridical-institutional mechanisms for its management and reduction at non harmful levels to the operation of ecosystems and biodiversity</i></b>						
47. To accomplish and/or to update the objects inventory, substances and dangerous organisms	- Inventory document - N° and kinds of dangerous pollutant	SEA	IBAP, CNB, Centro de Residuos/DGA, MADR	1 <sup>st</sup> Semester 2016	60.000.000	101.000
48. To identify the main harmful pollution sources to the ecosystems	- Study document	SEA	IBAP, CNB, Centro de Residuos/DGA, MADR	1 <sup>st</sup> Semester 2016	4.000.000	6. 670

49. To reinforce the controls and the inspection activities with strong pollution index	- N° of fiscalization reports	SEA	IBAP, CNB, Centro de Resíduos/DGA, MADR	From 2 <sup>nd</sup> Semester of 2016	12.000.000	20.000
50. To elaborate and to implement the National Policies of Basic Sanitation	- National Plan of Residues Management	SEA	IBAP, CNB, Centro de Resíduos/DGA, MADR	2 <sup>nd</sup> Semester of 2018	315.000.000	528.000
51. To create the Centers of Residues and Chemical Products in an integrated vision of gathering, treatment, valorization and final destiny	- N° of Centers	SEA	IBAP, CNB, Centro de Resíduos/DGA, MADR	Until 2018	1.250.000.000	2.125.000
52. To institute a quarantine system for suspicious organisms	- N° and species of organisms submitted to the quarantine regime	SEA	IBAP, CNB, Centro de Resíduos/DGA, MADR	From 1 <sup>st</sup> Semester of 2016	108.000.000	181.000
<b><i>National goal 9: By the year 2020, to identify exotic and invading species and their respective vectorial and to establish mechanisms for their control in order to prevent their introduction and establishment</i></b>						
53. To review and to update the existent legislations on controls of the introduction and dispersion of invading exotic species	- N° of updated legislations	SEA	IBAP, CNB, GRIAJ, DGA, MADR	1 <sup>st</sup> Semester of 2016	12.000.000	20.000
54. To elaborate Strategy and action Plan for Exotic Invading Species	- N° of strategic document - N° of action plan	SEA	IBAP, CNB, MADR	By the end of 2016	12.000.000	20.000
55. To develop mechanisms and measures to prevent the introduction, the establishment and control of exotic invading species, especially in the most critical ecosystems	- N° of developed measures - Presence and/or lack of EE	SEA	IBAP, CNB, DGA, MADR	2 <sup>nd</sup> Semester of 2016	175.800.000	300.000
56. To develop eradication programs of harmful EEI to the biodiversity and the ecosystems	- N° of existent programs - N° and type of eradicated species	SEA	IBAP, CNB, DGA, MADR	From 2017	30.000.000	50.000

57. To identify and to create a database of the main invading species established in the country and to evaluate those higher potential to cause environmental damages	- Database - N° of exotic invading species	SEA	IBAP, CNB, DGA, MADR	From 2016	12.000.000	20.000
58. To identify and to implement technological packages for the valorization of exotic and invading species	- N° of technological packages	SEA	IBAP, CNB, DGA, MADR	From 2017	65.000.000	110.000
59. To establish a rapid alert system on EEI	- N° of alert	SEA	IBAP, CNB, DGA, MADR	From 2 <sup>nd</sup> Semester of 2016	20.000.000	33.500
<b><i>National goal 10: By the year 2020, to identify the multiple anthropogenetic pressures on the mangroves, mud and sand banks and, moreover, marine and coastal ecosystems affected by the climate change or oceanic acidification and to establish strategies and programs so that their integrity and operation are maintained</i></b>						
60. To improve and to reform the government structures to assure management and an integrated conservation To improve and to reform the government structures to assure management and an integrated conservation	- N° of meetings among different intervening public structures - Group dispatch	SEA	IBAP, CNB, CHM-CDB	The end of 2016	4.000.000	6. 670
61. To identify, to recognize and to publish the government legislation, as well as the local community guidelines/laws/tradition that seek the protection and the sustainable use of the ecosystem and mangroves	- Catalog of laws and existing guidelines - N° of radio and TV emissions	SEA	IBAP, CNB, CHM-CDB	By the end of 2017	12.000.000	20.000
62. To monitor the variation in terms of extension and partition of different marine and coastal habitats, thus with the coast lines, with view to interpret and to understand the dynamics of occupation of the soil	- Satellite images , quick looks Ikonos, Spot (free) and of Google Earth - Aerial pictures - Letter of occupation of soils	SEA	IBAP, SIG/GPC, CNB, CHM-CDB	From 2 <sup>nd</sup> Semester of 2016	75.000.000	126.000
63. To accomplish vulnerability evaluation and to develop important adaptation measures to improve the	- N° of evaluation report - No. of measures	SEA	IBAP, CNB, CHM-CDB,	From 2016	254.500.000	426.000

resilience of prior ecosystems to the climatic change			CAIA			
64. To implement effective measures of evaluation, monitoring, surveillance and fiscalization for the mangroves protection	- N° of elaborated documents - N° of implemented measures	SEA	IBAP, CNB, CHM-CDB	From 2016	75.000.000	126.000
65. To accomplish consequent, participating and independent Evaluations of Environmental Impact before the approval of any development program/project or expansion that interferes with the mangroves ecosystem as well as the ebb	- Studies on Environmental Impact - Plans of Environmental management	SEA	IBAP, CNB, CHM-CDB, CAIA	From 2016	65.000.000	109.000
66. To promote the rehabilitation or supportive natural regeneration or intervention where the mangroves ecosystems don't have self-renovation capacity, including the restoration of hydrological regime and/or the mangroves plantation	- N° of Work programs - N° of reports and images of the qualified sites	SEA	IBAP, CNB, CHM-CDB, GPC, CIPA,	From 2 <sup>nd</sup> Semester of 2016	75.000.000	126.000
67. To promote and to improve the traditional techniques of conservation and sustainable management of the mangroves ecosystem and their sources	- Catalog of traditional techniques - Report of activities - Captured images	SEA	IBAP, CNB, CHM-CDB, GPC, CIPA,	From 4 <sup>th</sup> Trimester of 2015	60.000.000	101.000
68. To assure the conservation and the sustainable mangroves management based on an ecosystem approach	- Management and action Plan	SEA	IBAP, CNB, CHM-CDB, GPC, CIPA,	From 2017	25.400.000	42.500
69. To regulate and to implement appropriate measures to eliminate, to minimize or to mitigate the impacts of the pollution, including the pollution provoked by the spilling of garbages of different sources, sewer, oil and industrial fluids, solid and toxicant residues	- No. of implemented measures - Follow up and evaluation report - Visual images of the initiatives	SEA	IBAP, CNB, CHM-CDB, GPC, CIPA, GRIAJ	From 2 <sup>nd</sup> Semester of 2016	75.000.000	126.000
70. To identify and to improve the use of the best management practices for mangroves ecosystems through the research, education, training and incentives for the	- Document of research - Catalog of good practices - Adhesion and application index	SEA	IBAP, CNB, CHM-CDB, GPC, CIPA,	From 2017	254.500.000	426.000

fulfilment from the communities and other intervening actors	- N° of education and training sessions					
71. To recognize, promote and to assure that the cultural/historical ties and other traditional ties, particularly, the women's contributions for the conservation, rehabilitation and sustainable mangroves management are kept	- Documents of studies and inquiry - Study on the women's contribution	SEA	IBAP, CNB, CHM-CDB, GPC, CIPA,	From 2 <sup>nd</sup> Semester of 2017	35.800.000	60.000
72. To improve the opportunities and to promote alternative activities of income generating associated to the mangroves ecosystem	- N° of implemented activity - Follow up and evaluation report	SEA	IBAP, CNB, CHM-CDB, GPC, CIPA,	From 2016	254.500.000	426.000
73. To intensify training and sensitization sessions and current environmental education on the durable use of mangroves products	- N° of training sessions	SEA	IBAP, CNB, CHM-CDB, GPC, CIPA,	From 2016	25.400.000	42.500
<b>Strategical goal C: To improve the biodiversity situation, protecting ecosystems, species and genetic diversity</b>						
<b><i>National goal 11: By the year 2020, to strengthen and to consolidate the National System of the Protected Areas and to extend it to 26% of the national territory, covering the areas of special importance for biodiversity and ecosystem services, managed in an effective and equitable way, representative ecologically and satisfactorily interlinked, and to propose other special measures of conservation, integrated in larger terrestrial and marine landscapes</i></b>						
74. To elaborate and/or to update the management and businesses plans as well as the internal regulations of all the AP's	- N° of businesses and management plans - Internal regulations	SEA	IBAP, CNB, CHM-CDB,	2 <sup>nd</sup> Semester of 2016	30.000.000	50.000
75. To review and to update the AP's zone system, valuing scientific and local knowledge, and specially to assure the practicability of identifying and implementing this space arrangement	- Signal and buoying system of the external and internal limits of PA's	SEA	IBAP, CNB, CHM-CDB,	1 <sup>st</sup> Semester of 2017	60.000.000	101.000
76. To improve the effectiveness and the durability of the fiscalization systems, patrolling and surveillance in the protected areas	- Fiscalization strategy - Fiscalization and surveillance reports	SEA	IBAP, CNB, FISCAP,	From 1 <sup>st</sup> Semester of 2016	55.000.000	92.000

77. To promote the dialogue and the permanent adjustment with and in the resident communities and among all the interested parties, implicating them in all the conservation and management processes	- Meetings of management council - Reports of activities - Composition of organs and management, follow up and evaluation structures	SEA	IBAP, CNB, CHM-CDB,	From 2 <sup>nd</sup> Semester of 2015	92.000.000	154.000
78. To reinforce the infrastructures and equipments of all the protected areas to improve the operation and the working environment and to make them be attractive destinies for tourists and investors in tourism	- N° of notebooks of responsibilities - Jobs and equipments - Photographic images - N° of tourists and visitors	SEA	IBAP, CNB, CHM-CDB,	From 2 <sup>nd</sup> Semester of 2015	470.000.000	800.000
79. To consolidate the integrated management of the protected areas so that they can generate economic benefits, solve conflicts between wild animals and humans and to compensate the local communities	- Catalog of measures - No. and results of implemented actions	SEA	IBAP, CNB, CHM-CDB,	From 2 <sup>nd</sup> Semester of 2015	760.000.000	1.273.000
80. To identify the eco-development opportunities for the resident communities in and around the PA's	- Documents of development plans - Manual of good practices	SEA	IBAP, CNB, CHM-CDB,	From 2 <sup>nd</sup> Semester of 2015	1.300.000.000	2.176.000
81. To support the development of an ecotourism of reduced impact that benefits the resident communities	- Strategy and ecotourism action plan - EIA	SEA	IBAP, CNB, DGT, CAIA,	From 2 <sup>nd</sup> Semester of 2015	1.500.000.000	2.512.000
82. To identify habitats and non protected sensitive ecosystems, marine areas of ecological and biological importance particularly, and to accomplish inventory about the present biodiversity with view to its integration in SNAP	- Proposal of establishment of new protected spaces - Decree of establishment of new protected areas - Management plans - New map of SNAP	SEA	IBAP, CNB, CHM-CDB,	From 2 <sup>nd</sup> Semester of 2015	896.000.000	1.500.000
83. To evaluate the opportunities and potentialities and to retake the creation and the management process of the community forests	- Study of potentialities - N° of community forests made	SEA	IBAP, CNB, DGFF, KAFO	From 1 <sup>st</sup> Semester of 2017	150.000.000	251.300
84. To promote the creation and the durable use of forests and other sacred sites and support the elaboration of the respective	- N° of initiatives	SEA	IBAP, CNB, DGFF, KAFO	From 2 <sup>nd</sup> Semester of	150.000.000	251.300

management plans, seeking to integrate the biodiversity conservation their activities				2016		
85. To accomplish studies and negotiations in order to identify opportunities to increase the connectivity among current PA's through the creation of ecological corridors at the national level and with bordering countries	- Study documents - N° and minutes of local adjustment meetings and with congenerous from the neighboring countries - Signed agreements	SEA	IBAP, CNB	From 2 <sup>nd</sup> Semester of 2015	60.000.000	100.500
<b><i>National goal 12: By the year 2020, the extinction risk of the known threatened species will be reduced significantly, stopping the decline of the most threatened ones</i></b>						
86. To reinforce the juridical framing for the application of the laws associated to the illegal trade of fauna and flora and of derived products of threatened species	- N° of Regulation	SEA	IBAP, CNB, GRIAJ	From 2016	20.000.000	33.500
87. To conclude and to publish the red list of fauna and flora species and other taxonomic groups threatened in the country	- Red list of threatened species - N° of species integrated into the list	SEA	IBAP, CNB, GRIAJ	The end of 2016	65.000.000	110.000
88. To improve the management and conservation condition of threatened and vulnerable species	- Strategy and national plan of monitorship and conservation of threatened species	SEA	IBAP, CNB,	The beginning of 2017	76.000.000	127.000
89. To identify and to introduce measures and legal incentives for the ecosystems conservation and habitats of threatened species out of the protected areas	- N° of list of habitats and ecosystems - Catalog of measures and incentives	SEA	IBAP, CNB, DGFF	From 2 <sup>nd</sup> Semester of 2017	358.400.000	600.000
<b><i>National goal 13: By the year 2020, to maintain, through elaboration and execution of appropriate strategies, the conservation of cultivated species, of domestic animals, sylvan species and of other species of socioeconomic and/or cultural value</i></b>						
90. To update and to promote knowledge on genetic resources of animals and existent plants in the country	- Report of Study and Scientific Publications	SEA	IBAP, CNB, DGP, INEP	2017	30.000.000	51.000
91. Register the races in risk, to specify the nature of the risks, as well as the appropriate preservation measures	- List and no. of races in risk	SEA	IBAP, CNB, DGP, INEP	2017	25.000.000	41.800

92. To create means of treating, reserving and analyzing data and to establish a rapid alert system for animal races and vegetable species in danger	- N° created database - N° of alert	SEA	IBAP, CNB, DGP, INEP, SIG/GPC	2017	25.000.000	41.800
93. To maintain and to improve the genetic diversity of cattle species and cultures through <i>in-situ</i> and <i>ex-situ</i> (botanical and zoological gardens, lively museums, trees, banks of genes), of effective conservation measures and a safe use of biotechnology to improve the food security and the resilience of agriculture towards the climate change	- Surfaces of the installation zones of threatened species - Types of infrastructures and equipment's	SEA	IBAP, CNB, DGP,	From 2 <sup>nd</sup> Semester of 2017	180.000.000	306.000
94. To elaborate and to implement management plans of the genetic diversity of plants and threatened livestock	- N° of management plans - N° of genetic, threatened, maintained, and valued species	SEA	IBAP, CNB, INEP, DGP	From 2017	30.000.000	50.000
95. To regenerate and to conserve the germplasm of the varieties already introduced among the farmers;	- N° of germplasm banks - List of implicated species	SEA	IBAP, CNB, INPA, INEP	From 2018	18.000.000	30.000
96. To improve the genetics of the local races and to introduce improved races of animals of short cycle	- Document of study - N° and characteristics of improved races	SEA	IBAP, CNB, INPA, INEP	From 2 <sup>nd</sup> Semester of 2016	1.500.000.000	2.512.000

**Strategical goal D: To increase the biodiversity benefits and ecosystem services for all**

***National goal 14: By year 2020, supplying ecosystems of essential services, including services related to water and which contribute to the health, life and well-being means will be preserved, taking into consideration the needs of women, poor, of the most vulnerable people and of the local ethnic communities in relation to their sociocultural and religious reproduction***

97. To identify the ecosystem services of a particular value for the poorest and the most vulnerable, increasing their direct benefits	- N° of Studies - N° and list of the identified services	SEA	IBAP, CNB, INEP, GPC	From 2016	20.000.000	33.500
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98. To promote alternative income generating activities in the local communities	- N° of promoted activities	SEA	IBAP, CNB,	From 2016	1.300.000.000	2.176.000
99. To promote the implementation of integrated management plans of resources in water, including the protection and re-establishment of the critical wet zones	- N° of management plans	SEA	IBAP, CNB, DGRH, DGFF	From 2016	358.400.000	600.000
100. To update the evaluation of all the country's humid zones, to elaborate and to implement management plans in agreement with the management principles of Ramsar sites	- List of the wet zones - N° of management plans	SEA	IBAP, CNB, GPC, DGRH, DGA	Form 2017	358.400.000	600.000
101. To institute the attribution of incentives and annual recognitions of the best practices of public, private and community management at the local regional and national level in favor of the biodiversity conservation	- N° of sessions and attributed incentives	SEA	IBAP, CNB	From 2017	65.000.000	110.000
<b><i>National goal 15: By the year 2020, the resilience of ecosystems and the contribution of the biodiversity for reservations of carbon will have been increased through conservation actions and recovery, through the recovery of at least 15% of the most sensitive and degraded forest ecosystems, thus contributing to the mitigation and adaptation to the climate change and to combat the desertification</i></b>						
102. To stablish and to implement programs of gas emission reduction with greenhouse effect	- N° of programs	SEA	IBAP, CNB, INPA, INEP	From 2015	180.000.000	306.000
103. To review and to compile information on the possible contribution of the principal ecosystems in the retention and in the storage of carbon to increase the participation of the biological diversity and the resilience of the ecosystems in the storage of carbon	- Map concerning the main ecosystems with the mariority capacity of retention and carbon storage	SEA	IBAP, CNB, DGFF, P	By the end of 2017	110.000.000	187.000
104. To promote conservation actions and the sustainable use of the biodiversity which contribute actively to the mitigation and the adaptation to the climate change	- N° of programs, projects and actions plan - Results	SEA	IBAP, CNB, DGFF	From 2 <sup>nd</sup> Semester of 2015	30.000.000	50.000

105. To assure that mitigation actions and adaptation to the climate change consider the requirements of biodiversity conservation appropriately	- N° of measures	SEA	IBAP, CNB, DGFF, DGA	From 2016	8.000.000	13.600
106. To continue and to improve the measuring process of the forest systems roles as drains of carbon and in the adaptation to the climate change	- Tons of carbon captured annually by forest systems	SEA	IBAP, CNB, DGFF, DGA	From 2 <sup>nd</sup> Semester of 2016	20.000.000	34.000
107. To maintain or to restore the species adaptation capacity and the capacity of key-habitat recovery which work as drains or reservoirs of carbon	- N° of habitats and preserved species	SEA	IBAP, CNB, DGFF, DGA	From 2016	150.000.000	251.300
<b><i>National goal 16: By the end of 2016, to assure the formation, adoption and function of a simple and efficient juridical-legal aspect which allows the execution of Nagoya Protocol, especially in terms of Access to Genetic Resources and the Fair and Equal Partition of the Derived Benefits of its Use, in conformity with the national legislation</i></b>						
108. To conclude and to operate the juridical, institutional and regulating instruments on ABS	- N° of instrument	SEA	IBAP, CNB, GRIAJ	From 2016	8.000.000	13.600
109. To develop and to implement a national program of training for ABS regime	- N° of training sessions	SEA	IBAP, CNB, DGFF, DGA	From 2 <sup>nd</sup> Semester of 2016	12.000.000	785.000
110. E To establish programs / projects that contribute to improve the access and the benefit-sharing to assure that the interested parts benefit sufficiently of the biodiversity conservation measures	- N° of programs/projects	SEA	IBAP, CNB	From 2 <sup>nd</sup> Semester of 2016	65.000.000	110.000
111. To launch a pilot initiative, seeking the protection and the valorization of the traditional knowledge associated to the genetic and biological resources	- Quantity of valued knowledge	SEA	IBAP, CNB	From 2 <sup>nd</sup> Semester of 2016	22.000.000	37.500
112. To create operational mechanisms to protect the knowledge, the innovations and	N°. of created mechanisms - Quantity of knowledge and	SEA	IBAP, CNB, DGA	By the end of 2016	16.000.000	26.800

the autochthonous and local communities' practices, consolidating the traditional ways of living which present an interest for the conservation and durable use of the biodiversity	protected innovations					
<b>Strategical goal E: To increase the implementation through participating planning, knowledge and training management</b>						
<b><i>National goal 17: By the end of 2015, to update and to adopt, through participating methods, the strategy and the action plan for biodiversity as the instrument of biodiversity conservation policies and the national application of dispositions of biodiversity convention</i></b>						
113. To institute a coordination cell, follow up and evaluation of EPAN	- N° of Dispatch of SEA - N° of coordination meetings	SEA	IBAP, CNB, DGA	2 <sup>nd</sup> Semester of 2015	20.000.000	33.500
114. To establish collaboration and cooperation mechanisms in the implementation and development of the Strategical Plan and to guarantee the participation of all the important actors	- N° of mechanisms	SEA	IBAP, CNB	2 <sup>nd</sup> Semester of 2015	32.840.000	55.000
115. To establish decision mechanisms and united regulation to implement the measures contained in the Strategical Plan that affect different sectorial policies	- N° of mechanisms	SEA	IBAP, CNB	2 <sup>nd</sup> Semester of 2016	20.000.000	33.500
<b><i>National goal 18: By the year 2020, to respect and to make them be respected, according to the national legislation and the international obligations, the traditional knowledge, innovations and local ethnic communities' important practices for the conservation and the sustainable use of biodiversity, as well as the common use of these biological resources, integrating and making them reflect in execution of the Convention dispositions, with the full and effective participation from the local ethnic communities at all the levels</i></b>						
116. To register and to diffuse knowledge, innovations and the autochthonous and local communities' traditional practices	- Inventory of the traditional knowledge - N° of accomplished publications - N° of emissions in the averages	SEA	IBAP, CNB	From 2017	65.000.000	108.900
117. To develop laws and regulations to protect knowledge, innovations and the local communities' traditional practices	- N° of laws and regulations - Amount of knowledge, innovations and protected practices	SEA	IBAP, CNB, GRIAJ	From 2 <sup>nd</sup> Semester of 2017	22.000.000	37.400

118. To motivate traditional activities which promote the conservation of the biological resources (apiculture, medicinal plants, straw, etc.)	- N° of activities	SEA	IBAP, CNB,	From 2 <sup>nd</sup> Semester of 2015	180.000.000	300.000
<b><i>National goal 19: By the year 2020, to get better shares, to transfer and to apply the knowledge, on scientific base and the linked technologies to the biodiversity, their values, operation, situation and tendencies and the consequences of its loss</i></b>						
119. To compile and to synthesize scientific data and existent information about the biodiversity and to disseminate that knowledge for a large public	- Synthesis reports - N° of sessions and IEC campaigns	SEA	IBAP, CNB, INEP	From 2017	13.500.000	23.000
120. To promote and to stimulate researches that contribute to the knowledge and understanding of the biodiversity, of the ecosystem services, values and socioeconomic benefits for the human well-being	- N° of studies - Publications	SEA	IBAP, CNB, INEP	From 2016	57.700.000	98.000
<b><i>National goal 20: By the year 2020, to assure and to mobilize the necessary financial resources progressively to the effective execution of the Strategy and Action Plan for the Biodiversity, inclusively through the incorporation of innovative and more durable financing mechanisms</i></b>						
121. To develop and to implement resources mobilization strategy and an action plan for obtaining funds in favor of the biodiversity	No. of strategy and ction plan	SEA	IBAP, CNB	From 2015	30.000.000	50.000
122. To establish a working group of the State Administration for the study of fiscal mechanisms which seek to encourage the biodiversity conservation	- Dispatch of the implicated structures - N° of the group meetings	SEA	IBAP, CNB	The end of 2016	25.000.000	42.000
123. To promote the use of innovative financing mechanisms for the conservation and sustainable use of the biodiversity	- N° of mechanisms	SEA	IBAP, CNB	2 <sup>nd</sup> Semester of 2015	38.500	65.400
124. To reinforce and to enlarge partnerships with regional, sub-regional and international organizations on environmental subjects	- N° of signed agreements	SEA	IBAP, CNB	From 2016	15.000.000	25.000

## 7. Implementation, follow up and evaluation mechanisms

The elaboration of the Action Plan for the biodiversity has as a purpose to define solid measures for each strategic objective of the Strategy for the Biodiversity of Guinea-Bissau. This action plan will include, not only measures of the national responsibility, but also activities to be undertaken by the regions and the local communities and by other actors that interact with and on the biodiversity and that benefit from the services rendered by the ecosystems. It requires the effective and efficient implication of the local communities and of their representatives, of NGOs and AABs, of the civil society and of the private sector in the fulfilment of this plan, for that it is an essential condition for its success.

The institutional assembly and the follow up system of first EPANBD were treated in a very generic way, which may hinder the evaluation of their execution. Due to the multisector and the intervening actors' diversity in the environmental domain, in general and in the conservation and use of the biodiversity, in particular, it becomes indispensable the coordination and the cooperation among different intervention levels and implicated institutions.

The implementation of this strategy and action plan of second generation, for now elaborated, will be accompanied of the following mechanisms, control and efficient evaluation; this way, it can be possible to measure the progresses of achievement of its strategic objectives and subsequent readjustment. For that, a series of commensurable follow up and the indicators of evaluation and the progresses reached will be established.

### 7.1. Institutional Devices of Implementation

The effective implementation of EPANBD should base immediately on the attribution of responsibilities to the several institutions, at the national, regional and local, level which means the coordination among the different levels is indispensable. It is also important for its success that the different sectors of the society, namely the private sector, NGOs and the civil society in general are being taken into consideration and included along the process of its connection, elaboration and implementation. The State's Main Office of the Environment should assure the coordination of the activities and guarantee the integration of the several implicated sectors.

It is verified, however, that this State's Main Office has a little authority and flexibility to assume and to assure the necessary leadership to mobilize and to influence other ministries involved in the management of the biodiversity and of the environment. In this context, and yet considering the function that the new government prescribes in their strategic vision 2025 **Terra Ranka** for the biodiversity, it is revealed necessary the reorganization and the readjustment of the General Direction of Environment to the position of Ministry of the Environment, what would give it power to exercise more inclusive mandates than what it is actually accomplishing (see recommendations of PNGA). This Ministry would assure an effective coordination of the commitments of Guinea-Bissau in the aspect of the multilateral, regional and international agreements, in general and of CBD, in particular.

For the implementation of this EPANBD2, it will base on the existing structures, improving what needs to be improved for a better effectiveness. In the new organic structure of current SEA, it was recently launched the establishment and the institutionalized process of the National

Commission for the Biodiversity (CNB). The creation of this and other commissions in different thematic areas approached in the conference meet the international guidelines that mark these permanent management structures as the key element of the CBD implementation.

The CNB is an advisory organ concerning biological diversity; it is constituted by several sectors, of public and private ambit, and it will have as main function the accompaniment of the execution of the commitments assumed in the ambit of the Convention about Biological Diversity (CDB) and related agreements (as RAMSAR, CITES, CMS). More concretely, this commission should coordinate with EPAN-BD implementation, as well as to identify and to propose areas and priority actions for research, conservation, sustainable use of the components of the biodiversity, monitoring, evaluation, prevention and mitigation of impacts and partition of derived benefits of its use.

This organ is of multisectoral and interdisciplinary nature: the representatives of the ministries, regional governments, private sector, universities, nongovernment organizations, local communities and their representatives, associations and base groups and groups of economic interest propose, recommend and adjust policies, actions and measures to implement in an effective way the dispositions of the Convention about Biological Diversity and of the important national legislation regarding the matter.

The CNB, as an organ of information, communication, communication and coordination, should privilege and narrow relationships with the specialized Commission for the Environment and Natural Resources of the Popular National Assembly, of the Interministerial Commission for the Environment (the central government's organ), of the Advisory Council of the Environment, of the Regional Office of the Plan (regional governments), of the Management Council of the different protected areas and of Management Committee and other several initiatives, programs and environmental projects and of durable development.

## **7.2. Monitoring and evaluation**

In order to achieve the recommended results and to refocus the actions in case of need, follow up and evaluation mechanisms should be instituted nationally, regional and near the local communities, from the beginning of the implementation of EPAN-BD.

On the basis of pre-selected verifiable indicators at the elaboration of the logical participatory aspect, the follow up of the implementation progress of EPAN-BD should also be done under supervision of the National Commission of the Biodiversity. The regular and continuous accompaniment of the action plan execution is the responsibility of the General Inspection of the Environment and of the Regulatory Authority for the Environmental Impact Study of the permanent secretariat of CNB, through its Coordination Cell.

An independent mid-term evaluation should be applied in the middle of 2017. The final evaluation of EPAN-BD should be accomplished in 2021, supplying information about the contribution of Guinea-Bissau for the accomplishment of the objectives of Aichi as well as the good lessons obtained in the implementation of this instrument in the country. The progresses and the environmental and socioeconomic impacts will be presented to CBD in the 6<sup>th</sup> national report, in 2018, and in the 7<sup>th</sup>, in 2022.

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