REPUBLIC OF GUINEA-BISSAU

SECRETARY OF STATE FOR ENVIRONMENT AND TOURISM

Fifth National Report to the Convention on Biological Diversity

Bissau, 2014

INDEX

List of acronyms and abbreviations

AA	Environmental Evaluation
AAB	Associations and Bas groupings
ABS	Access and Just Benefit Sharing)
AD	Action for Development
AGIR	Support for Integrated Natural Resource Management
AMP	Marine Protected Area
AMPC-Urok	Community Marine Protected Area of Urok (Formosa, Nago and Chedeã)
AMP-I	Island Marine Protected Areas
AP	Protected Area
BAD	African Development Bank
BCP	Biodiversity Project Conservation
BIOMAC	Biodiversity Network of West Africa
BM	World Bank
B.O.	Official Bulletin
BP	Business Plan
CAIA	Unit for Evaluation of Environmental Impact
CBD	Convention on Biological Diversity
CBD-Habitat	Spanish Foundation for Biodiversity Conservation and Habitat
UNFCCC	United Nations Framework Convention on Climate Change
CG	Management Council
CIPA	Center for Applied Fisheries Research
UNCCD	United Nations Convention to Combat Desertification
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
CMS	Convention on Migratory Species of Wild Animals
COP	Conference of the Parties
DBT	Dulombi-Boe-Tchétché
DEA	Directorate of Agricultural Statistics
PRSP	Country Strategy Paper on Poverty Reduction
DGA	Directorate General of Environment
DGFF	Directorate General of Forest and Fauna
DGT	Directorate General of Tourism
EPAN	Strategy and National Action Plan
EPANBD	Strategy and National Action Plan on Biodiversity
FAO	United Nations Food and Agriculture Organization
FBG	BioGuiné Foundation
FIBA	International Foundation of the Banc D'ARGUIN
FISCAP	Surveillance of Fisheries Activities
GAECA	Support Group for Environmental Education and Communication
GEF	Global Environment Facility
GPC	Office of Coastal Planning
GTP / IE	Working Group on Petroleum and Other Extractive Industries
HIPIC	Heavily Indebted Poor Countries
IBAP	Institute of Biodiversity and Protected Areas
IBA	Important Bird Area
ICMM	International Council on Mining and Metals
ICOMOS	The International Council on Monuments and Sites
IDA	International Development Association
IICT	Tropical Scientific Research Institute of Portugal

IIEDD	Extractive Industries and Sustainable Development Initiative
ILAP	Small Poverty Assessment Survey
IMPAC	International Marine Protected Areas Congress
INE	National Institute of Statistics
INEC	National Institute of Statistics and Census
INEP	National Institute of Studies and Research
ISPA	University Institute of Psychological, Social and Life Sciences
LA	Environmental Licensing
LQAP	Framework Law of APs
MARD	Ministry of Agriculture and Rural Development
MERN	Ministry of Energy and Natural Resources
ODM	Millennium Development Goals
ODZH	Organization for the Defense of Wetlands
OMVG	Organization for the Development of The Gambia River
NGOs	Non Governmental Organizations
OPEC	Organization of Petroleum Exporting Countries
NTFP	Non-Timber Forest Products
PG	Management Plan
PNB	Boe National Park
PNC	Cantanhez National Park
PND	Dulombi National Park
PNLC	Natural Park of the Cufada Lagoons
PNMJVP	John Vieira and Poilão National Marine Park
PNO	Orango National Park
PNTC	Cacheu River Natural Park
PoWPA	Programme of Work on Protected Areas
PRCM	Regional Partnership for Coastal and Marine Conservation
RABBB	Bolama-Bijagós Archipelago Biosphere Reserve
RAMPAO	Network of Marine Protected Areas in West Africa
RAR	Early Warning Network
RBABB	Bolama-Bijagós Archipelago Biosphere Reserve
REDD	Reduced Emissions from Deforestation and Degradation
RNAP	National Network of Protected Areas
SEAT	State Secretariat for Environment and Tourism
SEADD	State Secretariat for Environment and Sustainable Development
SNAP	National System of Protected Areas
TAB	Gross Tonnage
UCF	Central Surveillance Unit
IUCN	World Conservation Union (International Union for Conservation of Nature)
UNESCO	United Nations Education Science and Culture Organization
WAMER	West African Marine Ecoregion
WCMC	World Conservation and Monitoring Centre
WI	Wetlands International
WWF	World Wide Fund for Nature
EEZ	Exclusive Economic Zone

List of Tables and Figures

Tables

Figures

Executive Summary

The objective of this 5th National Report is to increase social and political awareness about the importance of biodiversity and ecosystem services, highlighting their impact on the productive sectors and consequently human well-being. It is imperative that public sector, companies, communities and their representatives, as well as influential individuals have knowledge about the real contribution of biodiversity and ecosystem services in their economic and social development processes and the effects that policies and actions, whether individual or collective, have on recuperation capacity, resiliency and sustainability of natural ecosystems.

The search for solutions to current and future environmental problems requires an understanding of what is happening to biodiversity and ecosystems and how these changes affect the goods and services they provide (European Communities, 2008). Policy makers, decision makers and managers of deliberations with access to information about ecosystems and the values of their services are better positioned to make more efficient, effective and fair choices (TEEB 2009).

Guinea-Bissau has experienced several cycles of political and institutional instability over the past few years, particularly during the 2009 – 2014 five year period, (which corresponds to this reporting timeline).

It should be emphasized that the last military coup d'état that occurred in the country on 12 April 2012, changed the Constitutional Order and effectively halted all public and private institutions. The country became isolated by the international community; failed to meet deadlines for payment of salaries for public administration employees; coupled with bad results for the cashew crop for the year; are just some of the immediate consequences of military-political disruption. This current situation resulted in increased pressure on natural resources. Increased incursion into the exploitation of natural resources, on the one hand, arising from the binding of local communities to meet their basic survival needs, and on the other hand some alleged "economic operators" that came to see exploitation of natural resources as a way to recover or replace other sources of revenue lost, due to greater control from the exterior (for instance, the case of drug trafficking activities). The uncontrolled plundering of natural resources by these economic agents of convenience was greatly favored by complacency, if not complicity by some holders of civil and military power in the country.

In accord with the CBD format guidelines; this report has three main parts:

An update on the status of biodiversity, trends, threats and consequences for human well-being is the first part of this report. In this chapter, the immense dependence of the Guinean population on exploitation of biodiversity resources and its importance to economic development of the country is demonstrated.

The agricultural sector, accounting for 50% of GDP, employs over 85% of the population and is the backbone of the national economy, providing support for the overwhelming majority of the population and accounts for over 98% of national exports.

Rice is the main food crop (119kg/person/year) employing the largest amount of family labor and occupying more work time. This cereal is cultivated in about 80,000 ha with 45% on mangrove hydromorphic soils (saltwater fields); 18% on bas-fonds (small valleys freshwater fields); and 37% on rain fed forest ecosystems and savannas where the very predatory practice of shifting cultivation are the dominant farming system. The system of cultivating in uplands (rain fed) is practiced in all agro-ecological parts of the country, where it is associated with the cultivation of rice and other secondary crops like corn/maize, peanuts/groundnuts, cassava, etc.

Bas-fonds (freshwater fields in small valleys) cultivating is prevalent in the East of the country; where of the potentially existing 200,000 hectares, only 13.5% is used, with productivity being from 600 to 1,200 kg / ha.

The Southern agro-ecological zone has the greatest agricultural potential of the country for mangrove rice with production covering the Quinará, Tombali and Bolama Bijagós Administrative Regions, together known as the "Southern Province" - where of the potentially existing 106,000 hectares, only 50,000 ha are partially managed for a production of between 1700-2600 kg / ha. Rice field production (mangrove and bas-fonds) represents 80% of rice production. The different types of culture are a function of different types of existing soils. The technology is rudimentary, inexpensive and its production is low.

The system of mangrove soil fields requires, in comparison with others, greater control in water management and organization of work.

The economy of Guinea-Bissau is highly dependent on the exportation of cashew nuts monoculture, being the World's 5th largest exporter. It is the most important cash crop since the year 2,000 representing between 88-98% of all exports.

The livestock sub-sector, with great potential, is represented by about 1.5 million heads of cattle, contributing around 17.0% to the formation of the national GDP and 32% of the agricultural GDP. The Eastern Province - Gabu and Bafata Regions, are the most representative. The production system is extensive and transhumance type. Cattle feed is based mainly on grazing and the use of crop residues. The major problem is water shortage for livestock during the dry season.

The production of short-cycle animals (poultry, goats, sheep, pigs, etc...) is ensured mainly by women and is a supplement to rural production and has great importance for social and economic systems.

The fisheries sector contributes about 40% of State revenue to the GDP with 12.7% of the primary sector and 7.1% of the total GDP. It directly and indirectly employs a very important quantity of the labor force and is central to the socioeconomic development of the country.

Thanks to very favorable environmental conditions and the upwelling phenomenon, the coastal zone of Guinea-Bissau has waters with one of the highest levels of primary productivity in the world.

The incomes from fishing and small-scale artisanal fisheries are mainly intended to meet the basic needs of the family and village.

Guinea-Bissau, due to its biological diversity of national, regional and international importance, has enormous ecotourism potential; a booming sector with the potential to generate a high volume of revenue. This potential depends on well preserved natural areas and populations of readily observable animals.

The forestry sector contributes about 2% to the GDP; and is a source of food; fuel wood; building materials for domestic and small scale industrial use; fibers; and medicines for the vast majority of the Guinean population.

Despite all these benefits, the forests ecosystems are characterized by either a marked deforestation for agriculture (shifting cultivation) as well as for timber for export that focuses on selective species. No restoration or reforestation actions are being carried out.

It should be highlighted that it has a diversity of trees and bushes used for collecting berries, roots, leaves and fibers (non-timber forest products). Secondary forest resources include game meat; fruits; rhizomes and spontaneous medicinal plants; fuel wood (firewood and charcoal); wood for construction; straws to cover houses; and vegetable fibers for the production of handicrafts.

The tourism sector in Guinea-Bissau is in its infancy even though the country has a highly biological diverse landscape in good condition. The link between biodiversity and cultures of different communities offers great potential to enhance the development of tourism. On the mainland, coastal and terrestrial protected areas of the interior are touristic power poles in development.

The Guinean coastal zone occupies about 70% of the country and extends over an area of approximately 180 km. It is covered by a major river system composed of different types of water courses and a wide variety of ecosystems that serve as spawning and migration route, harboring at a particular season large numbers of migratory birds from Europe, Asia and the Sub-Region; and for the development of some of the most pelagic fish that migrates along the West African Coast.

In addition to its national strategic importance, it also has an international ecological function of great importance, serving as habitat for reproduction, growth, feeding and refuge for several species of both economic as well as cultural interests, symbolic, and species classified worldwide as rare or threatened.

The mangrove ecosystem is the most representative vegetation of the coastal zone of Guinea-Bissau. Estimates point to about 8% of the inlands being populated by mangrove ecosystem, distributed along the coast, estuaries, rivers and streams. Guinea-Bissau is among the top 15 countries in the world and second in Africa (after Nigeria), with the largest areas of mangroves. Their root systems have very dense core and fix sediments, thus limiting coastal erosion and providing ideal shelter for small organisms.

The marine environment of Guinea-Bissau is not only rich in terms of biomass, but also in species diversity. This richness is associated with factors such as the existence of an elongated continental shelf, which is of shallow depth and tranquil coastal waters, that in the rainy season transport large volumes of river water with organic debris and suspended materials with silt, rich in dispersed benthic fauna, hosting thousands of birds in the winter, especially those flying in the East- Atlantic migratory route.

Wetlands and inland waters - A network of different existing watersheds feed a wide variety of dependent wetlands in the hydrological regime and cover an area of approximately 18,000 km2. Its main activities are fishing and agriculture, along with collection of mollusks, grazing cattle and leisure activities.

Ecologically speaking, wetlands are a key element in the water cycle contributing to the supply of groundwater; prevention of flooding; shoreline stabilization; retention of sediments and toxic products; retention of nutrients; and biomass exportation.

The status and trends of national biological diversity have had very little evolution in terms of data availability, except for Parks where some things are being done; with emphasis on fauna, where there has been more data.

The status and trends of terrestrial ecosystems is characterized by a high rate of deforestation, whether by itinerant agriculture (burning) or by over exploitation of disproportionate species during logging. This situation causes a high level of fragmentation; a clear and alarming decrease in the surface of the more dense vegetable formations substituted by less dense low formations and cashew monoculture.

Marine and coastal ecosystems reveals a rapid and continuous population growth and consequently more demands which has as an immediate consequence an increase in harmful practices on natural resources. These tendencies accelerate increases in poverty; degradation of the environment; demand for more space for housing, agriculture and other economic activities; decreased rainfall and consequent loss of biodiversity in the country. These facts have generated conflicts between the imperatives of human development versus environmental values in general.

The acceleration of acidification, salinization and the appearance of soil erosion are the medium and long term consequences of intense deforestation.

The fisheries sector on the coastal zone has been facing pressure, threats and increasingly worrying ecological and social impacts.

The fauna, although still relatively little studied, is extremely rich; however, it has not been possible to follow its evolution and assess the degree of threats.

The waters of Guinea-Bissau figure on the list of the richest in terms of fish with a high diversity of fishery resources. Compared with the continental part of the country, the insular part presents lower faunal diversity. The Bijagós Archipelago was classified as a UNESCO Biosphere Reserve in 1996 and more recently, as a RAMSAR site on 21 January 2014.

Key factors which cause accelerated degradation and soil erosion, fragmentation of habitats, the decline in water resources and the rapid decline of biodiversity and ecosystem services were identified.

Among the anthropogenic factors that contribute to the degradation of the vegetation cover, the ones that stand out most, among others are: i) traditional farming practices "shifting cultivation"; ii) unbridled extension of the surface occupied by cashew monoculture; iii) exploitation of wood materials for the construction and production of domestic energy from firewood and charcoal; iv) anarchic exploitation of industrial wood; v) burnings (poaching, exploitation of honey, and uncontrolled fires, etc..); vi) development of the emerging mining sector; vii) anarchic occupation of spaces, and; viii) irrational exploitation of resources.

The subchapter on socio-economic, cultural and ecological consequences due to the loss of biodiversity and ecosystem services points to savannization and weed invasions as the main impacts that arise essentially from agricultural activities, exploitation of forestry and fisheries resources.

Part two of this report describes national biodiversity strategies, action plans, implementation and mainstreaming of biodiversity into the different sectorial policies and programs. It is clear that the country has not updated its EPAN and consequently the objectives of the New Strategic Plan for Biodiversity 2011 - 2020 and the Aichi Targets have not yet been mainstreamed into them. This part of the report describes the institutional mechanisms; the legal and regulatory framework; strategies, programs, and relevant national action plans; as well as Sub-Regional cooperation and international conventions established and adopted after the Fourth Report and how they have contributed to the implementation of the Convention on Biological Diversity.

The third part of this report is concerned with progress toward the Aichi 2020 Biodiversity Goals and contributions to the Millennium Development Goals.

Introduction

Guinea-Bissau is a coastal country in West Africa in the transition zone between the Sahel-Sudanese and Congolese Guineo domain displaying remarkable biodiversity recognized worldwide. The Guinean population, mostly live and depend on these diverse biological resources, which are the basis of its economy and its welfare.

Guinea-Bissau, as other countries worldwide, aims to conserve this heritage, which has been given by previous generations to future ones and Humanity. Consequently, it joined the other partner countries in signing on 12 June1992, and ratifying on 27 October 1995, the Convention of Biological Diversity, whose aim is to conserve biological diversity, the sustainable use of its components and the fair and equitable sharing of benefits derived from it. The signatory countries are obliged to take measures necessary to achieve these goals including through the National Strategy and Action Plans for Biodiversity Conservation. The first version, in the case of Guinea-Bissau, was drafted in 2002.

The ethnic populations of Guinea-Bissau have developed and applied elaborate methods to manage spaces and natural resources that still persist in some areas of the country. As a coastal country, Guinea-Bissau decided to prioritize a Coastal Zone Conservation Program as part of its strategy for conservation. Under this program the traditional conservation methods were appreciated and a National Protected Areas System was created consisting of six Marine Protected Areas, one of which is rated *"Gifts to the Earth"* under the WWF campaign program; one Biosphere Reserve in the Bijagós Archipelago and one as a RAMSAR Site; which all together cover about 14,9% of the national territory surface. Currently under the framework of the 10th COP and the adoption of the Aichi Strategy, Guinea-Bissau intends to increase its conservation efforts through the Protected Areas of the continental interior, which will lead to the National System of Protected Areas covering about 26 % of the national territory. This is a clear manifestation of its political will and tremendous effort for a small and poor country, within the context of global efforts for conservation. These decisions testify to the level of responsibility that conservation problems are carried out and how important it is to manage biodiversity for its people and for the world.

Despite these efforts being made in conservation, it appears that there are numerous pressures on resources and services of biodiversity, including some causing irreparable loss to the country.

The presentation of this Fifth Report, which is one of the obligations of the signing parties to the Convention, intends to inform on progress in biodiversity conservation, i.e. the implementation of the strategy and action plan for biodiversity since the previous report (i.e.- 4th Report). It also includes the results achieved in the development and implementation of the Strategic Plan 2011-2020 and the Aichi Biodiversity Targets with its main elements integrated in the process of updating the Strategy and National Action Plan for Biodiversity. This report consists of three main parts:

1.Update on status and trends of biological diversity; the dangers that threaten it and its consequences on human well-being;

2.Strategies and national action plans and their implementation and mainstreaming of biological diversity; and

3.The progress achieved in pursuing the objectives of Aichi 2010-2015 Biological Diversity Targets and the 2015 Goals of the Millennium Development Goals (MDGs).

In summary, the report shows that considerable progress has been achieved including the consolidation of the institutional framework, increased ecosystem representation and management of protected areas and the mainstreaming of biodiversity into sectorial strategies and the Country Strategy Paper on Poverty Reduction. But also regression was observed in certain areas which relate to the cyclical situation of political-governmental instability that the country has suffered since 1998.

1 - UPDATING BIODIVERSITY STATUS, TRENDS, THREATS AND CONSEQUENCES FOR HUMAN WELL BEING

1.1. Importance of biological diversity and ecosystem services for Guinea-Bissau

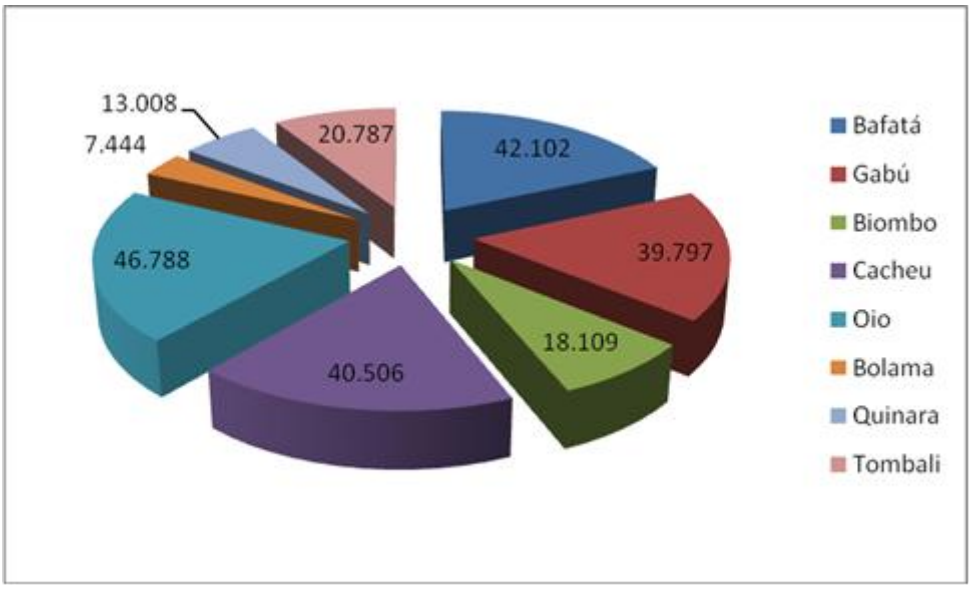
1.1.1. Level of productive sectors

The majority of the Guinean population directly depends on the exploitation of biodiversity and natural resources for their survival. Whether on the macro or the micro level, agriculture and exploitation of natural resources are the basis for economic development of the country. This describes the importance of biological diversity and ecosystem services in different economic sectors in Guinea-Bissau:

1.1.1.1. Agricultural sector

The agricultural sector, accounting for about 50 percent of the GDP and employing more than 85% of the population, is the backbone of Guinea-Bissau's economy. This sector is a nerve center that provides livelihood for the overwhelming majority of the population and plays an important role in the country's exportation. Agricultural exports represent more than 98% of total exports of goods. (MARD 2002; PRSP II: 2011).

Figure 1: Distribution of agricultural holdings by Region



Source: DEA, UEMOA, 2013.

The cultivation of **rice** (*Oryza L.)* represents the main food crop, both in terms of utilization of family labor as well the total working time invested annually. Rice as the main staple food (119 kg / person / year) is produced by three different systems, i) upland plateau or "Mpam-pam" by *shifting cultivation;* ii) in the hydromorphic mangrove soils "salty water fields"; and iii) *"bas-fonds"* small valleys, commonly known as " freshwater fields". A surface on the order of 80,000 ha is cultivated with rice, of which 45% with mangrove rice; 37% with upland rice; and the remaining 18% with bas-fonds rice (MARD 2002). The 2013/2014 Agricultural Campaign

indicates a total production of 209,717 tons of rice, including all production systems described above (DEA, UEMOA, 2013).

Itinerant rain rice cultivation with burnings **"shifting cultivation"** is practiced mainly in forest ecosystems and savannahs. Although with small nuances here and there, this rain fed agriculture is generally the dominant cultivation system in the country. In the context of shifting cultivation selective cutting is carried out where the lower extract shrub species are cut down while the trees with a diameter (dbh) of approximately 40 cm and the palm trees are pruned. All of biomass from this activity is left in the field of cultivation. The vegetation is burned when dry, with tilling done at the beginning of the rainy season, followed by seeding of rice and other secondary crops. In the Bijagós Archipelago, unlike other regions of the country, sowing is done on the terraces, without turning the land.

In this form of organization of production applied in almost all agro-ecological zones of the country, the main crop is rice as there are other associated minor crops, including cow peas (*Vigna unguiculata);* peanut (*Arachys hypogaea);* cassava (*Manihotsp.);* maize/corn (*Zea mays);* millet (*Pennisetm americanum);* and sorghum *sp.*,as well as other vegetables and spices such as squash (*Cucurbita sp);* cucumber (*Cucumis sp);* tomato (*Lycopersicum esculentum),* chili pepper *(Capsicum frutescens);* roselle (*Hibiscus sabdariffa);* okra *(Hibiscus esculentus);* bitter apple (*Solanum esculentus);* and some plants of domestic utility, such as the calabash (*Lagenaria siceraria).* Production is destined essentially for subsistence, but when there are surpluses they are exchanged or sold to purchase other consumer goods or money normally used to pay the running expenses of the family. It is noted that about 80% of these surpluses are typically used to purchase food items that were not produced by the family.

The system of rice production in small valleys **"bas-fonds"** is present in all agro-ecological zones, but with greater relevance in the Eastern part of the country, where a potential of 25,000 hectares of irrigable bas-fonds exist in the Geba River valley alone. It is estimated that a total potential of 200,000 hectares are available for this type of rice production in the country, whereas only a tiny fraction (13.5%) of these harnessed potentials is utilized. The production efficiency in these valleys is between 600 - 1200 kg / ha. The total annual production of bas fonds (rain and irrigation water) is historically about 10% of national production (World Bank, 2009).

Some of the **"bas fonds"** and terraces of rivers in the East, especially in the Geba River are already **irrigated** through motor pumps and improved varieties are used, *"inputs"* and often the lands are prepared by tractors. With proper management, two (2) crops are obtained per year with proceeds going between three to five (3-5) tons every harvest.

The agro-ecological zone covers the Regions of the South – (Tombali Quinará and Bolama / Bijagós) and is recognized as the largest agricultural potential in Guinea-Bissau, especially for **"mangrove"** rice**.** This estimate is more than 106,000 ha are potentially suitable for the production of rice mangrove, with only 50,000 ha being partially reclaimed and managed by farmers. The Cumbidjã River Valley alone is considered the main rice growing area of fields with an estimated potential of 22,000 ha.

Without using mineral fertilizers, the cultivation of rice in the hydro morphs mangrove soils presents a higher yield compared to other systems and is also the most demanding in terms of water management. This traditional system likewise involves the construction and maintenance of anti-salt dams as well as manual execution of all activities, thus resulting in a very intensive system in terms of skilled manpower.

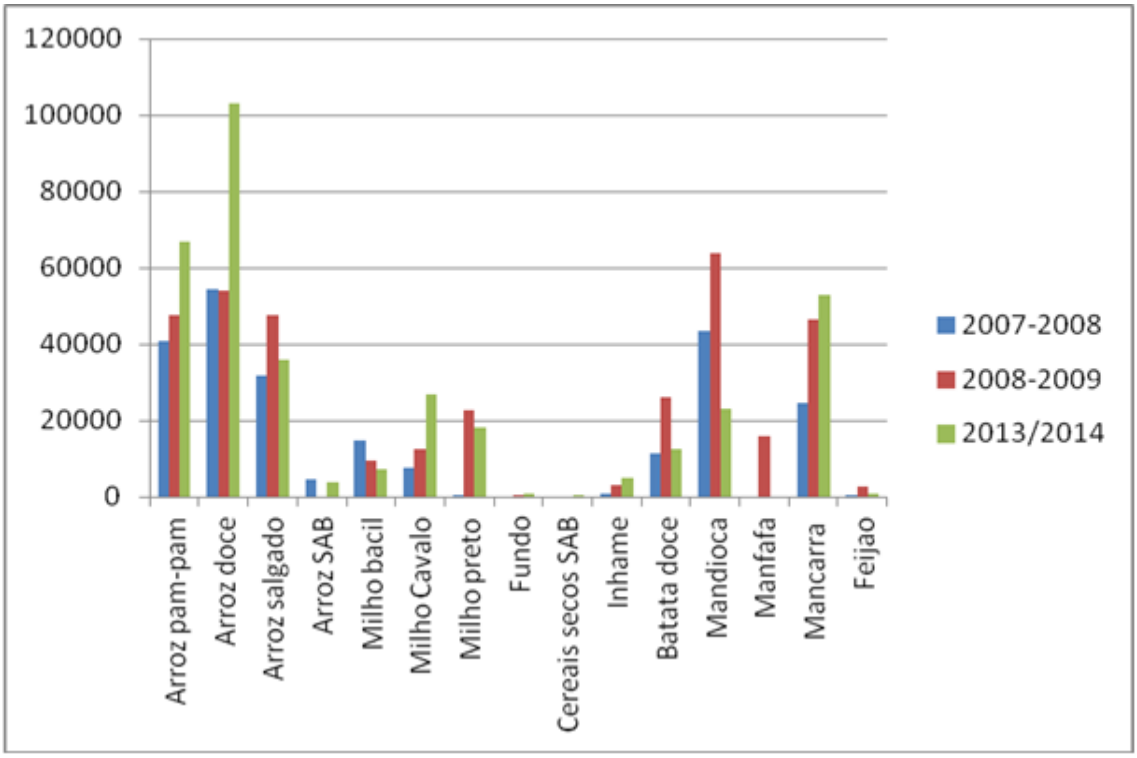
Mangrove rice yields vary between 1,700 and 2,600 kg / ha. The production of field rice was traditionally 80% of annual rice production, but it is estimated to have represented only 20% in 2007 (World Bank 2010).

The country's economy is hugely dependent on monoculture and export of cashew nuts (*Anacardium occidentale),* who's volume average production varies between 100 - 150 thousand tons / year. This **product for income** is grown by the vast majority of small producers and covers about 5 percent of the total land area of the country. Cashew is currently planted on 210,000 hectares, and it is estimated that their area increases by 4% per year, while production is growing at a rate of 10% (World Bank 2010). Cashew figures as the most important commercial crop for Guinea Bissau. Since 2000 this product represents between 88 and 98% of the total export revenue. This reality demonstrates the degree of dependence on exports of this crop, which is even higher than dependence on oil exports for most OPEC countries. Guinea-Bissau is the fifth largest exporter of cashew nuts after India, Vietnam, Ivory Coast and Brazil. However, unlike all other producers, most of cashew produced in Guinea-Bissau is exported raw. In 2011, the country exported about 174,000 tons of raw cashews. Whereas in India about 1 million tons are processed; 550,000 in Vietnam; 300,000 in Brazil; 35,000 in Mozambique; 32,000 in Tanzania; and 15,000 in Nigeria, in Guinea-Bissau the installed processing capacity is only 12,000 tons. Moreover, most of the processing capacity is of small scales, (units capable of processing between 1,500-2,000 tons per year) installed in the country are not used. In 2010 only 60 tons were exported as processed nuts, which clearly show that only a tiny part of this product is exported in the form of processed nuts (World Bank 2011).

Mango (*Mangifera indica);* bananas (*Musa sp);* citrus (*Citrus sp);* palm oil (*Elaeis guineensis);* cotton (*Gossypium);* and peanut (*hypogaea Arachys)* are other export crops with potential for development in the country. Crops such as sweet potatoes; beans; cassava (*Manihot sp);* yam (*Dioscorea sp);* corn/maize (Zea *mays);* millet (*Pennisetm americanum)* and sorghum are also grown, serving mainly for individual and family consumption or marketed on the national level, to neighboring countries and the Sub-Region. Dry cereals, notably millet predominate over rice in the Northeast and East of the country.

The production of vegetables: cucumber (*Cucumis sp);* cabbage (*Brassica sp);* lettuce (*Lactuca sativa);* tomato (*Lycopersicum esculentum);* chili (*Capsicum frutescens);* pepper (*Capsicum* annuum); roselle (*Hibiscus sabdariffa);* okra (*Hibiscus esculentus),* bitter apple (*Solanum incanum);* egg plant (*Solanum melongena),* etc. has increased recently, acting as a secure source of getting income. We are seeing, particularly in Bissau, huge implications from the dominance of women in this economic activity. In the dry season, the peri-urban horticulture covers between 70% and 80% of market demand for fresh vegetables, and in the rainy season and this coverage rate is reduced to 60%.

Figure 2: Agricultural production (in tons)



Source: DEA, UEMOA, 2013

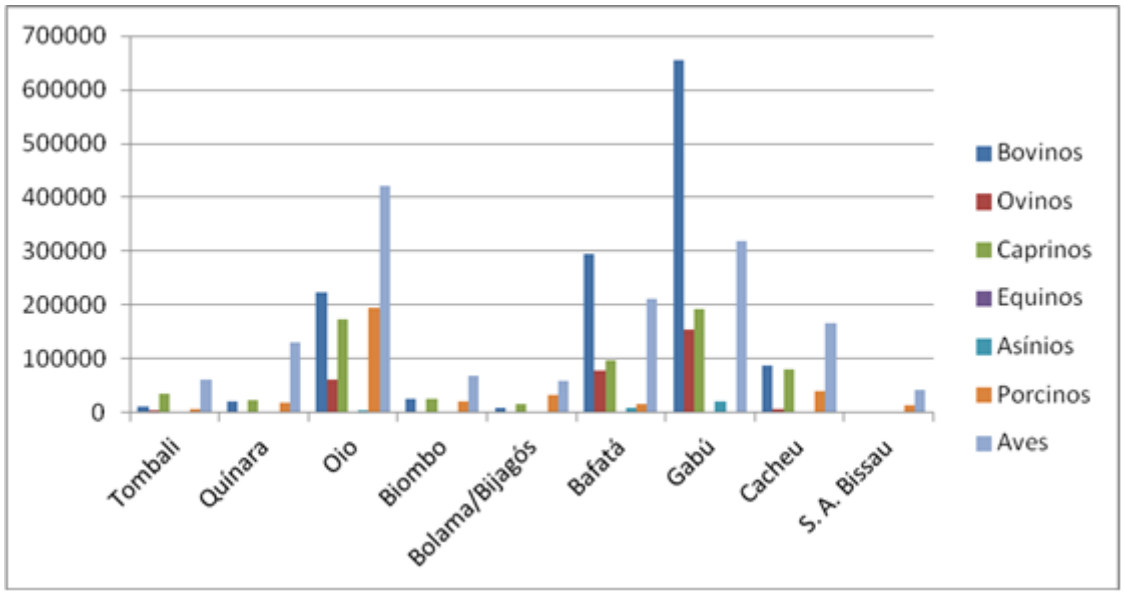
If there is a difference between the systems of production as far as the use of factors of soil production, water (regulatory functions of ecosystem services), technology and organization of the production process, it is not the case for the tools, the situation of active agricultural assets and the final yields.

The different soils and their fertility (production, storage and recycling of organic matter, soil formation and maintenance of soil fertility) used for agricultural purposes served as the basis for characterizing the different production systems existing. It should be noted that all systems resulting are highly dependent on rainfall patterns and rainfall differences (climate regulation, runoff, flooding and groundwater recharge) and soil fertility. The system of fields in mangrove soils requires, in comparison with others, greater control in water management and also better effectiveness in the organization of the work process. The technologies used across all systems are generally inexpensive and rudimentary, while agricultural assets are the oldest and involve very low rates of schooling. Rarely do they use inputs, so the capital investment, especially in major intensification factors (genetic material, mechanization, irrigation, fertilization and skilled labor) is almost nonexistent in the whole process of organizing production. In this sense, it could be said that the production is very dependent on natural conditions and its level is still very ecological.

The **livestock sub-sector** is represented by a total of approximately 1, 5 million head of cattle, contributing about 17.0% in the formation of the national GDP and 32% of agricultural GDP. According to the data of ADB / PRESAR 2009, Guinea-Bissau has great potential in the livestock domain. The development of this subsector is particularly notable in Eastern Province (i.e. in the region of Gabú and Bafatá). These two administrative regions harbor: 72% of the cattle; 76% of the poultry, 40% of the goats, 86% of the donkeys and 73% of the horses. In terms of cattle, sheep and donkeys, the Region of Oio is the third in order of importance after Gabu and Bafata. For the

class of small ruminants, in general, Oio is, after Gabu, the second largest area of concentration. Oio is the main Region for pork and poultry, representing 57% and 28.5% of the country's total, respectfully (DGP 2009).

Figure 3: Distribution of animals by regions



Source: Directorate General of Livestock 2009

Livestock production has developed very little in terms of the valuation of its products. The low genetic quality of breeds; animal diseases; conditions of supply; as well as the lack of basic treatment facilities for milk and meat are seen as the main constraints. As an example, there is "N dama" cow, which is very resistant and adapted to the natural conditions including the availability of food and water and resistant to some diseases, particularly in relation to bovine trypanosomiasis. However it is not a very productive race in terms of meat and milk. There is also the Boenca and Fulani N'Gabu spread throughout Eastern Guinea-Bissau and Manjaca race in the Central North and Coastal Zone. Some local races could be improved by the cross-breeding of Charolais (beef breed), Jersey (dairy breed) from France, Germany and Switzerland and Gir and Nellore Zeboides from Brazil:

The dwarf race goats and sheep in the Djallonke race should be given particular attention. In peri-urban areas, pigs are cross-bred with European breeds and especially the Iberian ones. In some centers pigs stocks were improved by the introduction of Large White, Landrace and Duroc swine. In order to intensify chicken meat and eggs, some breeds such Playmuth Rock, Sussex and Rhod Island were cross-bred.

The different production systems practiced in the country are extensive grassland type, with an assured supply for cattle mainly through grazing and waste from harvests. They are distinguished on the basis of the following mobility systems:

a) Nomadic: practiced by communities and families formed exclusively by shepherds moving almost permanently accompanied by his herd seeking water and pasture. It is a system which is now virtually non-existent as a result of Fulani herdsmen conversion to agriculture and sedentary life-styles;

b) The traditional pastoral transhumance, where there is periodic dislocation of animals to areas of pastures and water. This system is practiced by farmers, particularly the Fulani ethnic group, which in the dry season moves from the continental interior to the coastal plain in search of

pasture and water. Dependence on natural pastures obliges farmers to regularly made transhumance during the dry season in search of grazing areas still suitable with permanent availability of water and agricultural by-products. The frequency of transhumance is increasing (production services biomass, storage and recycling of nutrients and organic food) and are normally directed to more humid coastal plains. Each cattle raiser or groups of cattle raisers choose their routes and the people who accompany the cattle during transhumance.

c) Extensive, sedentary, agro-pastoral system is where in general the cattle raiser is also a farmer. The cattle are taken inside stables during the evening and / or for certain periods of the year kept in stables and / or corrals, depending on the ethnicity of the cattle raiser and the zone. Grazing is supplemented by domestic wastes and agriculture;

Semi-intensive to intensive systems are practiced particularly in peri-urban areas where the availability of pasture and crop residues is scarce and animals are usually tied.

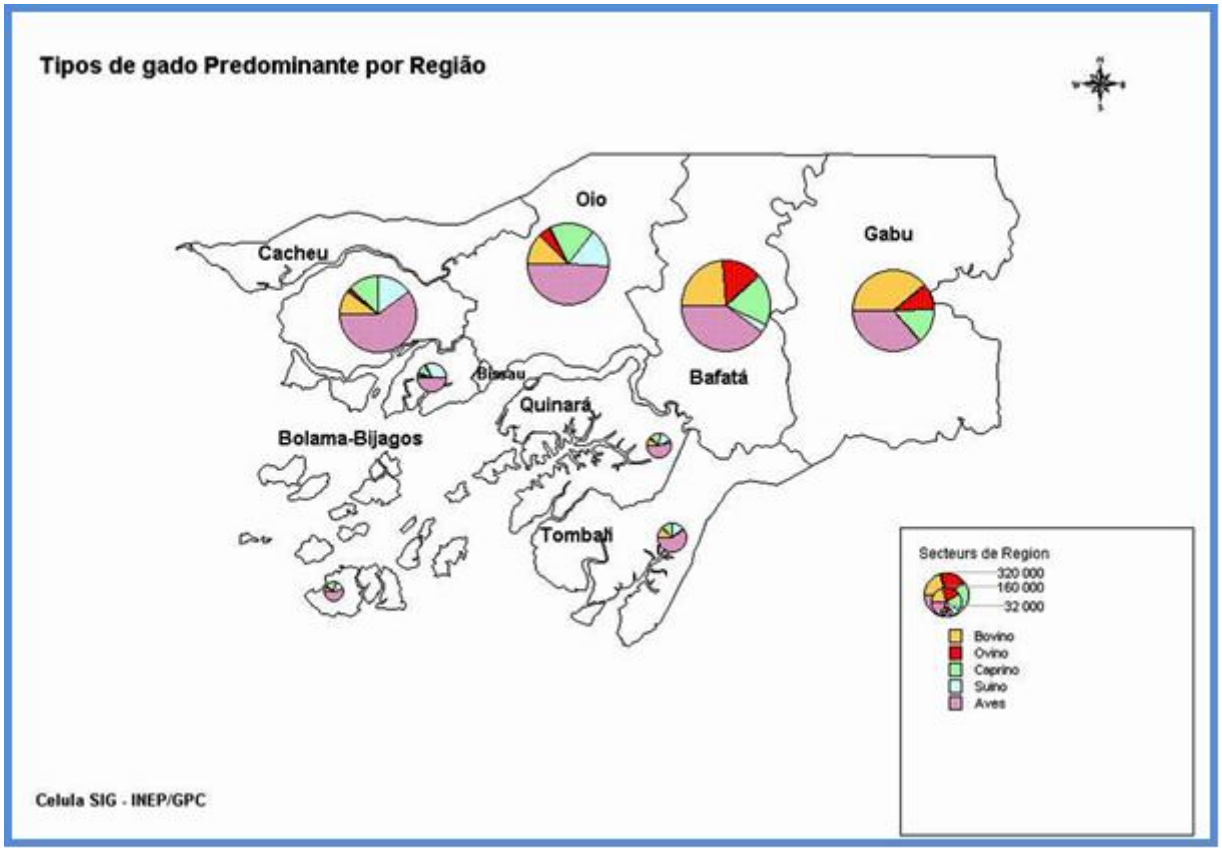
In general, production is still very low and very affected by the availability of water, food, hygiene, health and the general conditions of husbandry. Animal health extension services and are very deficient and consequently do not ensure efficient coverage at national level

The country continues to import meat, milk and dairy products. The reproduction of short-cycle animals (poultry, goats, sheep, pigs, etc...) is ensured mainly by women. The poultry industry is a component of rural production systems and is of great social and economic importance. Small units of semi-industrial production of eggs and chickens, poultry and swine production in recent years have been increasing, while milk production is still marginal and concentrated mainly at the level of Bafatá, Gabu and Oio Regions. Much of the coverage of urban demand for meat, poultry and derived products is still ensured by imports, often in the form of frozen products.

Despite the efforts that are being made in improving the dietary consumption, yet still the per *capita* / year consumption of meat is estimated at 11.3 kg; 10.8 liters of milk and 13 eggs (PGD, 2009). Domestic production of meat is also supplemented by venison. Although there is no more specific information about this type of production, it is observed that there is a considerable market with high demand which is mainly covered by clandestine hunting. There are no initiatives of domestication and intensification of production in captivity of some of these, such as for example, “bush chicken” (*Numida meleagris galeata);* partridge (*Francolinus*); wild ducks (*Dendrocygna* sp.); greater cane rats (*Ttryonomys swinderianus);* etc. whose meat is very well appreciated.

For some ethnic groups, in addition to social prestige, cattle have high socio-cultural and even religious value. Cattle are often used as dowry; for funeral ceremonies; and for sacrifices during great feasts. In the animist ethnic groups "*balobereos* "(masters of religious ceremonies believed to be endowed with super-natural powers) serve up the chickens to consult spirits on different aspects of the traditional family and community life.

Figure 4 Herds of animals by Region



Source: Directorate General of Livestock 2009

1.1.1.2. Fisheries Sector

The fisheries sector is equally of fundamental importance to the socioeconomic development of the country. Fishery resources represent a key element in the fight against poverty. Fish and shellfish are the primary sources of animal protein on a national scale, hence its vital importance to the economy and food security for the majority of the poorest rural population. Fishery resources represent, moreover, one of the main sources of foreign exchange inflows through licensing and for financial compensation resulting from agreements with foreign industrial fishing vessels operating in the waters of Guinea-Bissau.

Thanks to very favorable environmental conditions in the West African Region, the resulting configuration of the extensive and very shallow platform, numerous estuaries that provide fresh water, sediments and nutrients and the phenomenon of upwelling resulting from the encounter of cold currents coming from the North and those that are hot coming from the South, Guinea-Bissau's coastal area has one of the highest primary productivity levels in the world. This productivity, which influences the potential fishery resources on the national and Sub-Regional level, is still favorable.

The potential sustainable yield for all demersal and pelagic resources have been estimated at between 250 and 400 thousand tons, an amount that is influenced by annual variations in climatic and environmental factors and is the result of reviews with a degree of uncertainty embedded. The annual potential of demersal resources was estimated over successive decades between 40 and 100 thousand tons.

Since the pelagic resources are migratory, moving along the West African Coast on out to the Atlantic Ocean, (highlighting the case of tuna), it is very difficult to conduct an estimate of their potential restricted to the waters of Guinea-Bissau. Nevertheless, several reviews have estimated its annual potential in at least 235 thousand tons, of which only 110,000 tons are accessible to artisanal fisheries; 100 thousand tons of small pelagic and the remaining 125,000 tons are dominated by industrial fishing. Of the latter, at least 100,000 tons are small pelagic and 5-10 thousand tons of tuna (Ministry of Fisheries: 2008). In 2010, the fisheries sector generated at least USD14 million of revenue for the Government of Guinea-Bissau, essentially paid by foreign fleets for fishing access. Over the years, this amount has decreased. From previous agreements, the EU had paid about USD 15 million per year. However, the sector annually contributes between 25-40% of government revenue (PRSP II: 2011). The official contribution of fisheries exports of Guine-Bissau was estimated at 3.9%, which is relatively weak in view of the importance of fisheries in the country. Significant parts of fishery products do not land in national ports and therefore are not considered as exported from Guinea-Bissau – i.e. they are unreported and uncontrolled. Port conditions and poor availability of infrastructure for conservation (cold chain) is commonly used to justify the landing of fish in other ports in the sub region. The absence of sanitary control makes it difficult to track development of exports.

Most **traditional subsistence fishermen** only practice fishing partially; dedicating most of their time to farming activities. Within this perspective, the practitioners of this dual activity could thus be classified as farmer-fishermen. In subsistence fishing they mainly catch fish in nearby canals along the coast and mangroves using very modest means. The mangrove area is also exploited by artisanal small-scale fishers. For this type of fishing they use canoes (canoe paddle) or with outboard motors. These production units focus more on fishing for species of low commercial value, such as mullet *(Mugilidae);* tilapia (*Chichlidae)*; and bonga (*Ethymalose fimbriata).*

Traditional shrimp fishing is done on the coast and in the mangrove area. It is practiced mainly by women and tends to capture the migratory immature shrimp and few adults. A small portion of the fish is consumed as fresh shrimp, while a large part is dried and / or ground. The artisanal shrimp fishery for the domestic market is done on a small scale by artisanal fishermen who sell the products while still fresh.

Most tilapia (*Chichlidae*) and other species of small size are caught in saltwater fields and small river banks. The income from subsistence fishing and small-scale artisanal fisheries are mainly intended to meet the basic needs of the family and village, with any excess taken to local markets to be exchanged for other products of primary necessity, or sold.

Crustaceans and gastropods represent tremendous resources that are used to satisfy basic needs for animal proteins in the diet of most people of the Guinean coast and secondly, contribute to the individual and their families' income.

Throughout the coastal area, tagellus seashells (*Tagellus adansonii*); clams (*Anadara sinilis);* the Giant Hairy Melongena, (*Pugilina morio*); and False Elephant's Snout Volute Sea Snail (*Cymbium sp.*) are also exploited, but with less intensity. The last two are gastropods, due to its rarity, incidentally exploited when collecting shells. Among all mollusks described above, Tagellus seashells have higher commercial value, given its operculum (da Silva 2002).

Throughout the Guinea coast, the mangrove oyster (*Crassostra gasar*) is the shellfish most exploited for commercial purposes, especially in the northern regions of the country and nearby cities. The localities Quinhamel, Prabis, Bejimita (all located in the Biombo Region) and São Vicente are the main areas that exploit these mollusks, which are greatly appreciated nationally. St. Vincent, on the Cacheu River, has been the main center in recent years for collection and

processing oysters. The techniques used are rudimentary and the mangrove wood is the main source of energy used.

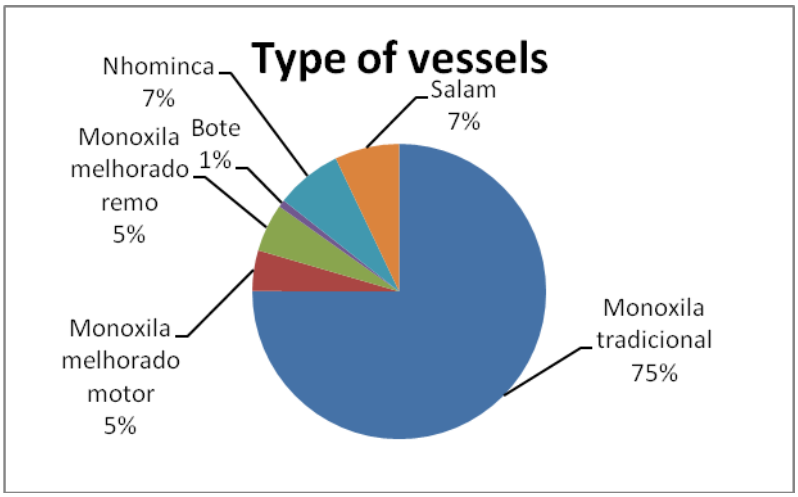
Artisanal fishery is concentrated in rivers and estuaries along the coast, especially the Bijagós Archipelago, Cacheu and Caió. Artisanal fisheries products are the main source of animal protein for the majority of the coastal population. Moreover, this sub-sector provides the primary raw material for small processing activities and marketing, exerted mainly by women.

The importance of fisheries in terms of duration and yield varies compared to rice cultivation in different parts of the country and among different ethnic groups. In the artisanal fisheries sector, fishery is performed by men, while the processing and marketing activity is predominantly by women.

The regular supply of fresh fish to domestic markets, particularly in Bissau, is guaranteed by the professional artisanal fishermen, most of who are from the Sine Saloum Region of Senegal. The fins of cartilaginous and "climbing" fermented fish are exported to the markets of Senegal and Gambia where they have greater commercial value.

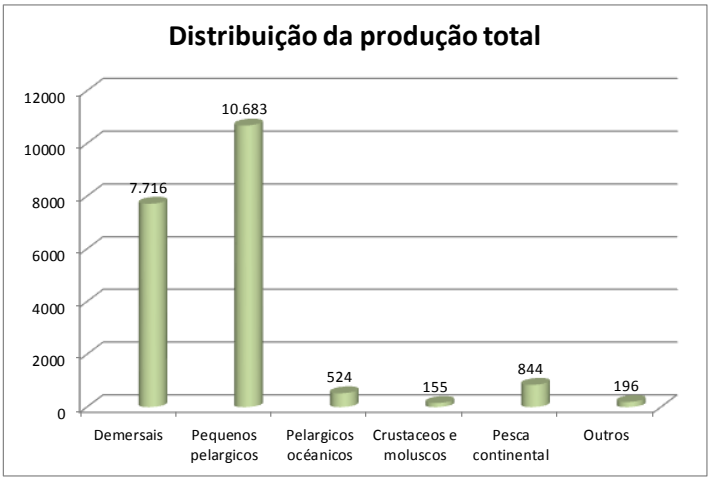
Mono-axle type canoes represent 75% of the total vessels used and are responsible for 54% of total fisheries production of the country. A total of 1,536 tons of fish caught were registered at the Bissau port in 2009 (GONZÁLEZ, 2010). This amount is greater than the production capacity of canoes based on this core fishing, since many landings are made by fishermen based in the islands, particularly Bubaque Uracane.

Figure 5 Number and type of canoes / boats



Source: González 2010

Figure 6: Production vessels surveyed in 2009 (Source: González 2010)

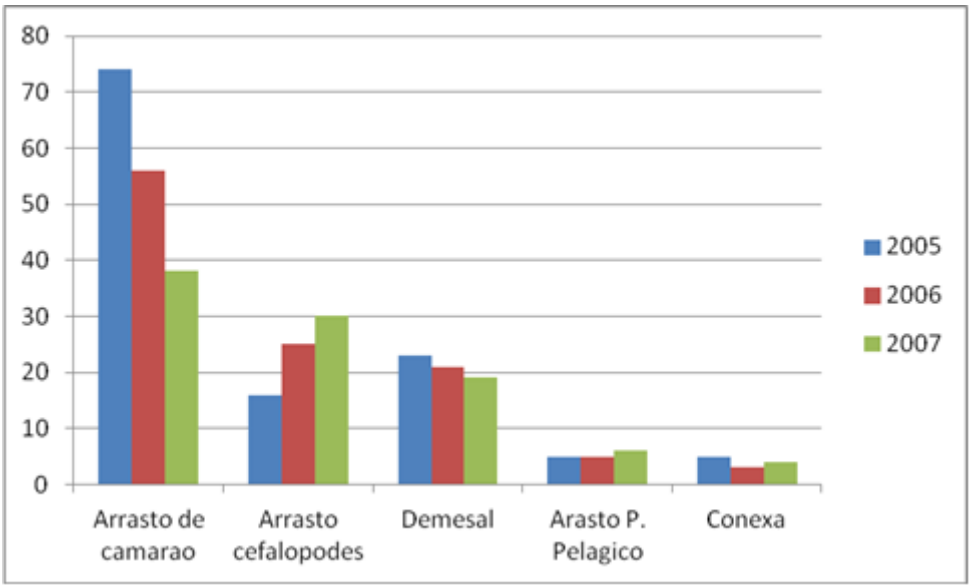


In the absence of national fleets, the **fishing industry** is carried out by granting annual fishing licenses to international fleets.

In the period 2004-06, between 215 and 237 fishing licenses were granted to foreign industrial vessels for periods ranging from 3-12 months. However, the actual duration of presence (their equivalent in months) decreased from 103 to 83 vessels, with a similar trend in terms of TAB (Ministry of Fisheries, 2008). Indeed the number of industrial fishing vessels operating in the EEZ is actually much higher due to a large part of ships and canoes fishing illegally without licenses or flagrantly violating the restrictions on fishing gear and areas authorized by the General Fisheries Law.

Industrial fishing is practiced mainly by foreign ship-owners whose countries sign fisheries agreements with Guinea-Bissau. These fisheries agreements, give rise to the payment of financial compensation to the State and the owners buy licenses for the right to fish in the country's Exclusive Economic Zone. They buy industrial fishing licenses. One of the most important agreements that Guinea-Bissau maintains, is the agreement with the European Union, which however due to political instability is currently suspended, driving down substantially the sector's contribution to the State budget. Fishing activity is undertaken almost entirely by foreign vessels, mainly the European Union and China, through the issuance of fishing licenses based on Gross Tonnage (GRT) and depending on the type of fishing practice (fish and shellfish). The total value of these permits in 2010 was about USD 4.2 million. Furthermore, the European Union gives the Government an annual compensation of about USD 9.5 million for fishing access. Participation of the domestic private sector is virtually nil due to lack of investment opportunities and fishing policies which give little incentive (expensive fishing licenses, discouraging tax incentives, among others).

Figure 7: Production of different systems of fishery from 2005 - 2007



The fishing industry transformation is also nil, with no hygienic-sanitary conditions for its effective exercise, causing the country to lose potential economic gains from fish products commercial value.

Guinea-Bissau has conserved biological diversity of national, regional and international importance and has enormous eco-tourism potential, a sector currently expanding with potential to generate a high volume of revenue. This potential depends crucially on well preserved natural areas and readily observable populations of animals. Over 50% of tourists who seek **recreational fishing,** commonly referred to as “sport fishing”, are landing in the country seeking the Bijagós

Archipelago to exercise their activities. The fish fauna richness of Bijagós waters is widely known among the sport fishermen. The large presence of fishing camps, also known as fishing clubs testify to this.

1.1.1.3. Forest Sector

Forests contributed about 2% to GDP in 2010 (Department of Economics) and represent sources of food; fuel (wood energy) for domestic use to smoke fish; prepare cooking salt; for construction materials; fibers; medicines; and other uses for a large majority of the Guinean population.

In 1978 the first forest inventory of the country was conducted by SCET International, which estimated a 2,344,950 ha forest area. Seven years later, i.e. in 1985, the Atlanta Enquiries estimated the forest area as only 2,030,284 ha. Comparing the results of these two estimates, points to a reduction of about 314,666 ha of forest cover in just seven years. On the basis of this comparison, it is assumed that the country loses about 45,000 ha of its forest annually. If so, by 2013, the vegetation cover of the country may have been reduced by more than 50% compared with the last forest inventory in 1985.

Of all timber logging, 80% was towards of a single species - African mahogany (*Khaya Senegalensis*), of which only 10.6% of this volume is transformed in sawmills in the country.The remainder (20%) of logging is reserved for African Afzelia (*African Afzelia*), Kosso (*Pteurocarpus erinaceus*), Sasswood (*Erytrophleum Guinea*), Kapok or Silky Cotton (*Ceiba pentendra*), Daniella (*Daniella oliveri*) and Iroko (*Chrorophora exelsa*). If in the past the wood exploitation was directed almost solely to African Mahogany (*Senegalese Khaya),*currently the Kosso (*Pteurocarpus erinaceus)* is the target species for export. All are exported in as trunks (MARD / DGFF: 2010).

The essential needs for protein used in food are acquired from wild species and products (wildlife hunting, honey, fish, shellfish, and by-products of plants, such as leaves, stems, fruits, roots and tubers). The collection and use for plant medicine is profoundly rooted within rural communities in the country. The forests still have interesting socio-cultural components and are seen as sacred. Forests are use in the process and initiation/passage rituals from one age to another.

Both terrestrial ecosystems and coastal marine areas of the country host some rare, vulnerable and / or endangered species on the national and global scale. Savannas and forests should be highlighted e.g., chimpanzees, buffalo, elephants, antelopes and various species of monkeys.

1.1.1.4. Tourism Sector

Tourism in Guinea-Bissau is still in its infancy. The country has an integrity and great diversity of landscapes in good condition. The tourist attractions are numerous and are associated with its beaches, its natural heritage (wildlife hunting and fisheries, Cusselintra currents, Saltinho waterfalls, etc...). The link between biodiversity and cultures of local communities has a great potential to enhance the development of this sector.

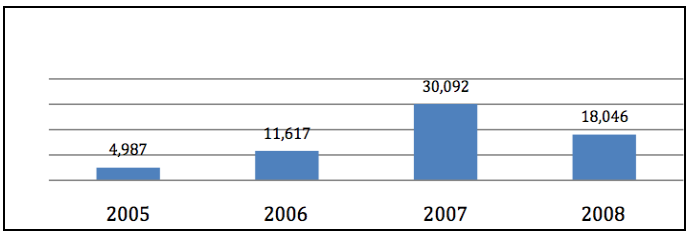
Given the constraints resulting from high humidity and heavy rains that fall during part of the year, it can be considered that the tourist season, i.e. the period most favorable to tourism, is situated in the months of November, December, January, February to March and may continue until April and May.

The insular part of the country has a variety of marine life and rare mammals (e.g. hippo that uses salt and fresh water) and endangered species such as sea turtles, manatees, gray parrots, etc. Other advantages of geographic, environmental and cultural nature may in the short and medium term to make the region an exceptional sub-zone ecotourism concentration.

The beaches of the archipelago, and some other coastal zones are mainly sandy, of a modest transverse extent, which can reach in some places, tens of meters at low tide.

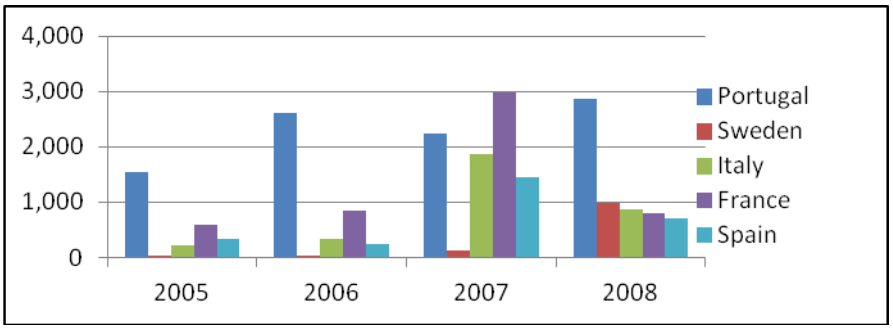
It is noteworthy that the bulk of tourists visiting the archipelago are attracted to recreational fishing (sport). From 500 to 600 tourists per year visited, before the civil war of 1998. From the year 2000 on, this number dropped to less than 100 tourists, due to the incessant cycle of instability. Since 2005, however, there has been a certain annual increase in tourist flow to the country, but the numbers are still very low, however. One must emphasize however, that the statistics of tourist entries available only for air entry - i.e. those registered in the country's only international airport.

Figure 8: Tourist arrivals 2005 - 2008



Source: UNWTO (2009), cited in World Bank 2011.

Figure 9: International arrivals to Tourism by Country of Origin



Source: UNWTO (2009), cited in World Bank 2011.

Establishments specialized in recreational fishing activities have already existed for more than 20 years at the Bolama-Bijagós Archipelago Biosphere Reserve (RBABB). Some are in operation in this insular part of the country, with a dozen of these with infrastructures in different islands. It should be noted however, that although they absorb a significant number of young people, these tourist circuit initiatives are very restricted and work autonomously in terms of catering and transport, which represents very little to the local economy.

The communication and the promotion of the tourism subsector are made directly from the few, mostly French, travel agencies. The average duration of tourist in the Bijagós is about 10 days each.

Rivers and mangroves that populate the entire coastal zone ecosystems are important wintering sites for many species of birds that come from the northern hemisphere to spend the winter. These ecosystems allow, on the one hand, for the development of sport fishing, have close contact with the mangroves and on the other, watching large amounts of birds that gather during low tide to feed.

In the palms forests adjacent to rivers and wetlands one can also observe birds and several species of mammals (chimps, different species of monkeys, painted gazelles, porky-pines, etc...).

Likewise in the forest, (mostly considered sacred by the local communities), one can watch and enjoy the unique flora and wildlife of the country.

Also on the coastal areas, the country has rich historical and cultural heritage. Various monuments and nineteenth century architectural are prominent tourist attractions for the country.

Tourism in the interior is devoted mainly to the small sport-hunting. This game is usually practiced by expatriates or nationals from the higher income class. It is a costly activity, because besides the price of a hunting license, guns and ammunition and payment of several installments of work, a fee is paid to the authorities responsible for management of hunting, for each animal slaughtered.

On the mainland, coastal and terrestrial protected areas of the interior (the Cacheu River Tarrafes Natural Park, the Natural Park of the Cufada Lagoons, the Woods of Cantanhez, Dulombi and Boe) are power poles in tourist development. In each of these protected areas are natural landscape and cultural values of different ecosystems and human communities that are highly attractive.

In the past the State prioritized large tourist developments that have since been mostly privatized and abandoned. There exist small private enterprises in Bubaque, Buba, Varela, Saltinho, and Bafatá. There are also NGOs with ecotourism projects in Orango, Quinhamel and Cantanhez with results that could later be used as models for ecotourism in Protected Areas where the reconciliation of biodiversity and cultural heritage of communities living in these areas date back the authentic characteristics of Guinea-Bissau to be a new tourist destination that will bring economic benefits to the country and contribute to poverty reduction.

In this sense, according to studies on the socio-economic development of Guinea-Bissau, most recommendations suggest Ecotourism as an alternative sector that can provide sustainable development of the tourism sector, based on enhancement of natural and cultural heritage, contributing to the creation of new jobs for youth, foreign exchange inflows, increasing national income and creating opportunity for investment and improvement of living conditions of local populations.

1.1.2. Characterization of environmental goods and services in different ecosystems

This section will identify and qualify the different types of goods and services provided by specific ecosystems, its importance and role in welfare, combating poverty and ensuring food security of the Guinean population. Guinea-Bissau has a total area of 36,125 km ^{2} and is constituted by the mainland and a group of adjacent islands and the broad Bijagós Archipelago.

From the phytogeographical point of view, Guinea-Bissau is located in the Guineo-Congolese and Sudanese Regional Transition zone i.e. between the arid ecosystems of the savannas of Africa Sahel and Guinea tropical rainforest eco-region. A diverse mosaic of trees and shrubs, savannas, sub-humid, clear and open forests, gallery forests and mangroves are the result of this geographic location. Towards a better interpretation and understanding, an analysis of services and goods supplied by different biotopes or ecological units that make up the country, namely:

1.1.2.1. Forest ecosystems and savannahs

The dominant dry open forest is associated with patches of dense sub-humid forests in the South, lying mainly in the region of Quinará and Tombali massively, as well as in the form of relics on certain islands and islets of the Bijagós Archipelago. Large areas of secondary and degraded forests can still be found in vegetable and floristic panorama of Guinea-Bissau.

The cultivation of upland rice "*m'pam-pam*" occurs mainly in forest ecosystems and savannahs. This system of rice production for local consumption is found in all three agro-ecological zones of the country.

The exploitation of ***natural palm (****Elaeis guineensis)* appears as a main activity of households (men, women and youth) of ethnically different groups. Of these forest species, palm fruits are extracted palm kernels for the production of palm oil, which is consumed directly or marketed. Their kernels are used to produce palm oil, whose consumption has significantly reduced with the passage of time. Women use the foliage to produce brooms that are used for cleaning of homes and public spaces in villages. In recent years however, this by-product has been widely sold in domestic and foreign markets.

The stems (trunks) of palms are used (instead of "cibe") also in the construction of homes and dikes of saltwater fields. Economic activities associated with palm tree is further complemented with the exploitation of palm wine, selling fresh fruit, production of palm and coconut oil, confection soap from its oil and production of brooms.

The African Palm **(*Borassus aethiopum)*** is used for multiple purposes in Africa in general and in Guinea-Bissau in particular. Its products occupy a prominent place in the micro-economy and for family and individual craftsmanship of Guineans. Its trunk is preferably used in construction and its other byproducts availed in different crafts, food and household items. Being a fibrous material, resistant to putrefaction, high physical and chemical resistance to termites, its trunks are used in the construction of housing infrastructure, bridges and in fields as water pumps.

The estimates in 2000, point to a holding of 250,000 planks of cibe a year and a contribution of about 75 million Franc CFA for the State coffers (MDRA / DGFF, 2010). The quality of African Palm sold point to an over-exploitation that is causing degradation and disappearance of these important species in their areas of occurrence in the North, Center and South of the country.

The fiber extracted from the base of the leaf stem has important qualities of resistance to chemicals, termites and water, its leaves are used for roofing, manufacture of articles of common use in households (baskets, brooms, straw purses - "*barkafons*", mats, ropes, furniture etc..), objects of adornment (hats, fans, umbrellas), gloves protecting arms in manual harvest of rice, etc.. The tree also produces many types of food, and the young plants consumed as vegetables "*palmite*" baked or pounded. Likewise, the fruits are eaten baked, boiled or raw and its sugary sap obtained from the young inflorescence is consumed in ceremonies / rituals and has medicinal properties. The immature seeds, containing a sweet jelly that has a refreshing taste are greatly appreciated in their areas of occurrence for both humans and the primates.

With regard to other ***non-timber forest products*** (NTFP) the existence of a diversity of trees and shrubs should be highlighted. They are used for the gathering of fruits, roots, leaves and fibers. It is noteworthy in this context the Saba fruit (*Saba senegalensis);* Landolphia *(Landolphia heudoloti*); "*palmite*" and African Palm fruits "*Ancol*" (*Borassus aethiopium);* Baobab fruit and leaves (*Adansonia digitata)*; African Locust Bean Tree (*Parkia* biglobosa); Velvet Tambarin (*Guinea Dialium);* Bush Banana (*Uvaria chamae)*; Sabine Prance or "*tambacumba" (Neocarya macrophylla)*; Yellow Mombin or "*mandiple" (Spondias monbin);* Guinea Plum or "*mampataz"* (*Parinari excelsa);* as well as plants and their parts are used in traditional pharmacopoeia. Sedges (Ciperáceas) are used to cover houses and in manufacturing baskets. Other types of cyperus, such as bamboo (*Oxytenanthera abyssinica)* and "*mampufa*" (*Cyperus sp)* also exist.

Secondary resourcesinclude game meat; fruits; rhizomes; spontaneous medicinal plants; fuel wood (firewood and charcoal); construction resources; the straw to cover houses and vegetable fibers for the production of handicrafts. In many regions of Guinea-Bissau, bamboo (*Oxytenanthera abissinica)* grows and is used in handicraft; traditional construction, and to fence backyards "*quirintins*", mainly in the East

Additionally, there are some ***traditional religious aspects*** of animists who consider large trees such as Kapok "*Poilão"* (Ceiba *pentandra)* and Baobab (*Adansonia digitata)* as sacred and use them to represent mystical-religious powers in daily series of ceremonies and traditional cults.

Small-scale ***hunting*** for individual and family consumption is also practiced by a small fringe of the resident population.

The extraction of ***honey*** occurs across forests / savannas as well as mangrove and also represents another activity carried out by the local communities. The need for domestic energy for lighting, heating houses and food preparation is almost met by firewood collection in different forest ecosystem.

Ecological role of forests and savannas: Indirect that forests provide benefits to humans are of great value, since they act as regulators of ecosystem functioning, such as the regulation of climate, carbon storage and sequestration, reduction of erosion and fertility for soil, pollination, biological control, water, air cycle, etc..

1.1.2.2. Coastal Zone

With an area of approximately 22,235 km ², the **Coastal Zone** of Guinea occupies about 70% of the national territory and extends over an area of approximately 180 km. The vast area occupied by mangroves and sandbars forms impenetrable bands between land and sea, whose tide influence can be sensed up to 150 miles inside the country. All cities and major towns of the country (Bissau, Bolama, Bafatá, Canchungo, Cacheu, Catio, Farim, Sao Domingos, Mansoa, Bula, Biombo, etc...) are concentrated on the coast; that is a fringe of less than 25 km from the coast.

The coastal zone of Guinea-Bissau is covered by a network consisting of important water courses of flowing water and stagnant water courses. In the first place, the Geba and Corubal Rivers and lochs of the sea in the form of Cacheu River, Mansoa River, Rio Grande de Buba, Cumbijã and Cacine Rivers. The Corubal and Geba Rivers are the only freshwater rivers serving as the most important resources of the country's surface water, while the Cufada Lagoon is the largest reserve in the country.

Interactions between semi-diurnal tidal currents, littoral drifts and the effects of estuaries greatly influence the degree of the kinematics of the area, resulting in the accumulation of sediments promptly intercepted by arrows sand. Beaches are relatively few on the mainland and are found mainly in zones influenced by fluvial-marine dynamics, where there is accumulation of sandy sediments.

The Guinean marine and coastal zones are represented by a variety of ecosystems (marine, transitional and terrestrial) high productivity and rich in biodiversity resources. Considering the high concentration of nutrients due to a huge potential of mangrove and other favorable environmental conditions such as temperature gradients and variable salinity and also the exceptional conditions of shelter support reproduction and initial feeding of most species inhabiting oceans and coastal environments became a major focus of attention. Most of the shoreline and numerous estuaries in Guinea-Bissau serve as spawning and development for some pelagic fish. Most of these pelagic species migrates along the West African Coast, and it is therefore very difficult to specify the potential annual production for Guinea-Bissau alone.

This area, in addition to their national strategic importance, also has an international ecological function of great importance, serving as habitat for reproduction, growth, feeding and refuge for several species of cultural, symbolic and economic interests like those classified as rare or endangered at the world level. Species most noted in this zone include: the manatee (*Trichechus senegalensis);* Hippos (*Hippopotamus amphibius);* Nile crocodiles (*Crocodylus niloticus);* Leatherback sea turtle (*Dermochelys coriacea);* Olive Ridley sea turtle (*Lepidochelys olivacea);* Hawksbill sea turtle (*Eretmochelys imbricate);* Green sea turtle (*Chelonia mydas)* and

Loggerhead turtle (*Caretta caretta*); different species of mammals, particularly primates: Bijagó Monkey (*Cercopithecus petaurista);* Western Red Colobus Monkey (*Poliocolobus badius);* Nobel Monkey *polykomos Colobus;* Chimpanzee (*Pan troglodytes versus);* and other mammals such as: elephant(*Loxodonta Africana);* African Buffalo (*Syncerus sp);* White Boca antelope (*Sable equinus koba);* Defassa waterbuck (*Kobus ellipsiprymnus defassa)*, etc..

Green turtles and Olive Ridley sea turtles, to a lesser extent are mostly found in the southern beaches of the Bijagós Archipelago, considered as the privileged place for spawning. Poilão Islet is considered as the most important point location for the Green turtle throughout the archipelago, the country, and the entire African Atlantic coast.

During particular seasons, the coastal region also serves as a breeding area and migration route for a large number of migratory birds from Europe, Asia and the sub region, Guinea-Bissau, in general and in particular the Bijagós Archipelago, is after Banc d'Arguin in Mauritania, the second most important place in West Africa, receiving up to 700 thousand Palearctic migratory birds of various species annually.

Birds that can be encountered breeding include: African Darter or Snakebird (*Anhinga rufa);* White Heron or Great Egret (*Egretta alba);* Little Heron (*Egretta garzetta);* African Sacred-ibis (*Threskiornis aethiopicus);* African spoonbill (*Platalea alba);* gray pelican (*Pelecanus rufescens)*; Grey-headed *Gull (cirrocephalus);* Slender-billed Gull (*Larus genei);* Large Tern (*Sterna Caspian);* Royal Tern (*Sterna maxima);* Gull-billed tern (*Sterna nilotica);* gray parrot (*Psittacus timneh)*, etc..A large part of the coastal zone and their habitats are thus included in the network of Important Areas for the Birds - IBA (T. Dodman and Mr SA 2005).

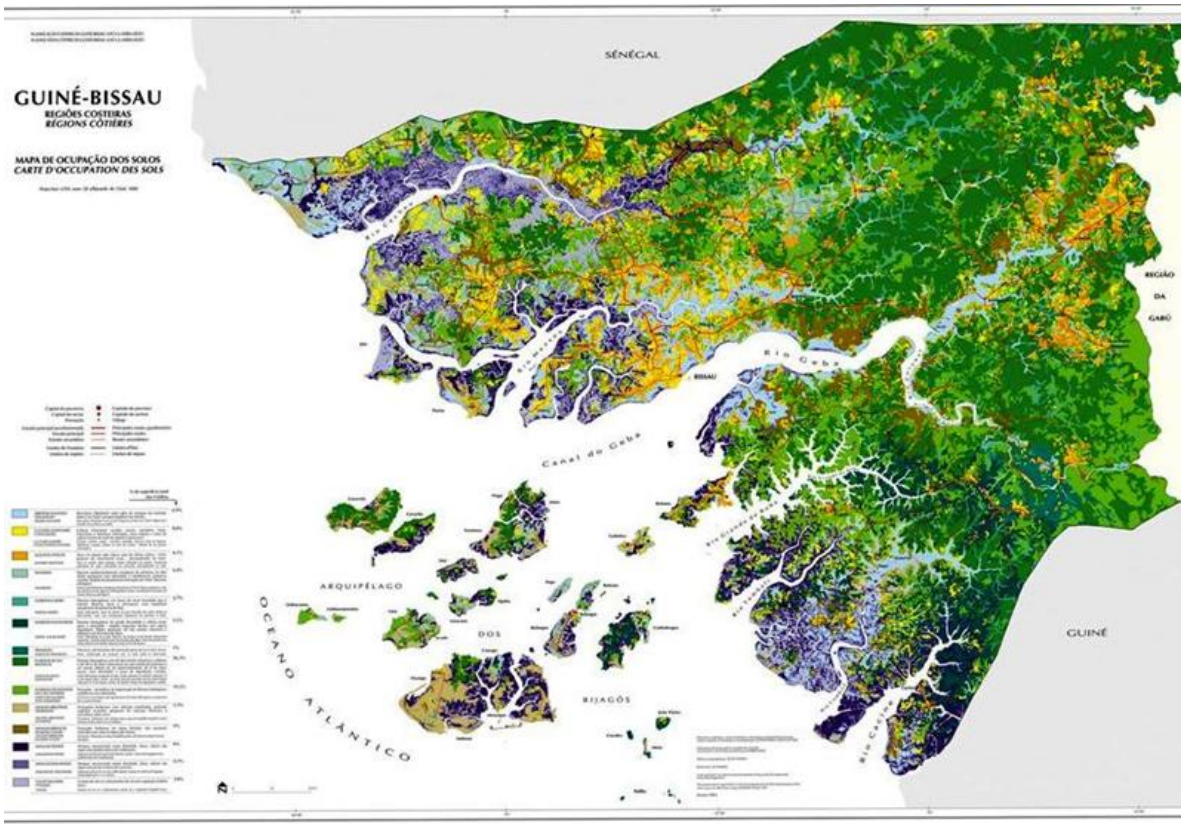


Figure 10: Guinea-Bissau Coastal Zone

Mangroves and weeds

Transgressions have allowed the sea to invade the lower courses of ancient rivers, turning them into estuaries and creating a complex network of marshes colonized by mangroves. The mangrove

is the most representative plant formation of the coastal zone of Guinea-Bissau covering about 10.1% of this space.

Estimates point to 8% of the country being populated by mangrove ecosystem, distributed along the coast, estuaries, rivers and streams. Six species floristic mangrove (*Avicennia germinans, Conocarpus erectus, Laguncularia racemosa, Rhizophora harrisonii, Rhizophora mangle* and *Rhizophora racemosa*) occur in the country, meeting the wider surface in the form of solid mass in the North Region of Cacheu concretely.

According to recent publications (2010) a group of experts in *"Global Ecology and Biogeography,"* consider that the total area of mangroves in the country in 2000 was 338,652 hectares or 2.5% of the world total. On the basis of these data, Guinea-Bissau is among the 15 countries of the world and the second in Africa after Nigeria, with larger areas of mangrove (IPM, C. et al 2011). It differs also from Nigeria by low pollution and degradation of this formation.

This ecosystem contributes indirectly to the equilibrium of the balance of payments of the country, as it protects the area of spawning and growth of the halieutic species of great commercial value, such as shrimp, crustaceans and fish (a major source of income for Guinea-Bissau, but far short of what could be if they were processed internally).

Intensive logging aimed at mangroves is not rooted in the tradition of coastal communities in the country. However, when women go fishing or collecting shellfish they take advantage of the trunks and / or branches of dead mangroves as a source of energy for lighting and cooking food. In recent times however, there is evidence of attempted sale of these trunks, without involvement of large agglomerations. Traditionally, the branches of the mangroves are used in residential construction for fencing in the back of houses and orchards.

Nationally and in the West African Sub-Region, the Balanta ethnic group is known as one of the largest depositories of the "know-*how*" in traditional rice cultivation in the hydro-morph mangrove lands. For this ethnic group that lives mainly in Northern and Southern Guinea-Bissau, mangrove rice production is their main economic activity, both in terms of utilization of family labor and working time invested annually. The whole social organization and life of these people, depends on and is carried out based on the production of this cereal.

Colonies of oysters live on the aerial roots of Red Mangrove (*Rizophora* mangle), which are regularly submerged by tides. They are collected and serve a supplement in the diet of many coastal communities and at the same time as the basis of some individual and family income. Women engage in a small fishing with the help of circular nets and catch Sharptooth swim crabs (*Callinnectes marginatus);* common crabs (*Callinectes pallidus);* Stone Crabs *(Menippe nodifrons);* and Spotted Box Crab *(Calappa rubroguttata);* Fiddler Crabs (*Uca Tangeri);* Land Crabs(*Cardiosoma armatum)* and other types of mollusks and crustaceans.

The roots of mangroves are very dense and fix sediments, thus limiting coastal erosion and provide shelter ideal for small organisms. This ecosystem of high biological productivity still plays an important role in the food chain and the restocking of marine and coastal resources, serving as a spawning area, for food, shelter, growth, rest, etc… for many species. Due to the fact that they are located between land and sea and subject to the rhythm of the tides, a very varied occurrence of faunal species, or group of species frequent it at low tide, at high tide and / or intertidal canopies arboreal species and their benthos.

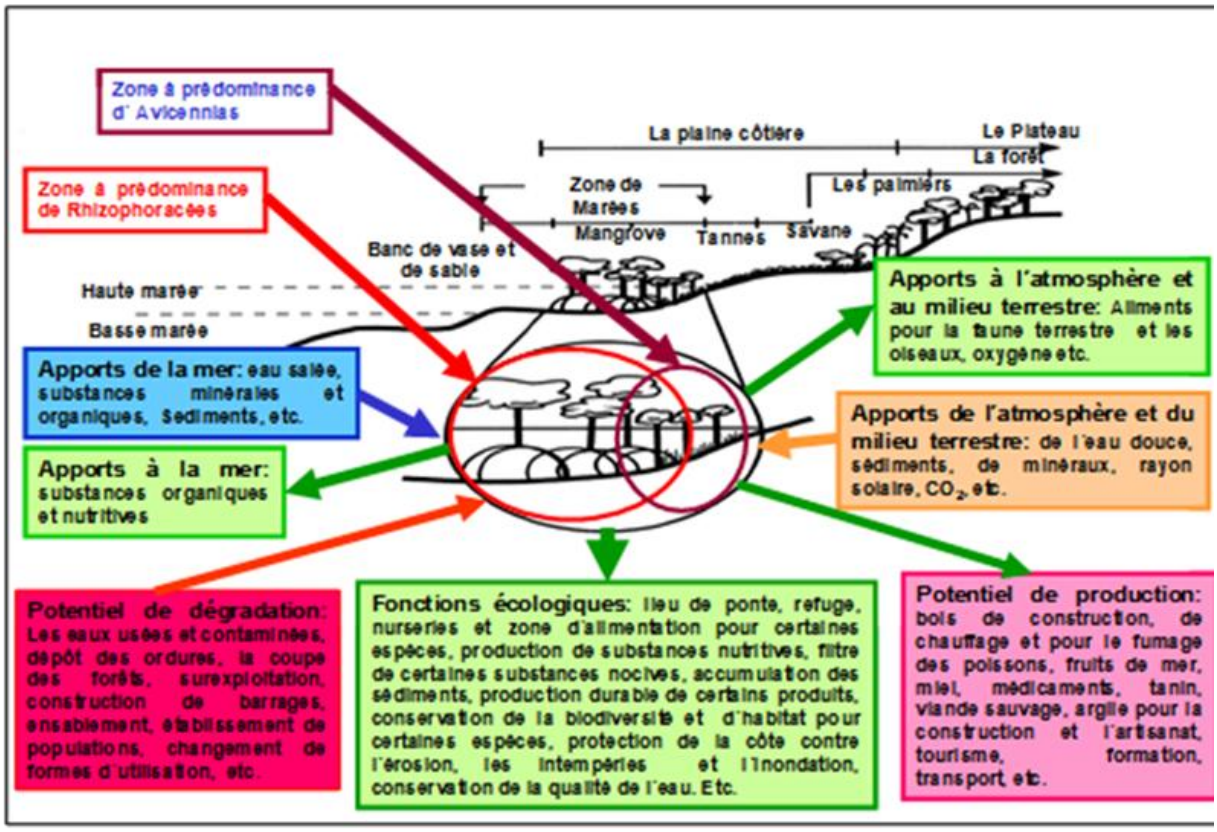


Figure 11: Function of Mangroves

1.1.2.3. Marine Environment (channels, banks, silt) and insular

According to several authors and experts of the marine environment in Guinea-Bissau, it is rich not only in terms of biomass, whose potentiality is still not well known, but also in terms of species diversity.

This wealth is associated with several factors, among which are: i) the existence of an extended continental shelf, which extends to the 200 meter isobaths (continental slope) and has a shallow surface extension of 53,000 km ², ii) depth and tranquility of coastal waters, iii) estuarine character (streams), through which at the time of heavy rains volumes of river water with organic debris and materials are transported, iv) the presence of a significant fringe of mangroves, v) encounter of cold currents coming from the North (Canarias) and those that are hot causing the remount of deep water " *Upwelling phenomenon* "and nutrient transport surfaces, etc. (IPIMAR & CIPA, 1996). These factors contribute to the presence of a very diverse range of ecological niches throughout the year, allowing the presence of a huge variety of species, mainly fish, and marine mammals, birds, particularly migratory waterfowl.

The strong presence of European industrial fisheries, in addition to increasing numbers of other foreign fishers in the Guinean Coast attests to its ichthyic fauna wealth.

In Guinea-Bissau, the islands can be distinguished in to the group of coastal islands (Jeta and Pexice in the Mansoa estuary; Como and Melo in the South; Bissau City; Reis Islet off the coast of Bissau City; Areias and Bolama in the estuary of the Geba River); and the Bijagós Archipelago. This latter consists of about 80 islands and islets spread over an area of 10,270 K m² - almost ⅓ of the national territory. Only about 10% of its surface (including 350 km2 of mangroves) is considered as immersed land. More than 1600 km² consists of intertidal zones

(sandy or silt banks), thus placing this Archipelago in the first position in the entire African continent with this type of ecosystem.

Sand banks and silt, rich in benthic fauna are dispersed and provide seasonal shelter to thousands of migratory birds in the winter. Among these we highlight the entire coastal zone of Guinea-Bissau and the Bijagos Archipelago, with the last considered the second choice as the most important area in the West African Coast migration route, following the Banc d'Arguin in Mauritania, and receives over 1.000.000 of these birds in the East Atlantic Flyway per year. There are also many known continental sites that have not yet been registered, which also host large numbers of waterfowl. In addition to migratory birds there are also some tens of thousands of individuals that belong to other species such as African-tropical (migrant and resident) species lying in reproduction or inter-nuptial periods.

The Bijagós Archipelago is considered as an ancient Geba River delta that was flooded for centuries and thus the only active deltaic archipelago on the Atlantic coast of Africa. It is bordered on its north side by the Geba Canal and on its south side by Orango-Canhabaque. Just like the marine continental shelf, all of the marine-aquatic Bijagós are shallow and deeply cut by channels and in which banks (coastal and pre-coastal) show a certain degree of mobility (PENNOBER, G. 1999).

Compared with the continental part of the country, the Bijagós Archipelago presents a lower faunal diversity. However its medium provides habitat for many rare, endemic, threatened and / or endangered species. The fauna wealth of the archipelago is mainly concentrated in the waters bordering the islands and inlets that infiltrate into the interior thereof, occupied mainly by mangrove forests. The biological wealth and the difficulties of penetrating the coastal explain the presence of a community of important aquatic mammals unique to West Africa.

The presence of extensive sand banks and with loads of vassals, bivalves and gastropods that serve as food for birds as well as vast areas of forest and mangrove islets for mating, nesting, and rest are the main factors that contribute to ornithological importance of Bijagós Biosphere Reserve (Robillard et LIMOGES, 1991)

Almost all rivers and / or streams were used for navigation 1950s. It's estimated that about 200 km of the river network can be taken advantage of for transportation. In the colonial era river transport was so extensively used that most rivers had docks and related infrastructure to make use of this transport system. Currently much of this network is not used and silted river traffic has almost disappeared, excluding some traditional vessels of small dimensions, namely canoes, but they offer services in the towns of the South located by rivers, sea and islands, although with a certain number of accidents given the inadequacy of facilities. Consequently, passengers' safety is risked, while large materials, equipment and goods in appreciable volumes are not yet guaranteed because the capacities of the canoes are limited.

Presently, the only route from the islands to the mainland, notably Bissau - Bolama and Bissau - Bubaque is ensured by two boats, which are irregular. Hence almost all the South Zone and the islands are geographically isolated. This "status *"quo* has greatly limited the appreciation and use of natural and economic potential for sustainable development of these areas of the country.

1.1.2.4. Wetlands and inland waters

The existing networks of different hydrographic basins feeding a wide variety of wetlands are located in the interior or in the coastal and marine zone. Depending on their hydrological regime and vegetation structure, one can still distinguish wetlands with water in the presence of seasons that dry naturally in part or in its entirety, in the dry season.

Coastal and marine wetlands of Guinea-Bissau cover an area of approximately 18,000 km2. Most of them are ecosystems under the influence of salt water associated with tides, estuaries and

rivers. In this category we also find intertidal areas such as mangroves, invasive weeds, sandbanks and beaches. "Lalas" (swamps) appear in depressed areas where the soils are submerged or groundwater very near the surface in the rainy season.

Humid continental zones or interior zones are in turn fed freshwater ecosystems by both the rivers in the interior as well by rainwater and groundwater.

The courses of the stagnant water are constituted by the Cufada, Bionra and Bedasse Lagoons in Quinará; the Cufar Lagoon in Tombali; the Olom-Cussantche Lagoon in Mansoa; the Bedaná; and Guluga Lagoons in Cubuceco-Bambadinca; and several in the Continental Interior, such as Vendu Tcham in Boe (Sá et al.). In the Bijagós Archipelago there are the Canicussa Lagoon and the Ancanacubê Lagoon in Ãnghor; and the Madina Lagoon in the island of Orango Grande. The Cufada Lagoon occupies an area of 413.5 hectares constituting the largest reserve in the country.

These lagoons are important from the socio-economic point of view. They have significant environmental services such as groundwater recharge, and the production of fish food and nutrients for freshwater fauna and avifauna resources. For communities their services are the basis of important socio-economic activities such as fishing, farming, collecting shellfish, pasture for cattle and for leisure and recreation.

A significant portion of the rice produced in Guinea-Bissau comes from swamps and small valleys "bas-fonds". Areas of wetlands are also widely used for the grazing of cattle, both domestic and wild.

Although no other species of aquatic plants are exploited in Guinea-Bissau to the same scale as rice, wetlands are used in diverse manners, especially for forage production, fisheries, along with harvesting other plants for human consumption (NTFP), building material and artisanal, etc..

The horticultural production in the country in general and in Bissau suburbs in particular occurs in flooded valleys and small plains. In the capital Bissau it's estimated that 26% of urban households grow vegetables, especially in the green belt of Bissau. It is noted that this sub-sector is largely dominated (80%) by women (ADPC 2002).

The *Raphia exica* Palm trees are a particular biotope located in the wetlands in Guinea-Bissau. Apart from its natural beauty, it also contains economic and cultural value because their products and by-products are widely used by people in basket weaving, the manufacture of mats, and household items and for hunting traps and fishing. Contrary to what happens in Bijagós Archipelago, where the making of mats is dominated by women, it is done elsewhere in the country by young boys and men.

Ecologically, wetlands are a key element of the water cycle and contribute to the supply of groundwater, prevention of flooding, shoreline stabilization, retention of sediments and toxic products, retention of nutrients; and export of biomass.

The **meteoric** waters are major freshwater sources and are estimated at 45,000 million (M) m^3 and may climb to 61,000 Mm3 in wetter decades and down to 34,000 Mm3 in the driest decades. It is through this that groundwater is recharged and fed large river basins are alimented.

The river network is characterized by the existence of two large freshwater rivers; the Corubal River nascent in the Republic of Guinea and the Geba River nascent in Senegal. As already mentioned, there are several other coastal rivers, including Cacheu, Tombali Cumbidja and Cacine.

Surface water is used for supplying populations, livestock watering and irrigation. The use in irrigation is still very limited in potential, since it is carried out in a very traditional way. The most intensive uses for irrigation are still much localized and have very limited land cover, since they involve investments in equipment and hydro-agricultural works that are not available to the majority of the peasants.

As for the underground-water, there is still little knowledge on the water-bearing formations. However, studies indicate that drilling to about 5-15 Mm3/year as formation that presents better productivity. It is through this formation that wells are dug to furnish water in most urban centers.

1.2. Status and trends of national biological diversity

While it's true that the current status and trends in ecosystems are relatively visible, the same is not verified with the floristic and faunal biodiversity of the country. Due to lack of data, it is very difficult to determine the status and trends of biodiversity with any clarity. It is noteworthy that since the fourth report submitted in 2009, to this date, very little information has been gathered on flora of the country as a whole. Instead, it has been limited to sporadic specific surveys in some bio-geographical areas, particularly in protected areas; especially national parks have benefited from greater attention in this context.

Data on the fauna, while also fragmented, are more available. However, more comprehensive and in-depth studies on birds, ungulates, mammals, insects and other specific species are needed.

1.2.1. Status and trends of Ecosystems and Habitats

For further characterization, analysis and interpretation, the ecosystems of the country will be grouped into two broad categories: i) Terrestrial ecosystems and ii) marine and coastal ecosystems.

1.2.1.1. Status and trends of Terrestrial Ecosystems

Data on the vegetation and flora are essential and crucial for the understanding of the status of terrestrial elements. In this context, the rate of deforestation and fragmentation indices is regarded as important indicators for measuring, tracking and monitoring the changes in the national biophysical landscape.

The vegetation surface of Guinea-Bissau has regressed considerably in recent years. While there still is a considerable and diversified surface of the natural vegetation cover, a certain depreciation is denoted generally in terms of quantity and quality, i.e. a clear and alarming decrease in the surface of the dense high vegetation formations in favor of formations less dense and low and a progressive decrease in species diversity in characteristics of the wetlands favors the species most adapted to drought and / or fire resistant. Data from the General Directorate of Forests and Fauna point to about 45,000 hectares of natural vegetation disappears annually as a result of the effects of fires. Other sources are more critical pointing to 60,000 and even 80,000 Hectares / year. Regardless of their source, all estimates thus confirm the extent of this phenomenon.

Cashew nuts are assuming increasing importance as the main export of Guinea-Bissau and consequently occupying more land. The **cashew** culture (Anacardium occidentale), has been increasing from year to year and taking up more of the areas of natural forests. Cashew nut production was 30,000 t in 1995 and tripled to about 95,000 t in 2005 and reached 190,000 tons in 2011, with174,000 t exported. The annual rate of growth of output is estimated at about 10% and based mainly on the extent of the area of plantations through brush clearing in the forests (annual growth rate estimated at around 4%) and planting more so than by the use of intensification factors.

Approximately 1.3 to 1.46 million m3 of wood are exploited for the production of fuel wood, with 83% turned into firewood and about 27% for charcoal production (MDRA / DGFF, 2010). The per capita consumption of fuel wood in Guinea-Bissau is of the order of 666 kg per capita per

year, with 550 kg / inhabitant / year for firewood and 116 kg of fuel wood / inhabitant / year converted to 21 kg of charcoal which is the average per capita consumption. On the basis of the extrapolation of this average consumption current demographic situation points to a consumption of about 1.5 million m3 year in firewood and wood for charcoal.

Part of this is transformed wood charcoal, causing a substantial depletion of wood resources, due to the still predominate traditional methods of carbonification in which the yield rate of 17 to 20%, i.e. in 100 kg of wood obtained is equivalent to 20 kg de17 charcoal (DA SILVA and DIOMBÉRA 2006).

Regarding the **wood exploitation,** it should be emphasized that there are only 13 sawmills in the country with an installed processing capacity estimated at around 40,000 to 45.000m3. These companies were primarily directed towards the exploitation of some commercialized and / or noble species such as the African mahogany (*Senegalese Khaya*); African Afzelia; Kosso (*Pteurocarpus erinaceus*); Sasswood *(Erythrophleum Guinea*); Kapok or Silky Cotton (Ceiba pentandra), Daniella (*Daniella oliveri*), Iroko (*Chlorophora excelsa*). It is noteworthy that by 2009 almost 80% was directed towards a single species, African mahogany (Senegalese Khaya) and the remaining 20% shared between the other species mentioned above. According to some previous studies, the installed capacity is sufficient and corresponds to an annual production capacity of timber; it recommended that no more licenses be conceded for the installation of new sawmills.

Since the last report, the scenario has changed completely. Now Kosso, (*Pteurocarpus erinaceus*) is the species to which all logging is directed with a view to satisfying the much heightened demand for this product in the Chinese market. To illustrate this situation, it appears that from 2010 to 2013, about 33,110 m3 of wood of this single species was exported to China. This year, 2014, only in the first quarter, its export has grown to 27,528 m3 of timber, with hundreds of containers waiting to be exported. While in 2011 only four (4) 20-foot containers were exported per week; in 2012 it went from 5 to 8 containers; and from 2013 it increased to more than 32 containers of trunks exported weekly. It should be noted that trunks are operated contrary to the legal provisions and the moratorium preventing the exportation of unprocessed timber. Indeed the Guinean economy loses in employment and economic gains that could result from production added to the export value of processed wood.

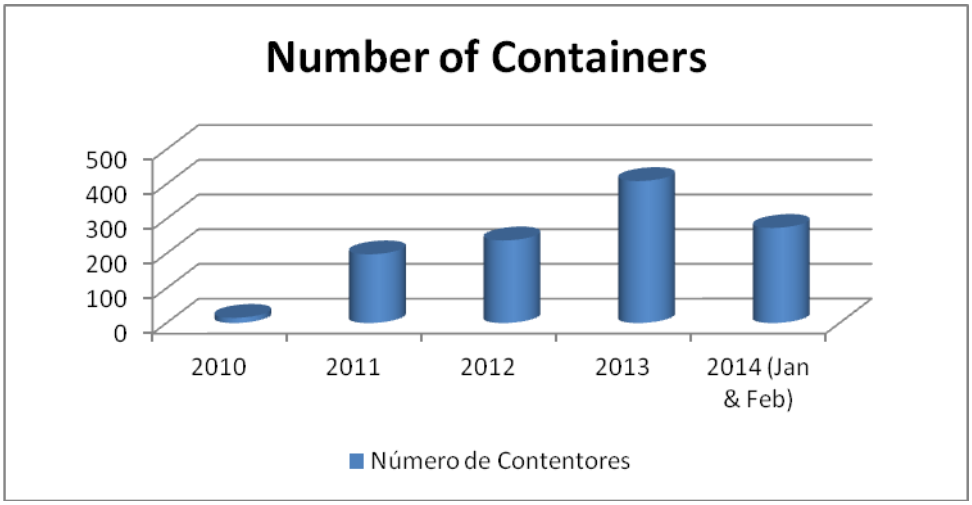


Figure 12: Number of containers of wood exported annually

Source: Based on General Administration of Customs of the People's Republic of China

In accordance with the applicable forestry law, for every 100 m3 of wood exported, at least four (4) hectares of forest must be planted; which in fact is not the case. Even the few loggers that tried to replant, the surface ended up decimated by fire for lack of follow-up and monitoring. Furthermore, all timber exported are trunks, despite being banned by the Forestry Law in force, which has negatively contributed to the national economy, especially concerning the creation of jobs.

The African Palm "cibe" (Borrasus aethiopum) is one of local species that is also subject to intensive exploitation and is the source of considerable decline and even close disappearance of surface cibe in its main areas of occurrence. The trunks of the "cibe" Borrasus aethiopum are widely used in residential construction, both in rural and in urban areas. It is estimated that 17 - 18 feet (corresponding to 200-250 planks) and 11 feet (100-160 cibe planks) are required respectively to build a house with a straw roof (Analdelphia afzeliana) and corrugate zinc. The construction industry has grown enormously in size, exerting remarkable pressure on forest resources - mainly cibe with already visible and disastrous consequences in many ecosystems in the country. The reduction and / or disappearance of older mature cibe testify to the pressure that is exerted on this species. Cutting and selling immature cibes is also an indicator par excellence of this siege. Existing regenerations are mostly natural, which means that no organized restocking or replanting of cibes took place. In fact, in Guinea-Bissau, no organized initiatives have taken place to replant forest species. Many these natural plantings haven't survived due to lack of a subsequent follow-up are often decimated by fire.

It is noted that the exploitation practiced does not reflect the composition of the population and the availability of volumes of different known species. This form of exploitation is very selective and targeted to a very small number of species, impacting negatively on the balance and composition of species in different forest types of logging objects. The species concerned are completely cut down without complying with the technical parameters and the need to save some trees relics in order to ensure seed production for the purpose of natural reproduction of the species, since reforestation is not performed. Besides killing and collecting trunks as developed causes the death of many young plants, not only with the fall of the trunk but also by its entrainment.

Fires from different origins (cleanings of land for agriculture, stimulating regeneration of herbs, beekeeping, wildfire, land conflicts, etc.), contribute to the degradation and destruction of the soil, which are uncovered at the mercy of the erosion effects of torrential rains, and runoff.

The **mining** sector is still an emerging sector in Guinea-Bissau, consisting of essentially confirmed potential for production of bauxite, phosphate and heavy sands and the possible existence of commercial oil reserves. In addition to the new socio-political dynamics that have created, the problem of the location of the identified deposits arises and therefore the concession areas and the impacts that its exploration and / or exploitation may have on ecosystems, habitats and biological resources, particularly in more sensitive areas in view of biodiversity conservation. For the case of bauxite, phosphate and mineral sands, concession areas are respectively in Boe and Farim - i.e. in the vicinity of Boe Park, Cacheu Park, Corubal River and Farim River and Cacheu River. The risk of contamination of the waters of these rivers and coastal areas is considerable. The area of operation of heavy sand is located on the coastline in Varela, already very fragile due to the erosive effects of coastal drift, runoff of rainwater and floods derived from tidal currents and estuaries in the rainy season. Oil prospection has already taken place along the boundaries of Bolama-Bijagós Biosphere Reserve. Note also that one of the highest traffic areas of tankers carrying hydro-carbons through the Gulf of Guinea zones to the ports in consuming countries of Europe and America is just beyond this Biosphere Reserve, posing serious risk of spills that can be caused by accidents; contamination by washing tanks and ballast water spills; contamination posed by chemicals (lubricants and fluids) used in drilling, mud resulting from drilling carried out during prospecting work: and from production waters and gases resulting from

prospecting and exploration. Equally important are the effects of stress that seismic testing may have on some species, particularly on large marine mammals.

1.2.1.2. Status and Trends of Marine and Coastal Ecosystems

We are witnessing over the past two decades the spread of harmful practices on natural resources, which has favored and accelerated the increase in poverty, the degradation of the environment and biodiversity loss in the country and thus reducing the supply of many ecosystem services. Reduced rainfall and depletion of soil fertility of the plateau, resulting from the effects of climate change has provoked internal migration from the countryside to the coastal zone. On the other hand, a stream of immigration (temporary or permanent) of the countries of the sub-region, economic refugees, climate change, wars or still young looking for better conditions of life and work, corroborates this current situation. These (internal and external) migratory phenomena underlying the rapid and continuous increase in population density in the coastal zone, and in particular frontier areas with immediate consequences, the demand for more spaces for housing, farming and to pursue other economic activities.

At the level of the **coastal zone**, except for some specifics, many environmental problems are found in land area, are reproduced here as well, especially i) deforestation and use of fire in agriculture; ii) the abusive cutting of mangroves; iii) the expansion of cashew and emergence of new settlements; iv) charcoal and traditional wood exploitation; v) the uncontrolled exploitation of palm trees; vi) and illegal hunting and fishing vii) conflict between man and wildlife.

The increased pressure on space and on coastal and marine resources has generated permanent conflict between the imperatives of human development and environmental values in general and wildlife in particular. Other impacts are cumulative and even arising from anthropogenic activities.

With regard to agriculture, e.g. deforestation, soil acidification, rice cultivation on the plateau at the expense of the production system in the mangrove soils and hence the abandonment of the latter has caused salinisation of soils and appearance of weeds.

As for cultivation in saltwater fields (mangrove soils) a progressive decline in production and productivity in this type of rice production is occurring. This degradation is a result of acidification and salinity intrusion and insufficient maintenance of traditional hydraulic works (mainly waist / protection dykes) and the growing disinterest in this culture for the benefit of cashew and other crops on the plateau. The destructuralization and the weakening of traditional power; which had planned and organized work in the fields, coupled with rural exodus of youth, leading to situations of shortage of active manpower, thereby negatively influencing the maintenance of dikes and the degradation of fields.

Pressures, threats and ecological and social impacts of the fisheries sector in the coastal area differ from subsector to subsector. Margins and river stretches and seas are the privileged quintessential zones for artisanal traditional fishing subsector, also known as coastal or river fishing.

In the **commercial artisanal fisheries** subsector, pressure on resources is associated primarily with fishing camps setup mainly by foreign fishermen from countries in the sub region. Setting up camps in areas that are critical for some species and areas for Bijagós' worship and religious ceremonies mainly appears as one of the major environmental problems and areas of conflict in the coastal zone. More than mere presence, the work performed by these occupants is identified among the greatest environmental impacts, thus constituting the greatest threats to natural heritage values.

These camps frequented mostly by fishermen in the sub-region were first periodic, but then later on inhabited all year round. Some accommodate hundreds of people, dependent entirely on the

activities of the sector of artisanal fishing (harvesting, drying or smoking and marketing to the sub regional market).

The proliferation of fishing camps around the Guinea Coast in the past has caused enormous pressure on the mangrove ecosystem. In these camps, the use of improved stoves is not observed, but rather inefficient expenditure of mangrove wood. Although exploitation of this wood in its immature green state is prohibited, this continues to be consumed in large quantities with preference to their trunks.

Industrial fishing is practiced mainly by foreign ship-owners whose countries either purchase of fishing licenses and / or conclude fisheries agreements with Guinea-Bissau, or by pirate ships. Fisheries agreements, give rise to the payment of financial compensation to the State and the owners buy licenses for the right to fish in the country's Exclusive Economic Zone. One of the most important agreements that Guinea-Bissau maintains, is the agreement with the European Union have been suspended for two years. The owners did not originate in the signatory countries of fisheries agreements with Guinea-Bissau buy industrial fishing licenses. Fishing activity is undertaken almost entirely by foreign vessels, mainly the European Union and China, through the issuance of fishing licenses based on Gross Tonnage (GRT) and depending on the type of fishing practice (fish and shellfish). The participation of the domestic private sector is virtually nil due to lack of investment opportunities (high costs of fishing licenses, discouraging tax incentives, among others).

Landings of catches in the industrial fisheries are conducted in neighboring countries due to lack of port conditions and cooling industry for packaging. The fishing industry transformation is insignificant, with no hygienic-sanitary conditions for its effective exercise and certification mechanisms for export to the European market in particular, losing the country's potential economic gains associated with increased value.

There has been increased interest in tourism around the whole coastal zone, which translates the proliferation of tourist camps and small hotels especially in the Bijagós Archipelago, considered the main tourist resort of Guinea-Bissau.

Statistics from *"The World's Mangroves"* indicate a reduction of about 66,000 ha of mangrove forest in Guinea-Bissau in the past 25 years i.e. from 1980 to 2005. As part of the process of preparation of a follow-up plan on mangrove, an analysis of the evolutionary dynamics of this ecosystem from 1978 to 2007 at three protected areas was carried out. It was found that during this timeline, all of them suffered reduction in mangrove surface, namely 3.9% for PNTC; 12.5% for PNC; and 13% for the PNO; (Crépeau, C. et al. 200). Due to the fact that there is great heterogeneity of databases and methods of mapping used for the inventory of mangrove, analysis and interpretation data must be carried out with great caution.

1.2.2. Status and trends of Biodiversity

1.2.2.1. Fauna

The fauna of Guinea-Bissau, although still relatively little studied, is extremely rich. There are over 1,000 species of vertebrates surveyed (e.g. Vié 2001, Dodman et al. 2004), and much remains to be discovered. Many thousands of invertebrates exist. Each of these numerous indigenous animal species is part of a heritage that is worth protecting. However, as is natural, it is not even possible to follow population trends and assess the degree of threat the overwhelming majority of them.

Guinea-Bissau has inventoried 132 species of mammals, distributed in 12 orders. Of these mammals earmarked for the country, 25 of them (19%) are considered particularly threatened:

a) Primates: Lesser Spot-nosed monkey (*Cercopithecus petaurista);* Western Red Colobus Monkey *(Colobus badius);* and King Colobus or Western Black-and-white Monkey (*Colobus polykomos)*;

b) Pholidotas: Pangolin or Scaly Anteater *Manis (smutsia) gigantea* and *Manis tricuspis;*

c) Carnivores: *Canis adustus, Canis aureus, Lycaon pictus, Mellivora signata capensis, Viverra civeta, Felis caracal, Felis serval, Felis libyca lion Panthera* and jaguar (*pardus leopardus);*

d) Tubulidentata: Aardvark (*Orycteropus afer);*

e) Proboscidea: Elephant, *Loxodonta cyclotis*

f) Rtiodáctilos: Buffalo (*Syncerus caffer); Tragelaphus spekei gratus, Sylvicapra grimmia, Kobus kob, Redunca Redunca,* antelope (*Sable equinus), Ourebia ourebi,* and *Hvemoschus.*Added to these are three other species: chimpanzee (*Pan troglodytes);* baboon *(Papio hamadryas)* and manatee or sea-cow (*Trichechus senegalensis*) for a total of 28 species that should be considered to be of national conservation priority. According to SILVA (2010), the Sooty Mangabey monkey (*Cercocebus atys),* which for some time had been considered as extinct in the country was observed in the Boe region, where it is common to see them in flocks with about two dozen individuals. All species belonging to the **Canidae** and **Felidae** families are considered extremely rare and endangered and threatened to disappear in the near future, if conservation measures are not taken. This same concern also applies for Honey Badger (*Melivora capensis)* and *Viverra civet,* which are increasingly rare species (Silva 2010 - List of mammals of Guinea-Bissau).

During the more profound studies that were carried out at Cantanhez National Park (PNC), through direct or indirect observations including interviews with hunters from different local communities, it was confirmed that of the total 184 species assigned to the country, at least 84 exist in the forests at PNC. Ten (10) different types are represented, namely:

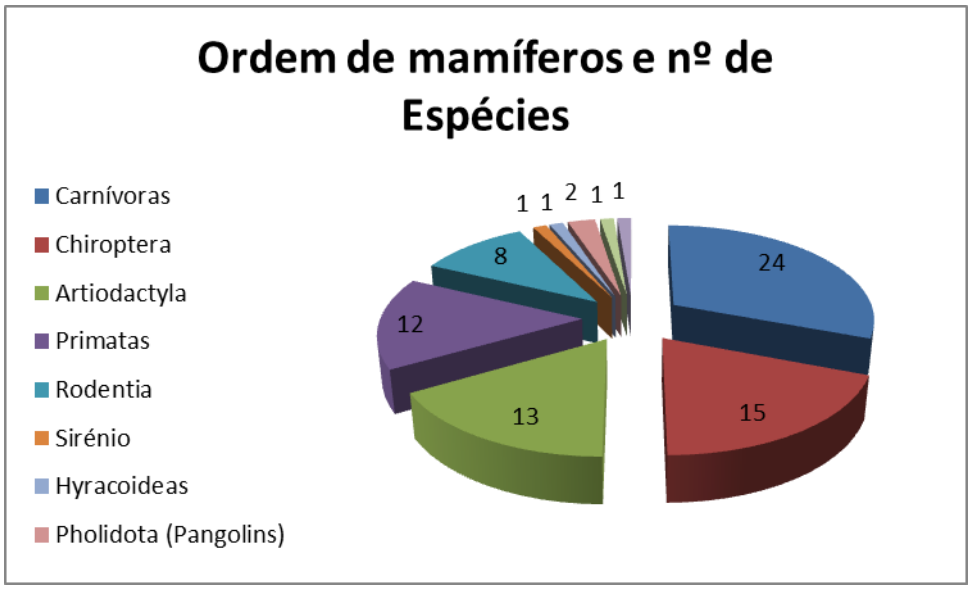


Figure 13 : Order and number of Marine Mammals species

Source: BOUT, N - GHIURGHI, A. (2013)

Most of these species listed on the IUCN Red List Species; and 33 of the PNC species and 36 of the cross-border area are ranked among Vulnerable and Critically Endangered for Extinction. This

national park thus constitutes a protected of high importance to the national and international conservation of this exceptional biodiversity area (BOUT, N. and GHIURGHI, A. 2013)

The waters of Guinea-Bissau are on the list of the richest in terms of fish and with a high diversity of fish resources (fish and mollusks). The Strategic Plan for Fisheries Development (2008) sets out the Government's total annual fish production (legally allowed) of 180,000 tons, comprising of:

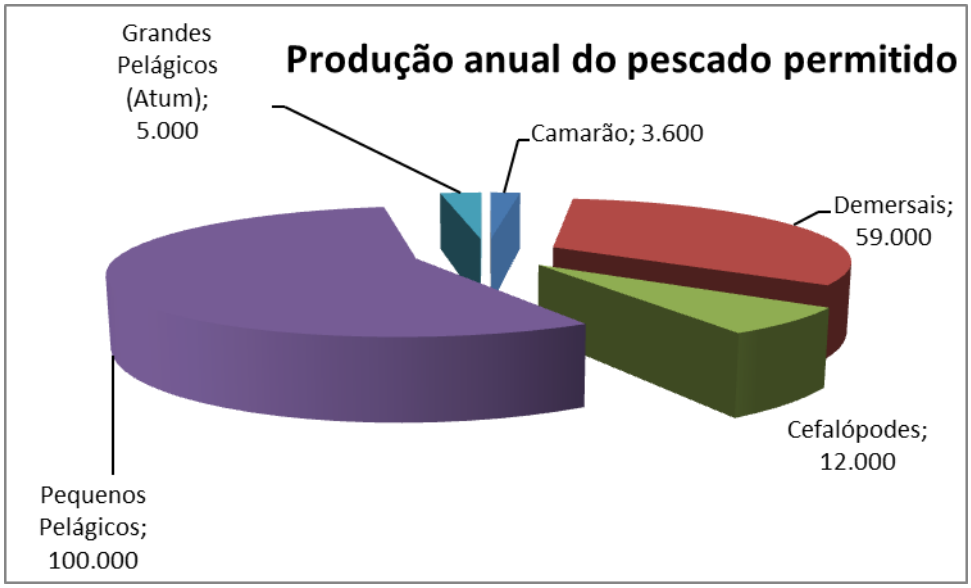


Figure 14: Estimated annual fisheries production

Source: Strategic Plan for Fisheries Development (2008)

As it can be revealed from the following table, the actual catch recorded by the Government over the past five years are much smaller than the estimates of annual production 160-180 thousand tons, which probably reflects the low level of communication for ships fishing and businesses on the actual amount of fish being removed from the waters of the country.

Table 1: Real fishery catches during the period 2005 - 2009

Group of Species	**2005**	**2006**	**2007**	**2008**	**2009**	**Total (tons)**
Cefalópodes (i.e. octopuses)	3,875	7,337	5,365	3,364	8,089	28,030
Crustaceans (i.e. shrimp)	5,484	4,327	1,835	1,241	1,705	14,592
Miscellaneous	5,099	6,356	4,641	4,368	5,227	25,691
Demersal (such as: corvina, grouper, etc.).	34,908	17,340	17,723	17,626	14,515	102,112
Large pelagic (e.g. tuna)	1,964	2,374	937	4,390	1,120	10,785
Small pelagic (e.g. sardines)	36,524	30,438	18,197	36,652	41,491	163 302
Total	**87,854**	**68,172**	**48,698**	**67,641**	**72 147**	**344 512**

Source: 2010 Plan of the Government of Guinea-Bissau for Fisheries Management, cited in World Bank (2011).

Traditionally, it has been estimated that the annual fish production is in the order of 250,000 tons. The strategic plan of the Government (2010) based on the latest research on the State of fisheries resources, points to 180,000 tons. Records of actual catches between 2005 - 2009 point to an annual average catch of about 70,000 tons, which is probably a reflection of misreporting. However, existing information indicates that the fishing sector is producing a level well below its sustainable potential.

Compared with the continental part of the country, the Bijagos Archipelago, (a UNESCO Biosphere Reserve) has a lower diversity in terrestrial fauna. However its medium provides habitat for many rare, endemic, threatened and / or endangered species. The faunal richness of Bijagós Archipelago is mainly concentrated in the waters bordering the islands and inlets that infiltrate into the interior thereof, occupied mainly by mangrove forests.

The wildlife resources of this Biosphere Reserve are illustrated as follows:

Graphic: Heritage of faunal RBABB

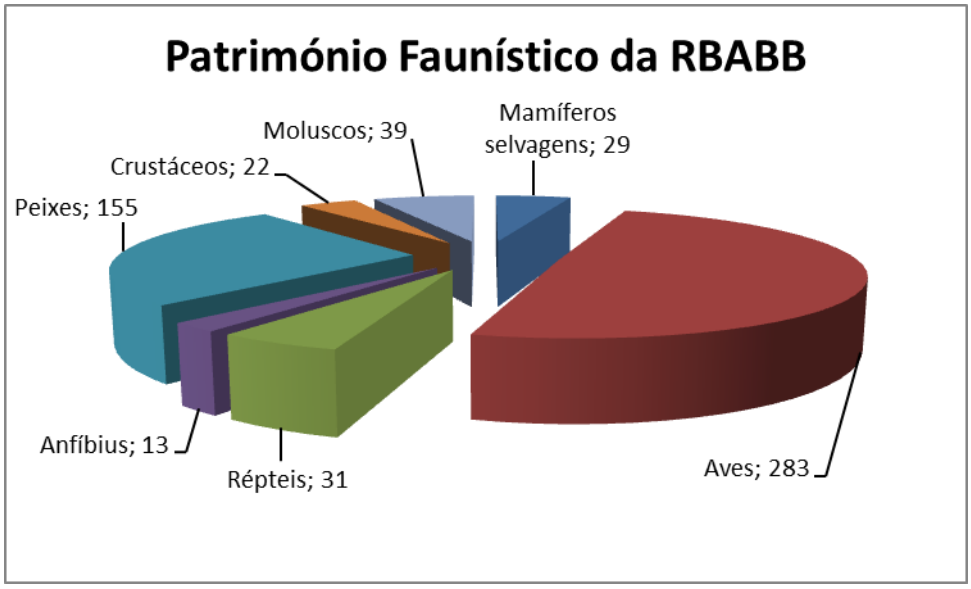


Figure 15: RBABB Fauna

Source: Archipel des Bijagós Motom Moranghajogo. Proposition d'inscription sur la liste du Patrimoine mondial (2012).

The following wildlife species can be found among the mammals in the Bijagós Archipelago:

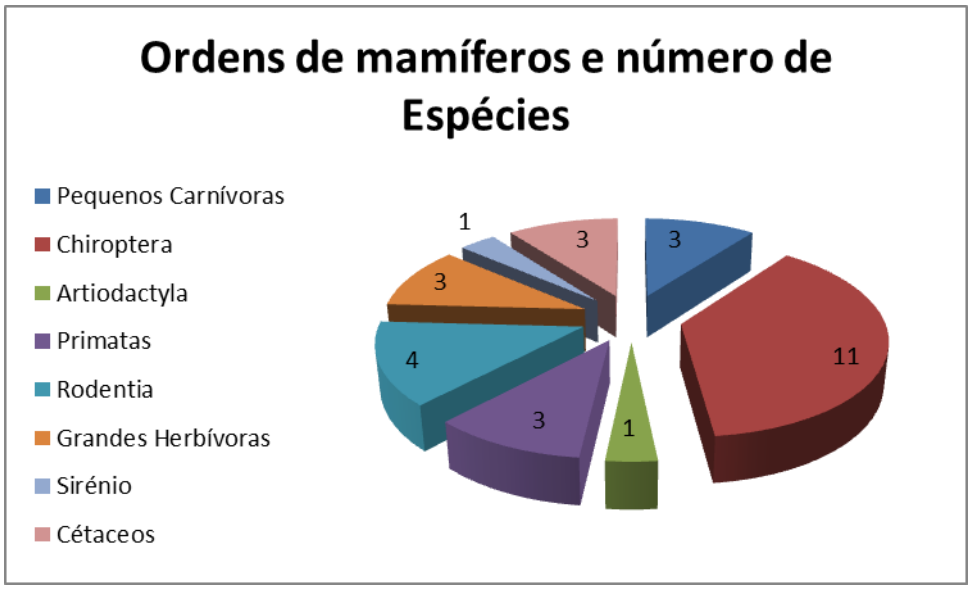


Figure 16: Order and number of RBABB Marine Mammals species

Source: Archipel des Bijagós Motom Moranghajogo. Proposition d'inscription sur la liste du Patrimoine mondial (2012).

Just waterfowl alone account for a total of 31 species and is therefore considered according to the criteria of the RAMSAR Convention, as a site of international importance. The RBABB receives 700,000-900,000 waders annually, including 16 species of Palearctic waders of international importance, using this insular space for the winter. Among these: the Curlew Sandpiper (*Calidris ferruginea*); the Bar-tailed Godwit (*Limosa lapponica*); and whimbrel (*Numenius phaeopus*); are highlighted. There are also interesting breeding colonies of: herons (*egretta* sp.); ibises (*Threskiomis aethiopicus*); spoonbills (Platelea alba); gulls (*Larus*); grey headed gull (*Larus cirrocephalus*) breeding populations of African Fishing Eagles (Haliaaetus vocifer), and the Palm-nut Vulture (Gypohierax angolensis). But Bijagós biodiversity is not limited to birds. It also has important populations of sea turtles, fish, marine mammals and hippos (ANONYM 2012).

Due to this biological richness the archipelago was classified as an UNESCO Biosphere Reserve in 1996 and, more recently as a RAMSAR site on 21 January 2014.

The Bijagós Archipelago is recognized as a center of important concentration of hippos (*Hippopotamus amphibius*). These iconic animals, which usually live in freshwater, adapted to salt water over thousands of years of progression from the delta to the sea, thus constituting a phenomenon little known in the world. The RBABB represents one of the last places with a high incidence of Manatees (*Trichechus senegalensis*) - large and vulnerable marine herbivorous mammals on the West African coast. Worldwide, the population of this species is in decline, thus considered vulnerable and appearing on the IUCN Red List. As the hippo and other charismatic animals, the socio-cultural value manatee constitute a potential for effective conservation (BOUJU, S.; CATRY, P. and Lamb, J. 2001).

Of all the seven species of sea turtles worldwide, at least five exist in the waters of RBABB: Green SeaTurtles, (*Chelonia mydas*); Olive Ridley sea turtle (*Lepidochelys olivacea*); Hawksbill Sea Turtle (*Eretmochelys imbricate*); Loggerhead turtle (*Caretta caretta*) and Leatherback sea turtle (*Dermochelys coriacea*). Of these, only the Loggerhead turtle has not so far spawn on the Bijagós Island beaches, from what we can see. It should be noted that all species of sea turtles are migratory and on a planetary scale, are a severely threatened species (Leatherback turtle, kempii and Hawksbill Sea Turtle) or simply threatened (Loggerhead, Ridley and Green). All these species are listed in Annexes I and II of the Bonn Convention (CMS) on the conservation of migratory species of wild fauna protected by various international treaties and also on the IUCN Red List.

There is no existing information about insects, algae, and microalgae, as they still have not been adequately studied in Guinea-Bissau. However, they exist in abundance.

1.2.2.2. Vegetation and Flora

The fact of Guinea-Bissau phytogeographically is found the Guineo-Congolesa/Sudanesa Regional Transition Zone, its vegetation and floristic elements present great diversity and variety.

L. Catarino (2004) in his doctoral thesis under the title *" Phytogeography of Guinea-Bissau,"* produced a list of the vascular flora of the country, with 22 species of Pteridophytes, 1,162 types of Magnoliopsida (Dicotyledons) and 419 types of Liliopsida (Monocots). In 2006, in a

publication, *Catarino et al. on Vascular Plants and Bryophytes of Guinea-Bissau* presents a comprehensive inventory of phyto-diversity thus bridging the absence of data on flora in the country. This survey listed 15 species of non-vascular flora (mosses), 7 specimens of the Mosses family and 8 of the Liverworts family were listed. The authors of this publication however call attention to the uncertainty in the identification of taxonomic groups of non-vascular flora, given the scarce knowledge about these in the country (Catarino, L. et al. 2006).

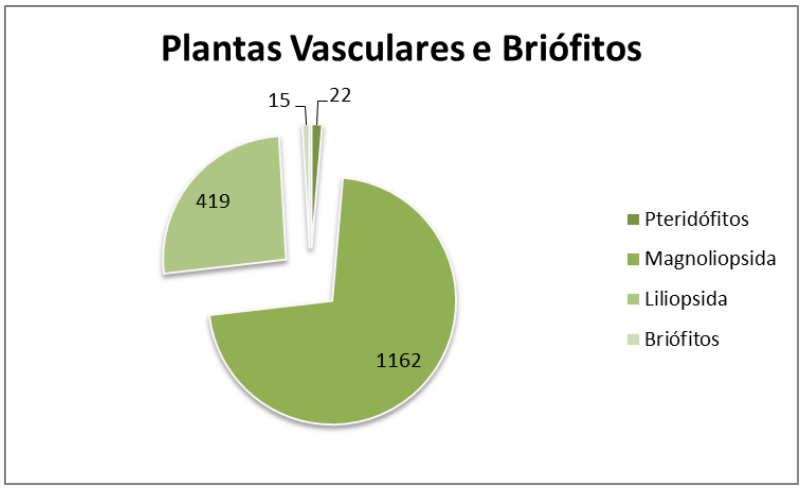


Figure 17: Vascular and Bryophytes Plants

Source: CATARINO, L. et al. (2006): Vascular and Bryophytes Plants of Guinea-Bissau.

In recent years, several specific missions have been organized and permitted the collection of numerous specimens throughout the territory, particularly in the Cantanhez Parks; the Cacheu River Tarrafes; the Cufada Lagoon; and in the Bijagós Archipelago. For more practical oriented projects, with the aim of studying, for example, weeds in upland and small valleys, as well as the medicinal plants, many specimens were also collected.

From 17 families and 105 species of weeds of upland crops were identified, while for weeds in rice production in basins and small interior valleys, 17 families were identified, but with number of species restricted to 64.

In 2010 a book edited on medicinal plants of the Orango Islands National Park and the Canhabaque Islands / John Vieira Poilão National Marine Park. Recently in 2014, in the book titled "Mezinho Orango" (Orgango's Medicine), 46 species of medicinal plants have were reported to be used in traditional pharmacopoeia, belonging to 28 families and 43 genera. Twenty-three species used are from trees; 15 from shrubs; six from herbs; and two from lianas. The leaves are usually the part of the plants used the most serving as the base for 32 recipes (prescriptions), followed by the roots for 29 recipes and the stem bark for 15 recipes. If the species is an herb, all aerial parts of the plant can be used (6 recipes). Fruits, sap and branches with leaves are used in a recipe for each one (Indjai, B.; Catarino, L.E. and Mourao, D.: 2010).

BARBOSA, (2012) in his unpublished work entitled: "*A utilização das plantas em Canhabaque e no Parque Nacional Marinho João Vieira Poilão*" *(*The use of plants in Canhabaque and João Vieira Poilão Marine National Park*)* 85 species of useful plants were identified. Of these 25 are used solely for the traditional pharmacopoeia; 23 in pharmacopoeia and other uses; and 37 for other different utilities. In the study titled: *"Mezinhos da terra e curas tradicionais nas Ilhas de Canhabaque e do Parque Nacional Marinho João Vieira e Poilão"* (Natural Medicines and Traditional Healing in Canhabaque Islands and the Marine João Vieira and Poilão National Park) 45 species of plants belonging to 25 families surveyed, used for a total of 85 different recipes in

traditional pharmacopoeia for the inhabitants of these islands (Indjai, B., Barbosa, C. and Catarino, L.E. 2014).

1.3. Main threats to biological diversity

1.3.1. Key factors that cause loss of biodiversity and ecosystem services

Guinea-Bissau is a country rich in biodiversity. However, in recent years, driven not only by natural factors but primarily by human activities, their terrestrial ecosystems have suffered high levels of degradation, fragmentation of habitats, soil erosion and reduction of available water resources, loss of ecosystem services and rapid decrease of biological diversity.

Among the anthropogenic factors that contribute to the degradation of the vegetation cover, the ones that stand out, among others are: i) traditional farming practices "shifting cultivation"; ii) unbridled extension occupied by monoculture cashew surface; iii) exploitation of wood materials for the construction and production of domestic energy from firewood and charcoal; iv) anarchic exploitation of industrial wood; v) burnings (poaching, exploitation of honey, and uncontrolled fires, etc..); vi) development of the emerging mining sector; vii) anarchic occupation of spaces, and; viii) irrational exploitation of resources.

This set of threats also constitutes a direct threat to most of the rural population of Guinea-Bissau, whose survival is inextricably linked to a healthy ecosystem in the country.

1.3.1.1. Traditional agriculture and the expansion of cashew monoculture

Rapid population growth (2.4% - INE, 2010), arising from the high birth rate, reinforced by the rampant migration, associated with decreased productivity fields (reduction and irregularity of rainfall and increased salinization) each imply the clearing of forests for cultivation and, more recently, shifting for the installation of private and family orchards. Deforestation and the use of fire in the preparation of fields for "itinerant" agriculture for subsistence and the emergence of new human settlements "villages" associated with the development of new agricultural concessions, commonly known as "farms" are the major environmental problems and factors of land degradation in the country.

Deforestation of the highest areas for agriculture has contributed to the leaching of soils and allowed erosion and transportation of the materials and soil particles to the lower parts, the silted riverbeds, by rainwater.

Poor marketing of cashew nuts in the last two years, caused by socio-political perturbations inherent from the coup of 12 April 2012, had very pronounced negative effects on deforestation. As a consequence, there was an increase in demand for agricultural fields, for the production of upland rice and at the expense of brush clearing of large tracts of forest areas.

1.3.1.2. Firewood and timber

Given its efficiency, African Mesquite Tree (*Proposis African)* charcoal is seen as the most appropriate tree species for the production of firewood and charcoal. This essence includes a good crystallization ability reflected in a slow, low-power combustion and therefore has suffered great pressure, resulting in it being endangered. For its replacement some of the trees used are: Kosso (*Pterocarpus erinaceus);* V*elvet* Tambarin *(Guinea Dialium);* Daniella *(Daniella oliveri);* African mahogany (*Khaya senegalensis);* Sasswood *(Erithrophleum guinea);* Mango trees (*Mangifera indica;* Cashew trees *(Anacardium occidentale*); and mangroves (*Avicennia and*

Rhizophora sp). These species have rapid coal combustion, reducing to ashes in much less time than in the case of charcoal wood, consequently causing a growing demand for this product.

The inability to ensure its constant availability in forests and the delay that implies in terms of a timely supply of charcoal to the market, coupled with its immediate economic profitability leads to a situations of arbitrary forest cuts. In these circumstances, firewood is obtained by: i) deliberate trees or mangroves cuts; ii) annealing - girdling the trunks; and iii) intentional burning through bonfires placed around the base of the stems; burned for shifting cultivation; all to achieve primary material for extractive processes.

The progressive disorganization of the forestry sector, institutionally speaking, as a result of endemic politico-governance instability, has contributed to this sector to the economy. Each time that sawmills and concessions are replaced by illegal cutting activities, conducted mainly by foreigners who for the most part export unprocessed trunks, is disrespect to the existing moratorium of this material. Using motor saws has been causing major damage to the forest ecosystem and the economy. The Kosso tree, already threatened with disappearance in certain forest concessions, is the main target endorsed by these actions of piracy. Illegal cutting is mainly motivated by the fact that the product from loggers are mostly exported trunks, so the internal needs of small carpenter for the manufacture of furniture are well met by wood harvested illegally (BELEMVIRE 2010).

The demand for building material from African Palm tree wood *Borassus aethiopum* has been intensifying in recent years with the expansion of towns and cities.

1.3.1.3. Burnings

Burning forests to clear land for cashew production, and / or cutting trees for the production of timber instead of "cibe" *(Borasus aethiopum)* have contributed to the aging and shrinking of the surface covered by this formation.

It is estimated that each year between 50,000 to 80,000 ha of forest in Guinea-Bissau are degraded annually by fires of different origins, including those arising in the context of shifting cultivation, the expansion of the areas used in the regeneration of pastures and swamp hunting with the aid of fire, and fires from various origins (exploitation of honey, carelessness and arson, etc..).

1.3.1.4. Extractive Industry

All sites identified for mining have an exceptional biodiversity which may be threatened. Likewise, there is huge potential for dissemination and potential impacts of these mining pollutants, contamination originating from other areas through the dynamics of river and marine waters and may have unpredictable impacts on fisheries production and in the case of the Farim River and the Cacheu River, in the production of shrimp.

1.3.1.5. Anarchic occupation of spaces

The current main threat in **the mangrove ecosystem** is the commercial exploitation of their timber for the smoking of fish, salt exploitation and unsustainable use of farming the oysters that grow on their roots. Mangrove areas on the perimeter of cities are used as dumps for waste and wastewater. Also to consider is the fact that many infrastructures are built in proximity without proper environmental impact studies.

Urbanization and construction of new infrastructure have been made at the expense of different plants and habitats formations, some of them of great ecological and landscape value. This is the case throughout the downtown area of Bissau, formerly a wetland harboring mangrove and lakes that served as resting sites and feeding area for many birds, as well it also served protein supply for the poorest people of Bissau, with fish, mollusks and shellfish.

As previously referenced, the Bijagós Archipelago is widely recognized as a major tourist potential of the Guinean coastal zone. The increased pressure in the tourism sector, the nerve to the development of this country is also felt in this area. It has been expressed by land acquisitions, particularly in the islets, for the development of tourist activities. The installation of tourist infrastructure in these localities has not taken into account the fragility and vulnerability of small islands in terms of their economic, ecological and social importance.

Because they are small and of sedimentary origin, they are exposed to the phenomena of climate change, moreover facts already observed with the increase in erosion, rising sea levels and even the disappearance of some more exposed islets and shoals. This phenomenon is already observed, especially during spring tides.

In Bijagós mythology many of these islets are considered sacred, serving as a site to perform various mystic-religious acts. It is noteworthy that all the sacred islands are of extreme ecological importance or vice versa. The vast majority of islands or sites with this designation are home to great diversity of animals or areas of occurrence are par excellence of a particular animal or plant species.

It should be emphasized the fact that a large majority of these islands are periodically used for agriculture (shifting cultivation) and forest extraction (fruit and palm wine, wood for fuel production, artisanal, construction material, etc.), serving strategically as backup sites food security.

The current changes in climatic factors including rainfall and temperature (air and water) are likely to have significant effects on the development of different species that constitute and impact their productivity.

1.3.1.6. Irrational exploitation of fishery resources

In traditional **artisanal fishing**, the use of monofilament nets of small mesh sizes, "mosquito net" and the technique of closing the mouths of rivers and river stretches "tadja river" are the main pressures on coastal fishery resources. The mosquito nets are used both in fields as well in the small stretches of the sea / river - i.e., coastal and mangrove for catching shrimp and immature fish zone. The closing the mouths of rivers system spreads the nets across the river mouths thereby catching fish of all sizes, and even the young immature ones and also other species of aquatic fauna, including the sea-cow (manatee). These mammals get caught up in these nets during the high tide, when seeking food and drinking zones. In an attempt to return to the deeper zones during the low tides they get trapped in these nets.

Among the activities that cause the most negative environmental impacts from groupings of commercial artisanal fishing camps, the ones that stand out the most are: i) cutting mangroves (and sometimes other types of vegetation) to obtaining firewood for fish processing; ii) cutting large trees to build canoes keels and other parts of vessels; iii) fishing directed at breeding areas, especially the cartilage, affecting fish stocks and fisheries in the food chain; iv) the accidental capture and / or targeting of protected and rare species; v) capturing African ospreys for meat consumption; and vi) collecting turtle eggs and adult females at nesting beaches. Among those captured with some frequency, usually drowned in the nets, there are the sea turtles, the sea-cow dolphins and crocodiles.

Pressures and threats exerted by the **industrial fishing** subsector are generic and present in almost all countries of the sub region, highlighting among others: i) operations and presence of trawlers in areas reserved for artisanal fishing leading to a degradation and alteration of the seabed, coastal ecosystems and its integrated resources; ii) overfishing of species of high commercial value along with threatened species, iii) pollution, iv) raids by pirate fishing boats.

As for "sports" **recreational fishing** it has been noted that large horsepower engines constantly attempt to penetrate the breeding areas of fish resources and, which implies constant noise and disturbance of the environment. The greed for profit has spurred operators in sports fishing to sell the products of their fishery. This situation beyond establishing unfair competition vis-à-vis the artisanal fishermen also constitutes a factor of pressure on fisheries resources.

1.3.1.7. Main pressures on Protected Areas

The graph below summarizes the main pressures and threats associated with managing the network of AP's. Currently, the main pressures identified in the parks are fishing, deforestation, poaching, exploitation of mangroves and increasing demographics. The main threats in turn are associated with the modification of ecosystems, mining, loss of traditional knowledge and wisdom and increased pressure on renewable resources.

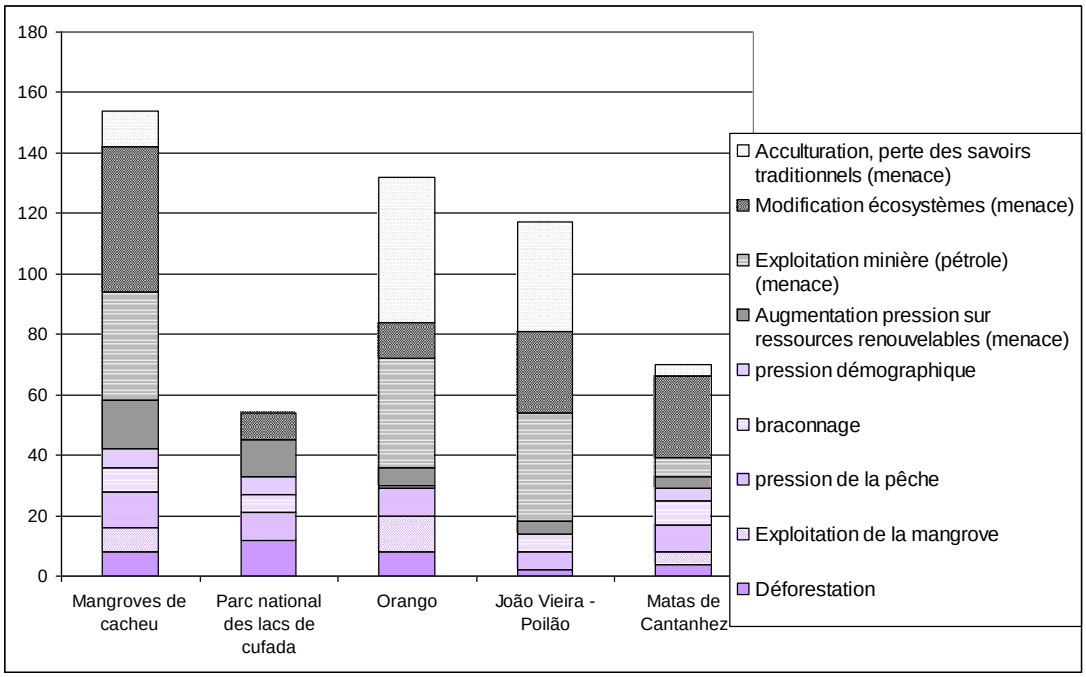


Figure 18: Threats and Pressures on the country's different APs

1.4. Impacts on biodiversity and ecosystem services and cultural and socioeconomic consequences

In recent years, several factors arising mainly from the effects of increasing globalization and regionalization of economies has contributed to breaking the secular equilibrium established between the coastal communities and the surrounding ecosystems.

However, the unbridled exploitation of natural resources of the country has not helped significantly to improving social and economic conditions of local residents. It is intended in this subchapter address the ecological and economic consequences stemming from the unsustainable

use of natural resources, especially related to agriculture, exploitation of timber forest resources and fisheries as major economic activities. For as long as the rain-fed agriculture on the plateau in association with the operation of timber and fuel wood will to contribute strongly to the **savannization.** Mangrove agriculture or salty water fields together with activities associated with the fishing industry, tend to compete against weeds for increased surface of Guinea's ecosystem transition.

The consequences for Guinean agricultural system are unpredictable; given the way that monoculture of cashew has been replacing the traditional techniques of conservation land under fallow. The introduction and expansion of rampant monoculture income, in addition to replacing agriculture geared towards individual and household consumption implies the simplification and standardization of agricultural production. The cycle between cultivation and fallow is thus interrupted by these practices while the lands under natural restoration decreases proportionately and accordingly deforested and degrade the ecosystems in areas across the country increases. Dry and semi-dry forests and palm trees groves are the most affected in this regard.

In short, this agriculture oriented to meet the demands of the foreign market are contributing to the loss and gradual decrease of both the diversity of traditional foods with known nutritional values as well as the very natural diversity of the country's ecosystems and their respective services.

The high population growth, rural exodus and rampant concentration around cities, towns and urban/ suburb areas has contributed significantly to the increased consumption of plant biomass (wood / charcoal). The urban population increased from 20.8% in 1990 to 30% just twenty years later

Of the 50,000 ha of arable farming fields claimed by farmers, it's estimated that about 20,000 ha were abandoned or never used in its entirety due to broken dikes and / or inappropriate land preparation. The abandonment of these fields without planting mangrove has caused acidification and salinization of soils and appearance of soil erosion. In addition to soil erosion, the destruction and degradation of mangroves, via ruptured levees also has their immediate and future consequences leading towards erosive phenomena in areas impacted by tides. While rehabilitation of these areas can be performed manually, it seems highly unlikely that there will be enough manual labor available to meet our needs due to costs, especially in cashew production.

II - NATIONAL BIODIVERSITY STRATEGIES AND ACTION PLANS, IMPLEMENTATION AND THE MAINSTREAMING OF BIODIVERSITY

2.1. Introduction

After the signing and ratification of Guinea-Bissau of the Rio Conventions (United Nations Framework Convention on Climate Change - UNFCCC, Convention on Biological Diversity - CBD and Combat Desertification) in late 1995, necessary conditions were created for the recipient country and support funds for implementing the same. In this context, in 2002 GEF provided the country funding needed to develop its first Strategy and National Action Plan for Biodiversity (EPANBD).

The 12 strategic objectives defined by EPAN BD-GB stem from the three main objectives of the CBD, namely: i) conservation of biological diversity, ii) sustainable use of its elements; and iii) fair and equitable sharing of the benefits from the exploitation of genetic resources. During the term of this first EPAN, considerable efforts (see the Fourth National Country Report), with a view to contribute to the reduction of declining biological diversity of national, regional and global significance have been gathered from, and achieved remarkable results in the country.

However, it was found during the 10th Conference of Parties (COP) to the CBD organized in 2010 in Nagoya (Japan) none of the Member States has achieved in its fullness, the objectives of the Strategic Plan of the Convention stipulated for the period prescribed for the 2011 - 2020.

Following this finding, one of its resolutions of the COP 11, held in 2012 in Hyderabad (India), invites the parties to re-examine, update and revise their strategies and action plans for biodiversity, in line with the objectives of the New and Strategic Plan 2011 - 2020 and Aichi Goals and Targets. In order to adapt it to the new guidelines and priorities, Guinea-Bissau EPANBD update process has recently been released.

2.2. National Action Plan Update Process - Incorporation of new objectives and improving the effectiveness of BD mainstreaming

The country recognizes the need to update its Strategy and National Action Plan for Biodiversity in view of the fact that the current EPAN does not clearly cover the links between biodiversity conservation and poverty reduction. The Country Strategy Paper on Poverty Reduction of the second generation (PRSP II) validated in July 2011, agreed on some efforts to integrate in their action plans, such as environmental issues and biodiversity conservation, contrary to what has happened in the PRSP (2006), where the issue of the environment was addressed very timidly.

The country likewise recognizes the need to develop actions for a better sectorial and cross-sectorial mainstreaming of biodiversity; propose and create mechanisms for payment of environmental and ecosystem services (fisheries, forestry, tourism, energy, etc.); ensure participation in the Carbon Credit market (REDD, REDD +); providing continuous training and capacity building for actors involved; explore and propose new energy sources; reflect on the problem of urban biodiversity, etc..

2.3. Measures taken and results achieved in the implementation of the Convention after the Fourth Report

In fulfilling its obligations arising under the Convention on Biological Diversity, Guinea-Bissau signed various international conventions; decreed and enacted a variety of laws; and undertook a range of activities in the environmental field during the 2009-2013 periods. Several structures of the State and civil society were established with the aim to better coordinate, harmonize and monitor the environmental policy's actions and sustainable development at the national level.

2.3.1. Institutional Mechanisms

2.3.1.1. Secretary of State for Environment

In January 2009, the 4th Constitutional Government of the country established the Secretary of State for Environment and Sustainable Development (SEADD) by Presidential Decree n. 2/2009. The institution's overall mission is to define, execute and coordinate the policies and actions aimed at the conservation and sustainable use of biological diversity. The institutionalization of this public agency is responsible for the pursuit of environmental policy, the demonstrating the importance that the environmental sector has for the country and its respective place in the Guinean State's sustainable development policy.

The creation of SEADD came as an attempt to bridge existing institutional issues, create synergies and foster greater coherence between sectorial policies and aspects relating directly or indirectly to the management of environment and natural resources.

With the publication on 11 March 2011 the new structure of the government, IBAP, previously under supervision of the Minister of Agriculture and Rural Development became subordinate to SEADD. In addition to IBAP, the SEADD also houses various departments, services, conventions, programs and projects that interact directly or indirectly with the issues of biodiversity.

After 12 April 2012, the State agency that manages environment, (in addition to IBAP) amended to include in its organic structure: General Directorates for Environment and Tourism; Environmental Inspection Services and Tourism; the Office of Coastal Planning; and the Unit for the Evaluation of Environmental Impact. Coordination and cooperation has improved by belonging to the same institution.

Guinea-Bissau's development is heavily dependent on foreign aid, and international partnerships. In this context, it is important for the country to honor its commitments to the protocols, agreements and other international agreements already made, projecting a positive image of the nation and facilitating the raising of financial and technical support for sustainable development. To foist a new dynamic in international agreements to which Guinea-Bissau is committed, (with particular relevance to the CBD and its Protocols), the director of IBAP was appointed as focal point of this Convention. In 2012 other technicians at this institution were to be appointed to take on the responsibility for the national reports and positions as Focal Points of: the Programme of Work on Protected Areas (PoWPA); the Convention on Migratory Species of Wild Animals (CMS); the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES); and the Centre for Exchange of Experiences (CHM).

2.3.1.2. Unit for Evaluation of Environmental Impacts

The Unit for the Evaluation of Environmental Impacts (CAIA) was conceived and established with the aim of creating conditions where environmental and social considerations are taken into account in political decision making processes and development activities planned in the country. In other words, this unit must contribute to the promotion of sustainable development, i.e. ensuring economically viable investments that are socially acceptable and ecologically balanced for Guineans in particular, and humanity in general. In the long term, CAIA must predict, determine, evaluate and help mitigate the potential impacts of a project, program or strategy on human beings, fauna, flora, and on biodiversity and ecosystems services in general Environmental Framework Laws (approved and published on 02 March 2011 through Law No. 1/2011 in the Official Gazette No. 9) and Environmental Evaluation (approved and published under Law No. 10/2010 in the Official Gazette No. 38), are important legislative provisions that govern the operations of CAIA. These above mentioned laws are to announce the obligation to conduct environmental assessments and to acquire environmental licensing for all projects, programs, plans and policies for potential users of natural resources likely to cause effects on human health, as well it define and established technical and administrative procedures for the environmental evaluation (AA) and Environmental Licenses (LA).

Since the establishment of CAIA, the number of investors that conform with environmental issues legal requirements has been constantly increasing. While construction companies, small and medium enterprises in the services field immediately embraced the EIA requirements and authorization requests for Environmental Compliance, the same has not happened with the mining industries, which have reacted hesitantly. However, several actions served to sensitize stakeholders in this field, including the National Conference on Extractive Industries that was organized by CAIA and under the impulsion of the Working Group on Extractive Industries which was held in March 2010. The main recommendations from this conference were that Studies / Strategic Environmental Evaluations, (EIA) must be carried out at all stages of

development of mining and petroleum projects including infrastructures associated with them to make sure that internationally imposed environmental standards were respected.

The following tables show evolution in the country to carry out EIA and applications for environmental compliance:

Table 2 Year, activity and Environmental Compliance license duration period.

Year	Activity	Issuance and validity statement
2007	Study of Sambangalou and Kaleta Hydropower Planning Project and the connecting lines to the member countries of OMVG	20.06.2007 - 20.07.2008
	Construction of St. Vincent Bridge	31.07.2007 - 01.08.2008
	Rehabilitation Project, Construction and Asphalting of the Boke and Quebo road and the rehabilitation connecting roads	27.1.2007 - 27.12.2008
	Bissau Daily Journal Rehabilitation Project	14.09.2007 - 01.11.2008
	LENOX Rehabilitation Project	14.09.2007 - 01.11.2008
	ASCON Company Rehabilitation project	14.09.2007 - 01.11.2008
	AFRIPECHE Company Rehabilitation project	14.09.2007 - 01.11.2008
	LUCO Industrial Shipyards Company Rehabilitation project	14.09.2007 - 01.11.2008
	GERAUTO Company equipment project	14.09.2007 - 01.11.2008
	MABI Company procurement of equipment and rehabilitation project	14.09.2007 - 01.11.2008
	CHEZ AMY Restaurant Rehabilitation project	14.09.2007 - 01.11.2008
	SOAPEC Company Eirl Rehabilitation project	14.09.2007 - 01.11.2008
	GUIMETAL Rehabilitation project	14.09.2007 - 01.11.2008
	SUINAVE (Rose and Rose)Rehabilitation project	14.09.2007 - 01.11.2008
	Jordani Aparthotel in VARELA Rehabilitation Project	14.09.2007 - 01.11.2008
	Dias and Dias Company Rehabilitation project	14.09.2007 - 01.11.2008
2008	Project to create Cantanhez National Park	12.02.2008 - 20.02.2009
2009	Project to promote local participation and volunteers in the management of solid waste in the city of Gabu	12.01.2009 - 31.03.2010
	Construction project for the installation of Cacine Artisanal Fishing in the Tombali Region	08.12.2009 - 10.01.2011
	Rehabilitation and construction of roads in Bissau City: Avenue Combatentes Liberdade da Patria section (Freedom Fighters of the Fatherland Avenue)	20.11.2009 - 30.11.2010
	Valuation and management of the OMVG Natural Resources Project	08.12.2009 - 10.01.2011
2012	Project to modernize the Port of Bissau	07.02.2012 - 06.02.2013
	Brandy Distilling installation project	15.10.2012 - 10.15.2013
	Project to promote rice farming by youth	15.10.2012 - 10.15.2013
	Guinea-Bissau Optics transmission project	15.10.2012 - 10.15.2013
2013	Rehabilitation and widening of the Mansoa / Farim road project	15/02/2013 - 01/15/2014
	Exploitation of heavy minerals project	19/04/2013 - 20/04/2014
	Rehabilitation and construction of 1,2,3 roads Bissau City project	17/05/2013 - 18/05/2014
	CICER Beer (Bissau) Rehabilitation project	04/07/2013 - 07/04/2014
	Gardete Assembly photovoltaic solar plant project	12.03.2013 -03.12.2014

Table 3 Request for Environmental Compliance for the different areas of intervention

Areas of Intervention	Environmental Compliance Declaration							
	2007	2008	2009	2010	2011	2012	2013	Total
Infrastructure for obtaining energy	1						1	2
Bridges and Roads Infrastructure	2		1				2	5
Fisheries Infrastructure	1		1			1		3
Agricultural Infrastructure	1					1		2
Mining Industries							1	1
Hotel Infrastructure	1							1
Industrial Drinks Infrastructure						1	1	2
Industrial and Infrastructure Repairs	5							5
Telecommunications Infrastructure						1		1
Fuel Infrastructure	1							1
Rehabilitation of various services	4							4
Creation of Protected Area, Valuation and Management of Natural Resources		1	1					2
Sanitation and Waste Management			1					1

2.3.1.3. Institute of Biodiversity and Protected Areas

The Institute of Biodiversity and Protected Areas (IBAP) was established by Decree 2/2005, published in the Official Gazette N^{o} 11 of 14 March 2005. Its mandate is essentially to propose, coordinate and implement the policy and actions pertaining to biodiversity and areas protected throughout the national territory. This institute is therefore responsible for the management of parks and the management and monitoring of the key values of biodiversity (species and habitats) in Guinea-Bissau.

By 2006, IBAP in collaboration with its partners had already identified its vision and mandate. In order to clearly define its purpose, set goals and realistic targets consistent with its mission and vision, this institution has engaged in preparing its five-year strategic planning (2007-2011). The strategic objectives and activities defined clustered around three major axes. The **first** concerns institutional strengthening aimed at ensuring the legal and practical recognition of IBAP as being an essential part of natural resource management systems. The establishment of sustainable funding mechanisms, through a Trust Fund; and the valuation of other complementary financing mechanisms stand out as prominent activities of this component.

The***second*** axis in turn focuses on improving the management of AP and on promotion of sustainable development in the local communities. The activities under this component must: a) promote participatory management; b) develop and adopt management plans for each AP; c)

implement stringent zoning with strict conservation areas and sustainable development areas; d) ensure effective supervision and signaling; e) invest in training IBAP cadres; f) identify the costs of lost opportunities and impacts on wildlife populations; g) support NGOs and local communities to develop sustainable development initiatives. This axis should contribute its inherent activities to expand the AP Network.

The ***third*** strategic axis focuses mainly on the knowledge of biodiversity and associated natural processes and their exploitation by man. Environmental monitoring focused on species or sensitive and emblematic habitats, plays a central role in the objective assessment of the impacts and outcomes of interventions; and this evaluation a key element of the strategy in question. These same species and habitats should be considered a priority, where appropriate, targets of action plans and specific measures. The dissemination of knowledge should be carried out differently, the level of decision-makers, at all levels of stakeholders in the management of AP, and the level of the general population.

Fostering partnerships with all stakeholders, in particular with other public institutions with responsibilities in the management of natural resources, NGOs, the private sector, with traditional rulers and grassroots communities as well as scientific institutions, conservation organizations and cooperation agencies is regarded as IBAP's cross-sectional area of intervention (IBAP, 2006).

A summary of events that took place during the implementation of the IBAP Strategy 2007 - 2011), namely internally drafting and editing its own Strategy; the construction and inauguration of IBAP's own administrative building; review and approval of the new Framework Law on Protected Areas; establishment and official registration of BioGuiné Foundation; the formalization of Cantanhez National Park and the launching of the extension of the national network of PAs in the forest belt of the country decisively marked the pillars of the conservation process in Guinea-Bissau, especially regarding its administrative-institutional, financial and ecological sustainability.

2.3.1.4. Extractive Industry Working Group

Guinea-Bissau envisions exploiting the mineral resources of the country, particularly phosphate, in Farim; bauxite in Boe; petroleum in territorial waters; among other minerals.

The "Working Group on Petroleum and other Extractive Industries" (GTP-IE/GB) was created in order to raise public awareness on the issue of petroleum and other Extractive Industries; To encourage decision-makers to select and use technologies with better performances in exploitation, processing and transportation, provide local population with better access to information and provide them with negotiating skills and understanding of the challenges in order to defend their interests. This guild integrates different State institutions, national and international NGOs, and is coordinated by the Director of IBAP.

The First Conference on extractive industries and sustainable development was organized in March 2010. It was presided over by His Excellency, Mr. Carlos Gomes Júnior, Prime Minister of Guinea-Bissau.

In fulfilling its work program, the GTP-IE restored conference results in: i) and Farim Djalicunda; the area identified for the exploitation of phosphate; ii) since the exploration phase in Gabu Region where the bauxite deposits are,; iii) the planned port in Buba, where bauxite is projected to be evacuated by sea; and iv) Bubaque, potentially oil-rich region. The restitution meetings included Members of Parliament, Regional Governors, representatives of the nation, governors of regions, representatives of power traditional rulers, leaders of decentralized State structures, associations and grass-root groupings and the public in general.

From a legal standpoint, the president of GTP - IE in August 2010 signed a Memorandum of Understanding with the Minister of Natural Resources recognizing the role of GTP-IE in facilitating the adoption of the best social and environmental policies, in mediating between actors and stakeholders' capacity building. The main purpose of this Memorandum is to help strengthen institutional dialogue between the Government and civil society organizations in the field of rational and transparent management of mineral resources.

In 2011 we highlight the following actions carried out:

- 15-16 January: Information sharing session about ilmenite and zircon in Varela;
- March 2011: 2nd animation session in the ANP on mines and oil for the Guinean Parliamentarians, with the participation of Dr. Paul Siegel from WWF Warner / PRCM;
- 25.08.2011: Contract signing ceremony of the new project on *"Promotion de la Démocratie et Gestion des Industries Extractives Transparent, Phase III";*
- October: Publication of the report on Petroleum and Mines in Guinea-Bissau;
- November: GTP-IE members participation in a seminar held in Switzerland on evaluation and strategic reflection on the dialogue between ICMM (International Council on Mining and Metals) and IUCN

During 2013, GTP-IE organized a visit to exchange experiences with the mining site of Taiba in Senegal. Together with SEAT, in the wood industry area, several missions were organized in loco in the area where illegal trunks were seized. Because of these acts, the group supported the organization of a conference debate on the problematic of logging in Guinea-Bissau. This Conference was attended by over 150 guests representing State structures, Parliamentarians, NGOs, private sector, timber companies and grass-roots associations. During it, an 18 minutes movie on the topic was displayed. Moreover, members of this group also participated actively in discussions on the expropriation of land in Bijagós Islands for tourist purposes.

It can be summarized that at the instigation of this group, many activities have been undertaken, highlighting: i) the completion of the 1st and 2nd National Conference on Extractive Industries; ii) assistance in updating the Mining Code; iii) the development of laws, policies and strategies in the environmental field (Law of Environmental Impact Evaluation, Mining Code, the Petroleum Law, MARPOL Convention); iv) various training activities and capacity building of local actors about the risks and benefits of Extractive Industries: Farim, Boe, Varela, Buba and Bubaque (2009, 2010, 2011, 2012 and 2013); v) briefings in the National Assembly on mines and oil (2009 and 2011); vi) animation of a sub-regional network on extractive industries: Senegal, Guinea and Sierra Leone (sensitization, case studies); vii) creation of a newsletter on extractive industries; and viii) after repair of a synthesis of all available documents on the sector (Internal Report of activities, training and awareness - unpublished).

2.3.1.5. RAMSAR National Committee

In June 2012, the IUCN country representative and its expert partners on conservation and sustainable management of wetlands partners, decided to re-launch the process of creating the Guinea-Bissau RAMSAR National Committee. Joint intervention by the DGA, GPC, and IBAP with technical assistance given by IUCN, facilitated the holding of first meeting to reactivate this committee on 20 November 2012, during which representatives of different institutions discussed and validated the RAMSAR Statutes.

The first training session on the RAMSAR Convention and the importance of wetlands to the designated members took place five days after the constitution of the Committee referred to above. This training held at the PNTC Headquarters in Cacheu, addressed the following topics:

i) Background, Concepts, Structure, Membership, COPs, dimensions and other requirements of the RAMSAR Convention;

ii) Concept, characteristics and types of wetlands; iii) values, functions and use of wetland resources; iv) tracking targets in wetlands; v) ecology, migration, methods and techniques of counting waterfowl; vi) Basic Concept of Ecosystem Services or environmental; vii) Total Economic Value and methods for calculating viii) Restitution of the pilot and preliminary study to determine economic value of a wetland – PNTC, as well; ix) a guided study visit to Cacheu River.

The second training session, held from 11- 13 December in Buba at the PNLC Headquarters, targeted partners, stakeholders and members of the Board of Management of APs. This training in Buba, unlike in Cacheu included three new themes, including: i) Role of advocacy in conservation and sustainable valuation of wetlands; ii) Function and importance of the coastal zone and; iii) Environmental Education and Communication in wetlands.

Both the process of reactivating the Committee as well as two training sessions were technically and financially supported by PREMI (Poverty Reduction and Environment Management Initiative) of the Program of Central and West Africa (PACO) of the International Union for Conservation of Nature (Internal Reports - unpublished).

2.3.2. Legal and Regulatory Framework

In recent years, a variety of laws on environment have been passed: (Environment Basic Law; Environmental Assessment Act; revision and update of Forestry Framework Law on Protected Areas; the General Law on Fisheries Act; the Artisanal Fisheries Regulation; Decree on Creation of Cantanhez National Park, etc..) enacted by the Government, ratified by the National People's Assembly (legislature) and were signed into law by the President.

The elaboration and implementation of these laws have contributed directly or indirectly in strengthening the legal recognition of IBAP. Moreover, IBAP's guardianship was transferred from the Ministry of Agriculture and Rural Development (MARD) to the Secretary of State for Environment and Sustainable Development (SEADD). With the integration of IBAP, DGA (General Directorate for Environment), the GPC (Office of Coastal Planning) and CAIA (Unit for the Evaluation of Environmental Impact) in SEADD, joined institutions where there are overlaps and complementarities of skills. This administrative measure, as already mentioned, contributed greatly to improve the coordination and synergies in the management of biodiversity and ecosystems in general, and threatened species and habitats in particular.

2.3.2.1. Environment Basic Law

The Basic Environment Law was approved under Law No. 1/2011 and published in Official Gazette N^{o}. 9 on 02 March 2011. Proper application of specific principles, such as the prevention and precautionary, polluter-pays, user-pays, international cooperation, recovery, participation and accountability contained in this Act for repairing the environmental damage caused by a non-durable activity could bring highly positive contribution for the country in general and biodiversity in particular.

2.3.2.2. Environmental Assessment Act and Social Impacts

On 24 November 2010, Law N^{o}. 10/2010 was published in the Official Gazette No. 38, regarding the requirements of preparing ASIS and AIAS well as the audit, licensing and environmental monitoring introduced as policy instruments on environmental management in the framework of

CAIA intervention. IBAP and its APs must give its evaluation before any environmental permit is issued, if the project in question resides in the geographic areas under their jurisdiction.

2.3.2.3. Forestry Law

The revised Forest Act, approved and published under the Decree-Law No. 5/2011 in the Official Gazette N^{o}. 8 of 22 February 2011, defines that all protected areas and forests whose main function is conservation as well as inland waters that cross or located in these areas are considered forest area.

In recent years, cooperation between the DGFF of the MARD and the different DGs of SEAT, has found new impulses, consummated in the participation of DGFF technicians in the CG meetings and the participatory monitoring missions to the parks. By synergizing, mutual recognition has had immediate impacts of this strategic approach. The new Forestry Act, in addition to recognizing IBAP as the management organ for patrimony and forestry and when necessary, this institution may also be solicited to be part of the Forestry Technical Council.

2.3.2.4. Framework Law on Protected Areas

The 1st Framework Law on Protected Areas (LQAP) was drafted and approved in 1997. In 2007, ten (10) years after its enactment, the revision process to update the outdated parts was launched. On 10 December 2010, the revised LQAP was approved in the Council of Ministers. After its creation in 2005, IBAP revealed great importance – revision and approval of the new Framework Law on APs. This legal instrument served, on the one hand to officially define the role of this newly created institution (IBAP) in park management, other APs and for Biodiversity in the country, while on the other hand to clarify the interrelationships between IBAP and other institutions with competences in the area of natural resource management. The use of synergies and consensus and the anticipation of overlapping competences guided the spirit of the new LQAP.

After signing into law by the President of the Republic on 22 February and its publication, through the Official Bulletin N^{o}. 9, Decree-Law No. 5-A/2011 on 1 March 2011, adapting in the new national, sub-regional and international context, some of the innovations and contributions of this new law are as follows:

Definition of a protected area: adopting the definition published by IUCN (International Union for Conservation of Nature) and WCMC (World Conservation and Monitoring Centre) published in 1994

🗝 **AP Typology:** adoption of the six (6) categories of APs as defined by IUCN in 2008, eliminating the category of Natural Parks. Community Protected Areas, Forests and Sacred Sites became typified as AP. Possibility of having new types of APs with scientific development, conventions, treaties or agreements🗝 **Competence and Organs:** competence of the government structure that houses IBAP and the role and mandate of the former clearly defined

🗝 **Management tools:** Integration of the Strategic Plan of IBAP in the list

2.3.2.5. General Fisheries Law

After its official creation, the executive directorate of IBAP and their AMPs, requested and provided several workshops and consultation. These meetings began with Agents and Technicians in loco, then on to Regional Directors and Artisanal Fisheries Centers Delegates, FISCAP, CIPA Investigators, on up to the highest leadership of the Ministry. The harmonization of existing laws

relating to the control and a (re)definition of the competencies were discussed in these work sessions.

In 2006, after several meetings, an awareness committee was created at the governmental level headed by the Director of CIPA and a working group responsible for drafting a new participatory monitoring plan based on various proposals made at the meeting. Fishing restrictions in Orango National Park, João Vieira Poilão Marine National Park and Marine Protected Area Community of Formosa, Nago and Tchediã Islands, clearly visible on the reverse side of artisanal fishing licenses was introduced by the Department of Fisheries, constituting one of the major results and most impactful outputs of these meetings. Presently all of artisanal fishing licenses in the Republic of Guinea-Bissau clearly state that fishing is not allowed in PNO, PNMJVP.

Artisanal Fishing Regulation: The following results and impacts of the approved revisions of the General Law on Fisheries (Decree-Law No. 10/2011) and the Artisanal Fisheries Regulations (Decree No. 24/2011), published in Official Gazette N^{o}. 23 of 7 June 2011, are:

a) Introduction of the Reserved Fishing Zones concept; whose proposed creation must be made jointly by the General Directors of Artisanal Fisheries, Environment and IBAP. The Regulations and participatory management are elaborated by IBAP and its partners;

b) Prohibition of hunting, capture and detention of all seabird species, as well as on board possession, landing, marketing or offering for sale of species of marine mammals, sea turtles and crocodiles, stingrays and sharks as well as other species considered threatened or endangered have been included in the list of species to be protected;

c) Prohibition or restriction of use of mangroves for fish processing, marketing and construction;

d) Recognition of the Marine Parks Guards as entities for surveillance and to control artisanal fishing activities in their areas of jurisdiction.

2.3.3. Strategies, Relevant National Action Plans and Programs

2.3.3.1. National Action Plan for the Conservation of Specific Species

Action Plan for hippos: The existence of a protected area imposes certain restrictions on the use of natural resources in ways that these normative guidelines should wherever possible be supplemented with alternative activities as a way to compensate local communities. Hippos are responsible for the destruction of large tracts of paddy fields and represent a threat to the physical safety of people, constitute one of the major environmental issues in the management of the Orango Islands Parks and the Cacheu River Tarrafes Natural Park. In some areas of these parks are left to do agriculture because the losses were too high. In some villages residents do not go out at night due to their fear of hippos. In other areas fishing is impossible at night, especially the stretches in the sea. Moreover, knowledge still lacks about hippos and their interactions with humans still and these animals have been insufficiently exploited as a resource with potential for the development of a linked ecotourism industry. On the other hand, the hippopotamus is one of the most charismatic animals of these parks, and may help attract researchers and external financing. It has happened in the past, with visits to the hippos in the Anghõr Lagoon in PNO, but it was haphazard, not being control by the Park Directorate and population.

The first study of PNO hippos took place in 2001 during the dry season and intended to estimate their total number, based on a survey the populations of the park and the damage caused by this species in agricultural fields. The results indicated between 112 and 140 hippos (Campos et al. 2001). The second study took place six years later during the dry season and was geared towards the behavior of the species. According to this estimate, there were about 137 hippos. In subsequent years routine monitoring missions and annual censuses were carried out (Schwarz, C. et al 2006).

Various missions to the interior visited the fields of Carantabá, Bissorã and villages in the PNTC aiming to evaluate the impact of hippos in this area and discuss with farmers strategies to minimize and / or put an end to this problem (Schwarz, C. and Monteiro, H. 2006).

In Guinea-Bissau this species is protected in most parts of its actual distribution area. And, although it is mainly in protected areas, there are still places where their numbers are large enough to cause damage to crops.

Nationally, its area of distribution has decreased dramatically in recent years, mainly by deforestation and conversion of wetlands, which is progressively causing fragmentation of their populations. Wars / military conflicts also have negatively influenced the populations of hippos. However, it is essential that the country intensify the implementation of research programs in search of a better framework in relation to their status as fully preserved species.

It is on this basis that the great need for development of a National Action Plan for their conservation arises, whose main objective is to *significantly improve the conservation status of Hippo (Hippopotamus), through the implementation of a strategic policy on Research, Conservation and Education / Awareness.*

Action Plan for Marine Turtles: In a not too distant past, turtles were extremely abundant and a coastal ecosystems structuring element all over the planet. Nowadays, most of the species is globally threatened. Guinea-Bissau is one of the most important areas for sea turtles African countries. Five breeding species exist in this country and the site of spawning green turtle Chelonia mydas on Poilão Island (Bijagós Archipelago) with 7,500-20,000 a posture deposited

annually, is among the 10 most important sites in the world for this species and probably represents the most important place for reproduction in the entire African Continent.

Sea turtles in Guinea-Bissau are particularly threatened by capturing adult females spawning; by harvesting its eggs; and by accidental deaths in fishing gear (both artisanal and industrial fishing). There are also other less immediate threats, but they are likely to become more severe in the future with pollution linked to oil exploration and climate change.

In 2000 IUCN and its partners drafted a national action plan for the conservation of turtles. During the following seven years, during which some of the integrated projects of this plan were partially implemented and some progress obtained, manifesting the need for its review, update, presentation and submission to various donors for funding and implementation (Catry, P. 2000).

In 2010, a new plan of action was elaborated, in which the strategic guidelines were identified for the conservation of sea turtles in Guinea-Bissau. These lines are presented in the form of project outlines (Catry, P., Barbosa, C. and Indjai, B. 2010).

Action Plan: The ultimate goal of this initiative is, in the long term, to preserve all species of sea turtles in Guinea-Bissau, for the benefit of grassroots communities, as well as the Guinean Nation and the international community, through the preservation of this common heritage. Central to this idea is the use of sea turtles as a resource for the promotion of ecotourism as flagship species for environmental education and raising funds for the conservation of biodiversity, and as biological indicators for marine ecosystems.

The year 2010 was marked by the publication and edition of the book on marine turtles in Guinea-Bissau. This work is the result of 12 years of regular monitoring of marine turtles in the Bijagós Archipelago and in particular on Poilão Island. This initiative had the technical and scientific participation of the Office of Coastal Planning, INEP, CIPA and the School of Applied Psychology in Portugal (ISPA), and was supported throughout this period by IUCN, FIBA, and GEF through the World Bank. The final edition of the work was funded by WWF through the PRCM. The elaboration of the National Action Plans for the conservation of some species was also carried out.

The Action Plan for Elasmobranchs: In certain regions of the globe, populations of rays and sharks are decreasing intensively and therefore may constitute a serious risk for extinction of certain species, because existing stocks cannot afford excessive fishing efforts exercised by professional fishermen, especially in search of fins and derivatives, due to low biological productivity and late sexual maturity of these species.

With a view to counter the risks and consequences related to this exploitation, in 1999 FAO developed an International Plan of Action for Conservation and Management of rays and sharks (PAI-Requins), whose fundamental objective is to ensure conservation and management of sharks and rays and their sustainable long-term use. These measures should be guided by the principles set out in the precautionary Code of Conduct for Responsible Fisheries.

Aware and concerned about this situation and in the framework of the implementation of the PAI-Requins at the sub-regional level, the Sub-Regional Fisheries Commission (SRFC) prepared a Sub-Regional Action Plan (PSRA-Requins) which was adopted in September 2001 at the 14th Ordinary Session of the AU Conference of Ministers of Member Countries in Nouakchott. Consequently, it was recommended that each member country prepare its National Action Plan (NAP) on the basis of PSRA and nominate a Focal Point.

The International Action Plan and Sub-regional Conservation and Management of Sharks established the foundations for the development of national action plans. In this context Guinea-Bissau elaborated its NAP tri-annual (2011-2013), objectively insuring management and

conservation of sharks and rays in order to guarantee the durable and sustainable exploitation. For the implementation of the NAP-GB six main strategies of intervention were identified: i) Implementation of monitoring measures ; ii) strengthening national technical capabilities ; iii) improve the level of information on resource and system exploitation of sharks; iv) Elaboration and implementation of conservation and management measures; v) Promote concertation between actors involved and; vi) Reinforce sub-regional, regional and international cooperation regarding the management and conservation of stocks of sharks.

Despite the contribution of international, regional and national action plans, elasmobranchs populations of West Africa continue to be overexploited with some being endangered species. On top of this list are the sawfish. In fact, worldwide, all species of sawfish, whose distribution is restricted to the shores of tropical seas, have the status of Critically Endangered with extinction, according to the Red List of the International Union for Conservation of Nature (IUCN). Similarly, all species of sawfish are listed in Annex I to the Convention on International Trade in Endangered Species (CITES), with its marketing being prohibited.

In Guinea-Bissau the sawfish were somewhat common along the coast as well in the large rivers. It is believed that the sawfish were abundant both in the Bijagós Archipelago and in large rivers such as the Cacheu River and the Cacine River, to name a few. Besides the well-marked presence of this fish, also in Bijagó culture there are many testimonies of fishermen and older people on the techniques used for their capture (traps, spears, bow and arrow), especially by Bijagós, suggest the occurrence of these fish in great abundance. More recently, from the 1980s, due to the widespread use of networks and the technological advances in terms of fishing, a dramatic decrease of sawfish throughout the country is noticed. However, there doesn't seem to have been a contraction in its distribution area, since the 2000s, there has been several reports of catches in Bijagós Archipelago, as well as in the North and South.

In West Africa there are few ethnic groups who attach significant importance to the sawfish. Among them are the Bijagós, due to the symbolism that this species has in its society, marked by a strong cultural tradition linked to sawfish. The sawfish symbolizes courage, strength and power. There are several dances in which masks are used alluding to sawfish (with a skull and its saw or a wooden model to imitate sawfish). The way the dances are performed symbolizes the different stages of life and social mobility. Likewise, sawfish are used in certain ceremonies, above all its meat and liver, which can only be consumed by individuals who have reached certain social class.

The populations of sawfish and manatee are very vulnerable and can be easily caught in fishing nets. This is why IBAP decided to create an Early Network Warning (RAR) to facilitate the transmission of any information on these two species (CIPA 2010). This network works as follows:

» Collaborators (former fishermen) were sensitized and trained in various parts of the country where according to information, one of the species was observed. This network not only intervenes in protected areas, but also in certain rivers or stretches of rivers in the country

» Places with collaborators (PNO, PNMJVP, PNTC, Saint-Vincent, Sintchã Boco, Fa Mandinga, Apilho, Cacine ...) and partner institutions were also trained (CIPA DGFF, Captaincy and Ports, FISCAP, SEAT, GPC, Noé Conservation, CBD-Habitat).

» The system consists of simply passing information on to IBAP on any accidental catching of a species, to make observations and biometric measures taken by trained technicians for this purpose.

» To transmit any information there are two phone numbers that serve as the green numbers (IBAP and CIPA) for sawfish and (IBAP and INEP) for the manatee.

» Awareness-raising activities are carried out in the nearby communities by the community radio stations in different regions.

» It is also planned to give out prizes for any information that is transmitted.

Action Plan for Manatee (Trichechus senegalensis): Marine mammals are an integral part of the marine fauna and coastal waters of Guinea-Bissau. For a variety of these species, these waters are their primary habitat, reserved a series essences and vital functions, such as feeding, reproduction, and refuge as dormitories.

The manatee is a widely distributed species in Guinea-Bissau. Thanks to its geographical position and substantial area of mangrove forests, the country has one of the most important populations of West African manatee. Manatee's presence is observed in both shallow coastal waters as well in the main and rivers, freshwater lagoons and in some estuaries. It is estimated in this case, that Guinea-Bissau certainly has the most viable population of this species. RBABB is seen as one of the last large areas of manatee concentrations in West Africa.

F or this, the elaboration and implementation of a National Plan of Manatee Conservation is a priority that could have considerable regional and global impacts.

Among all the types of Sirenia, the sea-cow or manatee (Trichechus senegalensis) in West Africa is the least known, but it is also believed that it is the one that is most at risk of extinction. Guinea-Bissau has the ideal dietary condition conducive to the survival of this vulnerable herbivore manatee or sea-cow (Trichechus senegalensis).

Research conducted at regional and national level confirms that most of the threats to this species result from captures by the artisanal fisheries and by degradation of mangroves, which is their main habitat.

The degradation of their habitat and accidental interaction with artisanal fishing devices can lead to the extinction of this symbolic species, especially within the animist communities.

To reinforce the conservation status of the manatee (*Trichechus senegalensis)* in Guinea-Bissau, Wetland International commissioned a legal consultant to the effect. The results of this consultation were restituted in a technical seminar held on the 20 March 2012, aimed at validating the technical proposal submitted by the consultant. According to the consultant, an area administered for the protection of the manatee and their key habitat should have a status as an Integral Natural Reserve.

The technicians present at this workshop rejected this proposal, stating the following arguments:

- Distinguish in the first line, areas manatees exist within and outside of PAs and zones built and adopted first;
- Take into account the large spatial distribution, habitat diversity and mobility of this species and
- Existing information on the areas of highest concentration of manatees in Guinea-Bissau is still insufficient.

Taking into consideration the arguments and counter-arguments, the plenary proposed that focus be given primarily to small conservation nucleus i.e. ecological sanctuaries, as pilot conservation sites. It is advised that intervention priorities benefit from awareness activities, monitoring and improvement of inter-institutional relations, which could contribute significantly in reducing accidental captures.

Studies are conducted by the WIA and its national partners (IBAP and GPC) in certain selected areas as follow-up, despite the lack of material and human resources that make it difficult to cover the whole area of distribution of the manatee. Consequently an alert national system to report accidental captures or manatee left by the tide to the team of IBAP and GPC rapidly, in order to reach the site and take necessary measurements of this species. This process must go through several steps and integrate other partners such as community radio, local administrations, EVAs, the General Directorate of Forests, and forest guards. Will be necessary to produce information through t-shirts, hats, informative posters (on the importance of the manatee, the Conventions that protect ...), create radio emissions, and produce theater and film debates. All these items should be harmonized, structured to create a strategy alert.

Action Plan for Waterbirds: Integrated National Action Plans for four (4) species of national and sub-regional importance were developed, namely: *Balearica pavonina; Limosa limosa; Phoenicopterus minor; and Platalea alba.* This activity falls within the AEWA agreement and the IDA-PBC and the sub-regional project for participatory conservation of habitats and key species.

These action plans are structured as follows: **i) general knowledge about the species; ii) existing information for each species in Guinea-Bissau (distribution, behavior in and out of the AP); iii) Major threats; iv) sites and priority actions for their conservation; v) Policies and existing laws and; vi) the own action plan with priorities**

Grey parrots (Psitacus timneh): The gray parrot of the further west regions of West Africa has recently been declared as separate from that species that occurs in Central Africa, and became known by the name of Psittacus timneh. This species is considered "vulnerable" by the IUCN Red List, and its statutes real, albeit poorly understood, may be even more threatened than this, possibly justifying the classification of "Endangered". Consequently, of all the birds that mark a presence in Guinea-Bissau, this is possibly the one that has the most unfavorable international conservation status.

The situation of the population of gray parrots in Guinea-Bissau has always been the target of interest by national and international institutions working for conservation. This endangered species occurs in isolated nuclei in RBABB and in some rare points of the continent.

Some interventions have helped to greatly decrease the pressure on the gray parrots, especially the creation of three AMP in RBABB, studies and follow-up work on the ground, which have been organized by IBAP, in partnership with national institutions such as the GPC along with funding and technical support from foreign institutions. However, a major contribution in this context is the regular presence of the agents, conservation technicians and in the areas of occurrence of parrots and the conversion of former parrots hunters into collaborators and participants in the studies and follow-up activities.

Missions were organized, between 2012-2013, to several new localities most likely to host grey parrots, (PNO - Acanho, Uassa, Canogo and Community Marine Protected Area Complex Urok) in order to better understand the real situation (occurrence, breeding season, threats, diet and types of trees used for the edification of nests). In the last few years activities were undertaken aimed at:

- Increase the level of protection for the gray parrot in the João Vieira - Poilão National Marine Park.
- Create conditions for the recovery of gray parrots that are seized by the authorities.
- Test the use of nest boxes for gray parrots on the island of João Vieira.
- Increasing knowledge about gray parrots on the island of João Vieira.

The following activities were undertaken at the level of AMPC-Urok in 2013:

- **Assess the presence and distribution of the gray parrot-of-Timney (Psittacus timneh) and Parakeet-massarongo (Poicephalus senegalus) in the territory that composes the AMPC;**
- **Carried out a survey on local knowledge regarding the ecology and reproduction of P. timneh;**
- **Got an idea of the trends of the actual population of P. timneh over the years in terms of AMPC Urok islands;**
- **Got an idea of the current condition and threats to P. timneh in AMPC Urok islands.**

2.3.3.2 Actions to combat deforestation and reduce forest degradation

The process of deforestation and forest degradation as well as land use changes are considered as the main risks and threats to coastal and terrestrial biological diversity and should be given special attention, particularly for Guinea-Bissau. In this context several initiatives have been undertaken to reduce and combat this phenomenon, highlighting the following actions:

The KAFO Peasant Federation was established in 1996 and officially registered as a national non-profit association (NGO) in December 2000. KAFO's primary mission is Community self-promotion and Sustainable Rural Development and supports steps to strengthen personal and organizational skills to ensure the local population's participation in defining and implementing its development options. Through information, education, awareness activities and promoting experience exchanges among peasants, (especially through Djalicunda Community Radio), research actions in forestry, agriculture and on traditional knowledge, training and continuous capacitating of peasants, promoting beekeeping as well as creating seed banks; the KAFO Federation has contributed positively to the conservation and sustainable management process of forest resources in their areas of intervention. The following results obtained in 2012 – 2013 are highlighted:

»Populations of 150 villages were involved in the dynamics of community forestry practices dominating four methods of forest exploitation (Fighting fires, rational charcoal production, production of forest trees seeds, and application of techniques for reforestation);

»Training and capacitating 300 peasants, including 120 agents of forests community and 180 members of the forest management committee;

»Consolidation of community efforts to manage forest land and regularization of 30 polarized forests around 150 villages, benefiting 2,550 farmers' families;

»Local recruiting of forest community dynamics secured by a group of 384 peasants, with 120 of them being from the Forest Agents Community; 180 Members of the Management Board of the Forests Community; 24 professional nurserymen and 60 charcoal producers "Carvoeiros" composed of farmers and 384 farmers trained;

»Effective functioning of six plant nurseries in different villages with an average annual production of 47,136 forestry and agro-forestry plants;

»Reduction of clandestine charcoal production practices and rational use of firewood for charcoal production, thanks to the awareness programs carried out on appropriate technologies, such as the introduction of 25 pilot ovens;

»Reduced the extinction of the most emblematic forest species of the Oio, Cacheu and Bafatá Regions' forests, thanks to the preservation of Borassus aethiopium, Pterocarpus erinaceus, Afzelia africans (among the six most endangered species).

Young Cadres Agricultural Cooperative (COAJOC): founded on 15 June 2000 by Guinean technicians with training in Agronomy, Cattle Raising and Forestry. The priority intervention of this cooperative is to give agricultural services to local communities. COAJOQ leases agricultural machinery and equipment to the population, such as walk-behind-tractors, rice shelling machines and palm oil presses.

The fact that there has been a progressive decline in production and productivity in the main sub-category of "mangrove rice" has already been emphasized. This degradation is a result of acidification and salinisation of soils and inadequate maintenance of traditional hydraulic works, particularly due to the rural exodus of young people (lack of manpower) and the growing disinterest in this culture for the benefit of cashew and other rice cultures. This created a vicious cycle; because the increase in cashew value led to a lot of people devoting more to this culture at the expense of rice. With fields being abandoned, caused by the migration of labor to urban centers and neighboring countries, the process of clearing forests to obtain new agricultural land for cashew cultivation was further aggravated.

The intervention of the COAJOC cooperative is precisely to put an end to this social and environmental distortion, making machines available to the community who otherwise could not have access. These machines have had a major impact on production, the environment and even the health of populations.

With the introduction of walk-behind-tractors, the average length to plow a field of rice was drastically reduced. For example, a field that was plowed traditionally took two (2) weeks; but with the tractor only takes two hours. As a consequence, there was a considerable increase of income and agricultural productivity. Moreover, this intervention allowed the recovery of once abandoned fields and future expectations of positive impacts in reducing the pressure on forests and savannas.

CBD-Habitat Spanish Non Governmental Organization: All fields that are located in coastal wetlands are usually frequented by hippos (*Hippopotamus amphibious*). A prime target of these species is rice, at all stages of cultivation and growth – from the first days of transplantation until flowering through postharvest - is all appreciated by hippos. It also attacks other food crops in other parts of the country, although to a lesser extent.

In the Cacheu River Tarrafes Natural Park, most rice fields are located in the Islets between the little intricacies of the Cacheu basins, leaving grown rice at the mercy of hippos. Due to these extremely high losses caused by the presence and damage caused by these animals, many agricultural fields no longer grow rice. This abandonment was also observed all over the country, PNO, Uno, Bissorã, Carantaba, etc., where this species occurs. To illustrate the magnitude of the conflict, in 2008 an inventory of the PNO fields was carried out and found that 82% of existing fields had been either totally or partially abandoned in recent years and that the main factor for abandoning fields was due to hippos attack.

This conflict has led to the increase of non-sustainable alternative crops, m'pam-pam for instance, which requires cutting and burning large areas of forests and grasslands, with implications for the loss of habitats for biodiversity and greater releases of carbon. The installation of electric fences served to protect the cultivation of rice, increasing rice production and reducing plateau cultivation. Moreover, this initiative has improved the safety of people and reduced carbon emissions. Rice cultivation in coastal wetlands is accomplished mainly by women, so this project encourages female employment.

In short, the interventions of the CBD-Habitat NGO, in partnership with IBAP, aimed at protecting the habitat of hippos and at the same time contribute to ensuring food security of the resident human communities, reducing conflicts and ensuring livelihoods and income to local populations.

2.3.4. Sub-regional cooperation and International Conventions

Over the last thirty years, Guinea-Bissau has made great efforts to integrate sub-regional and global dynamics in conservation of the environment in general and the protection of threatened species and endangered species in particular.

For this, the country has committed, joined and ratified several international conventions and agreements relating to the conservation of biological diversity and sustainable use of natural resources. The signing and ratification of various treaties forced the country to develop strategies and action plans to be able to monitor ongoing initiatives, which aim to address the shortcomings identified.

Guinea-Bissau is cooperating with several countries in the region through participation in programs such as the Sub-Regional Fisheries Commission (SRFC); the Program for the Conservation of West African Regional Marine and Coastal Area (PRCM); the Network of Marine and Coastal Biodiversity of West Africa (BIOMAC Network) which is an offshoot of the PRCM; West African Network of Marine Protected Areas (RAMPAO); Regional Network for the Conservation of Marine Turtles; and the Atlantic Coast of Africa (URTOMA), etc..

After the Fourth Report, Guinea-Bissau ratified and signed the Cartagena Protocol on Bio-safety and established the National Bio-safety Authority. The Nagoya Protocol on access to genetic resources and fair and equitable sharing of the benefits arising from their use; and the Kuala Lumpur on the distribution and accountability of the Nagoya Protocol were ratified last September.

The country is entrenched in the dynamics in progress at the sub-regional level, whether in the PRCM, as well in the bilateral initiatives with neighboring countries. In mid February 2009, Guinea-Bissau hosted the Fourth Forum of the PRCM. the V Forum of this sub-regional organization for marine and coastal conservation was held in Dakar from 25 – 30 November 2013, under the motto "Investing in marine and coastal conservation for the welfare of the public".

Guinea-Bissau was represented by a high ranking delegation comprising representatives of various public sector entities: national and international NGOs as well as socio-professional actors and civil society. In addition to its presence in the plenary sessions, and presenting an exposition of images of the country, the following themes were presented in workshops and side events:

- Monitoring system of MPAs in Guinea-Bissau;
- The development of ecotourism as a tool for improving the living conditions of the local population, and;
- Explorer de nouveaux outils de gestion et de valorisation du réseau d es aires protégées Guinée-Bissau: aérienne Photographie par cerf - volant au service des aires protégées « Eye of the Parrot ».

The delivery of conservation and sustainable resources management prize to the group of Rio Grande de Buba in Guinea- Bissau fishermen and women fish processors was a landmark event in this forum.

Another contribution of IBAP for the sub-region is its engagement in the Mangrove Initiative for PRCM West Africa, in which a sub code was prepared for the mangrove ecosystem, whose first workshop was organized in Bissau in collaboration IBAP and IUCN.

IBAP actively participates in the activities of other existing networks in West Africa, such as the Network of Natural Resources Users in Protected Areas, (BIOMAC).

IBAP is also involved in bilateral initiatives between countries in the sub-region. Negotiations were begun with the National Center for Biological Diversity and Protected Areas in Guinea-Conakry with a view to creating a protected area border between the Cantanhez National Park and Northern Boké (Guinea-Conakry). This approach relies on the collaboration between IUCN, AD and the AGIR Project. The same initiative is underway with Senegal, envisaging the creation of a protected area between the Rio Cacheu "Tarrafes" Natural Park and the Lower Cassamança Region.

One the worldwide level, several IBAP cadres are members of the World Commission on Protected Areas and participate in the work of the committee. IBAP itself is a full member of the IUCN (International Union for Conservation of Nature) and had the privilege of participating in the World Congress on Nature held in Barcelona, Spain.

The Institute of Biodiversity and Protected Areas and GAECA "Palmeirinha" were admitted as a member of IUCN's during the 68th meeting of the Council of the International Union for Conservation of Nature, held in South Africa from 18-20 November 2007. With IBAP's admission, now Guinea-Bissau has 9 full members of this international institution.

IBAP participates in worldwide efforts of the World Network of Biosphere Reserves (REDEBIOS). The Bijagós Archipelago Biosphere Reserves was admitted as a full member at the meeting of said network held in Azores, Portugal, in July 2008.

The application of the Bijagós Archipelago the World Heritage Site was announced at the first photographic exhibition on archipelagos, held at the UNESCO Headquarters in Paris in 2005.

Seven years later (January 2012), the Guinea-Bissau Government officially deposited to the UNESCO World Heritage Committee the dossier of this archipelago called "Bijagós Archipelago - Motom Moranghadjogo" for inclusion on the list of Natural and Cultural Heritage of Humanity Sites.

The facts in this "dossier" application were validated by UNESCO as having fully met all the requirements necessary. Therefore, IUCN as a body with technical and scientific capacity to assess the " *dossier "*with regard to natural and environmental component and ICOMOS regarding the cultural component, were represented in a joint mission that visited the Bijagós Archipelago from 17-25 October. This mission evaluated on the ground the veracity of the facts presented in the "*dossier"* application. Unfortunately, the World Heritage Committee at its 37th session held in Phnom Penh in 2013 decided to defer the examination of this registration proposal.

The Third International Congress of Marine Protected Areas (IMPAC3) took place in Marseilha, France, from 21 – 27 October 2013. The central objective of this congress was protecting the oceans and its resources for future generations. Guinea-Bissau, through its delegation IBAP Technicians and Tiniguena NGO actively participated in plenary and different side events. The delegates shared experiences of AMP's management of the country through presentations of the following themes:

- **Exploring new management tools and enhancement of Guinea-Bissau's APs Network: Kite - Flying Aerial Photography in service protected areas;**
- **Effectively conserve marine biodiversity with Humble means: Guinea-Bissau's experience;**
- **Carbon Market, the BioGuiné Foundation and sustainable financing for Guinea-Bissau's National Protected Areas System (SNAP), and**
- **The AMP participatory approach to governance: the case of Urok in the Bijagós Archipelago in Guinea-Bissau.**

The Director of IBAP was invited to a plenary panel on the 3rd day of the conference to undertake an analysis of the workday report conclusion work and also participated in a sideline meeting organized by the CPMR, as a member of the sub-region Task Force Team that worked on the process to sustain APs in West Africa. Also, Guinea-Bissau AP communication materials were exhibited at the PRCM stand.

2.3.4.3. Conventions on Biological Diversity and Associated Protocols

After the Fourth Report, Guinea-Bissau signed and ratified the Cartagena Protocol on Biosafety and established the National Biosafety Authority. It signed the Nagoya Protocol on access to genetic resources and fair and equitable sharing of benefits arising from their use; and the Kuala Lumpur, on the allocation and accountability; which was ratified in September 2013.

It is necessary to create an association of healers in each zone and then transform it into a network in order to streamline the work of traditional medicine;

- Strictly implement the laws that prohibit cutting and export logs;
- Establishment of an effective partnership between traditional healers and modern medicine;
- Scrupulous respect for traditional knowledge and traditional knowledge and secular members;
- Organize more often these types of meeting and establish a national forum for this purpose;

2.4. Effectiveness of Integrating Biological Diversity in Sector Strategies, Plans and Programs

Despite the great efforts made, the level of practical application of the texts governing the management of natural resources is still weak (Forestry Code; Environmental Code; General Law of Fisheries and Artisanal Fishing Regulation Framework Law; Creation of APs Decrees; and Code of Mines, etc..).

2.5. Implementation / Execution of Strategy and National Action Plan for Biological Diversity

The objectives set by the Convention on Biodiversity during the EPAN 2002 period articulated around three main axles:

1st The conservation of biological diversity;

2nd. Durable use of its elements (genetic resources, species and ecosystems);

3rd. Fair and equitable sharing of benefits arising from the exploitation of genetic resources, through appropriate access rights to technological cooperation, taking into consideration rights over resources and technology, and through appropriate funding).

From the vision "a country with sustainable management of natural resources and ecological awareness of citizens in frank progression" the following national objectives were established in compliance with the context:

1. Protection of ecosystems;
2. Forestation and reforestation;
3. Optimization of water resources;
4. Exploration of new energy sources, to end the production of firewood;
5. Combating soil erosion;
6. Combating soil salinisation;
7. Combating estuarine and coastal erosion;
8. Strengthening the capacity and participation of civil society based on training, education and environmental awareness;
9. Strengthening the capacity of public intervention, central and regional government to respond to the main problems linked to the environment;
10. Collection and systematization and dissemination of information that will form the basis of a progressive knowledge of the territory, in order to find appropriate solutions to environmental problems;
11. Urban environment as a whole and;
12. International cooperation.

Recognizing that biological resources are the backbone of the national economy and considering that the rate of degradation is increasingly more alarming, it is proposed to identify the causes and propose solutions for a more rational human intervention in order to guard against accelerated erosion of biological resources and reduce its economic and social costs. In this perspective the great principles of conservation were adopted, namely the participation of the population, the adoption of integrated approaches and precaution, and partnership. Indeed in order for development to be sustainable it has to be economically viable, socially equitable and adapted to the environment.

In the definition of operational objectives, 10 thematic areas of intervention were identified, as well as the elements of strategy and actions to achieve them. The theme areas were:

I. Agricultural Durability
II. Forests Durability
III. Protected areas (marine, coastal, wetlands, etc.)
IV. Livestock Durability
V. Fisheries Durability

VI. Spatial planning

VII. Education, training and awareness

VIII. Research

IX. Legal and institutional aspects

X. International Issues

Targets and indicators were not established in EPAN preparations. Also, no specific structures responsible for its implementation were created. However it should be noted that some issue areas were subject to special treatment in the respective sectoral strategic documents, although the targets and indicators are not always in line with what could be a Strategy and Action Plan for Biodiversity. It should also be highlighted that the political and governmental instability, which has been cyclical in the last 15 years in Guinea-Bissau, considerably affected, if not to say that it did not allow the implementation of these national strategic documents. Incidentally these cyclic instabilities contribute to the weakening of the legal and institutional framework and the reduction of external support. The ability to enforce laws and regulations decreased considerably and a lot of ongoing funding and / or planned funding for the country were suspended.

From the technical and scientific perspective, is should be highlighted that in many sectors the strategies are based on very old and outdated data, like the fishing and forestry sector which doesn't allow us to fully consider the current levels of pressure on biological resources. Scientific research and in particular basic studies for the production of knowledge necessary for the preparation of sectorial strategies at national level are not considered priority.

Although for the most part they not included in the action plan of biodiversity and not integrated into a national strategy, many actions were undertaken by State bodies, NGOs, and populations who came together for the conservation of biological diversity.

III - PROGRESS TOWARDS THE 2020 AICHI BIODIVERSITY TARGETS AND CONTRIBUTIONS TO THE MILLENNIUM DEVELOPMENT GOALS

3.1. Country's progress in implementing the Strategic Plan 2011 - 2020 for biological diversity including the Aichi targets

In this section the main steps and results obtained in the management of biodiversity and ecosystems services during the period 2009-2013 will be presented.

3.2. Contribution of the measures implemented to achieve the 2015 targets of the Millennium Goals for Development

The measures for the achievement of the targets of the 2015 MDGs including reforms taken between 2007 and 20012 were performed in an extremely unfavorable environment, marked by political and institutional instability, major lack of basic economic infrastructure and impact of the international economic crisis. Indeed the rate of real GDP growth of 5% set as a goal in the first PRSP was never achieved, despite the improvements made from 2008 (3.1%) to 2010 (4.4%) as a result of good management of public finances and macroeconomic stabilization. These improvements led the country to completion with the consequent cancellation of foreign debt

under the HIPC initiative in 2011. These improvements were mainly driven by the agricultural sector and cashew in particular.

The decrease of weight from the debt created a more favorable, promising and attractive macroeconomic framework in particular with regard to attracting foreign capital from international financial institutions. But these expectations were hampered with the new situation of instability created in April 2012, which in addition to interrupting the ongoing process of stabilization, also blocked all possibilities of running a more ambitious and sustainable public policy.

The level of human development is low and precarious as demonstrated by the position occupied by Guinea-Bissau in the last 20 years. Widespread poverty derived from low monetary income and life expectancy conditioned by the low level of access to health services are determinants of low HDI for Guinea-Bissau. A summary of other key social indicators shows improvement over the rate of schooling, reducing child mortality and life expectancy during the 2000-2010 period.

Table 4: Evolution of the Main Social Indicators

	2000-2003	2005-2007	2009-2010
Incidence of poverty:			
– Incidence of absolute poverty (%)	64.7 (2002)	-	69.3 (2010)
– Incidence of extreme poverty (%)	20.8 (2002)	-	33.0 (2010)
Education:			
– GER in primary (%)	70.0	102.0	107.8
– TLE in primary (%)	45.3	56.9	67.4
– GER in secondary education (%)	19.0	30.0	46.6
Health:			
– Infant mortality rate (⁰/ 000)	122	138	104
– Infant-juvenile mortality rate (⁰/ 000)	205	223	155
– Assisted birth rate (%)	-	38.6 (2006)	43.0 (2010)
– Maternal mortality rate (⁰/ 00000)	822	800	
Potable Water:			
– Rate of access to drinking water (%)	-	35	40
Life expectancy at birth (years)	-	-	48.6
Human development:			
– HDI	-	0,278	0,289 (2010)
– Position relative to HDI			164 of 169
Gender inequality			
– Gender inequality index (IID)	-	0,381 (2007)	-
– Position in relation to the IID		148 of 155	-

The importance of biodiversity in achieving the MDGs in Guinea-Bissau:

Goal 1: eradicate extreme poverty and hunger: This objective would be achieved by: (1) from 1990 to 2015, to halve the proportion of people income inferior to one USD / day; (2) ensure full employment and the opportunity for each to find decent and productive work; for every one including women and youth, and; (3) halving the proportion of population suffering from hunger. Data from Passenger Poverty Assessment Surveys (ILAP) respectively in 2002 and 2010 show an increase in the incidence of poverty from 64.7% (2002) to 69.3 (2010) and extreme

poverty from 20.8% (2002) to 33% (2010) respectively. Non-monetary poverty affects about 40% of the population. In this type of evaluation the contribution of biodiversity resources for the livelihood of families are not always taken into consideration, since without the existence of these resources and their services, many families could not survive, find the means of subsistence and not make any income. Biodiversity resources and in particular from agriculture, fishing and forestry are the Guineans staple diet and provide income that largely are also used to purchase food items.

Goal 2: Achieve universal primary education: there have been considerable improvements in relation to teaching. But the general problems that affect it still exist. It is noted that environmental considerations were introduced into school curricula. In the Environmental Verification Schools promoted by some national NGOs and the Protected Areas, introduced environmental components and went further, promoting "labs" modos vi vendi that allow students to learn better and take better advantage from their environment in a sustainable manner.

Goal 3: Promote gender equality between men and women and empower women: Women are still discriminated in communities, in schools and in the family, besides being objects of some very traditional practices harmful to her health and well-being. However, they contribute substantially to the economy through their involvement in agriculture, particularly in the areas of the rice crops, cashews and horticulture, in the informal sector, the service sector and the socio-economics of the family. The primary sectors of the economy absorb about 77.1% and commerce absorbs about 12% of active women (ILAPII/2010, DENARP, 2011). In these sectors biodiversity resources are extremely important and directly and indirectly contribute to improving the economic and social advancement of women.

Goal 4: Reduce child mortality: Reduce by two thirds the mortality rate of children during the 1980-2015 period. This goal was not achieved. It is noted however the contribution of biodiversity resources in improving the nutrition of children and especially through and in curing some diseases affecting children. Many NGOs and associations have invested in the production of food based on local produce which is very suitable for infant feeding.

Goal 5: Improve maternal health: This target was not met and some of inherent indicators are still worrying, despite slight improvements. The rate of maternal mortality (800 per 100,000 live births in 2010) and the rate of assisted deliveries (43% in 2010) are still very high. The nutritional quality through local biological resources can overcome some of the causes of deterioration of maternal health.

Goal 6: Combat HIV / AIDS, malaria and other diseases: This objective has as a target that by 2015 to stanch the spread of HIV / AIDS and reverse the current trend; ensure all treatments against HIV / AIDS and control malaria and other serious diseases. The prevalence rate that still occurs with various diseases, notably HIV / AIDS and malaria, demonstrate that this indicator was not achieved. Many traditional pharmacopoeia products have replaced the original chemical pharmaceuticals in combating other diseases and malaria, which is one of the diseases causing the largest number of deaths in Guinea-Bissau annually.

Goal 7: Ensure environmental sustainability: The targets of this goal are;

- Integrate sustainable development principles into country policies and programs and reverse the wasting of resources;
- (2) Reducing the level of impoverishment of biological diversity and bring the levels significantly lower than those of 2010 (preservation of biodiversity, essentials habitats and disappearing species) over-exploitation of fisheries;
- (3) By 2015 reduce by half the percentage of population without access to drinking water and to basic sanitation services;

- By 2020 improve the living and housing conditions of the 1,000 million people who live in cities;
- Improving access to drinking water; basic sanitation; degradation of forests; and degradation of marine resources

Goal 8: establish a global partnership for development:

(1) Respond to special development needs of landlocked countries and Small Island States;

(2) Implement an open, regulated, predictable and non-discriminatory commercial system (developed countries with advantages in undeveloped countries' markets); globally resolve the debt problem (reduce the debt);

(3) Making essential drugs by pharmaceutical industry available;

(4) Together with the private sector, make technology and especially information and communication in the reach of all;

The **Montreal Protocol on Substances that Deplete the Ozone Layer** is an international treaty to which the signatories undertake to replace substances that are shown to be reacting with ozone (O_3) on top of the stratosphere (known as ozonosphere). The Treaty was open for signature from 16 September 1987 and entered into force on 1 January 1989. It had membership of 150 countries and was revised in 1990, 1992, 1995, 1997 and 1999. Due to its large world membership, Kofi Annan said: "Perhaps the most successful international agreement of all times ..."

In celebration, the UN declared the date 16 September as the **International Day for the Preservation of the Ozone Layer**

Bibliography

1.	Atlanta-Consult (1985)	Inventaire et classement des Forets de Guinée Bissau, 2 volumes
2.	BAD/PRESAR (2009)	Inventário dos recursos animais do país
3.	Barbosa, C. (2012)	A utilização das plantas em Canhabaque e no Parque Nacional Marinho João Vieira Poilão
4.	Belemvire, A. (2010):	Document de politique forestiere. Projet "Appui au renforcement des capacités nationales de la Guinée-Bissau en matière de gestion durable des terres et de lutte contre la désertification".
5.	Boletim Oficial nº 11	Criação do Instituto da Biodiversidade e das Áreas Protegidas (IBAP). Decreto nº 2/2005 de 14 de Março de 2005. República da Guiné-Bissau.
6.	Boletim Oficial nº 13	Lei geral sobre a Pesca. Decreto-lei nº 2/86 de Outubro de 1986. República da Guiné-Bissau.
7.	Boletim Oficial nº 17	Regulamento sobre a Lei Geral sobre a Pesca. Decreto de aplicação nº 10/86 de Outubro 1986. República da Guiné-Bissau.
8.	Boletim Oficial nº 21	Decreto-Lei: Lei-Quadro das Áreas Protegidas. Lei nº 3/97. República da Guiné-Bissau.
9.	Boletim Oficial nº 21	Regulamento da Pesca Artesenal. Decreto-lei nº 13/97 de Maio 1997. República da Guiné-Bissau.
10.	Boletim Oficial nº 23	Decreto-Lei: Lei Geral das Pescas. Lei nº 10/2011 do dia 7 de Junho de 2011. República da Guiné-Bissau.
11.	Boletim Oficial nº 24	Regulamento da Pesca Artesanal. Decreto nº 24/2011 do dia 7 de Junho de 2011. República da Guiné-Bissau.
12.	Boletim Oficial nº 36	Principios gerais da política de aproveitamento dos recursos haliêuticos nacionais. Decreto-lei nº 4/96 de Setembro de 1996. República da Guiné-Bissau.
13.	Boletim Oficial nº 38	Lei Avaliação de Impactos Ambientais e Sociais. Lei nº 10/2010 do dia 24 de Novembro de 2010. República da Guiné-Bissau.
14.	Boletim Oficial nº 43	Lei sobre as Florestas. Decreto-lei nº 4-A/91 de Outubro de 1991. República da Guiné-Bissau
15.	Boletim Oficial nº 8	Revisão da Lei Florestal. Lei nº 5/2011 do dia 22 de Fevereiro de 2011. República da Guiné-Bissau.
16.	Boletim Oficial nº 9	Lei Base do Ambiente. Lei nº 1/2011 do dia 02 de Março de 2011. República da Guiné-Bissau.
17.	Boletim Oficial nº 9	Nova Lei-Quadro das Áreas Protegidas. Lei nº 5-A/2011 do dia 22 de Fevereiro de 2011. República da Guiné-Bissau.
18.	Boujou, S.; Catry, P. e Cordeiro, J. (2001)	Les Aires Protégées de Guinée-Bissau Propositions pour une Stratégie Nationale 2001-2005.
19.	Bout, N. e Ghiurghi, A. (2013)	Guide des mammiferes du Parc National de Cantanhez : Guinée-Bissau

20.	Campos, A., Monteiro, H., Soares, J. e Catry, P. (2001)	O Hipopótamo no Parque Nacional de Orango. UICN, Bissau.
21.	Catarino, L. (2004)	Fitogeografia da Guiné-Bissau. Dissertação doutor. Lisboa: Universidade Técnica
22.	Catarino, L. et al. (2006)	Plantas vasculares e Briófitos da Guiné-Bissau. IICT / IPAD, Lisboa. 340 p.
23.	Catry, P. (ed.) (2000)	Action Plan for the Conservation of Marine Turtles in Guinea-Bissau. IUCN, Bissau.
24.	Catry, P.; Barbosa, C. e Indjai, B. (2010)	Tartarugas marinhas da Guiné-Bissau. Estatuto, biologia e conservação. Instituto da Biodiversidade e das Áreas Protegidas, Bissau.
25.	CIPA (2010)	Plano de acção para a conservação e gestão durável de Raias e Tubarões. PAN-REQUINS / Guiné-Bissau. Actualisation pour la período 2011 - 2013
26.	CRÉPEAU, C., et al. (2008):	Projet IBAP «Plan de suivi des forets et mangroves de guinee-bissau»
27.	DA SILVA, A.S. et DIOMBÉRA, K. (2006):	Suivi écologique des ressources ligneuses disponibles dans les bassins d'approvisionnement en bois énergie des principales villes de Guinée-Bissau. Recensement des sites, outils et résultats du suivi écologique. Programme Regional de Promotion des Energies Domestiques et Alternatives au Sahel (PREDAS/CILSS).
28.	DEA, UEMOA (2013)	Assistance a la réalisation de l´enquete agrícole. Campagne Agrícole - 2013/2014. Rapport de présentation des resultats
29.	Direcção Geral de Pecuária (2009)	Inventário dos recursos animais do país.
30.	Dodman et al. (2004)	Monitorizacao das aves aquaticas no Arquipelago dos Bijagós, Guiné-Bissau/ Waterbird monitoring in the Bijagós Archipelago, Guinea-Bissau, Wetlands international, Dakar.
31.	DODMAN, T. & SÁ, J. (2005)	*Monitorização de aves aquáticas no Arquipélago dos Bijagós, Guiné-Bissau /Waterbird monitoring in the Bijagós Archipelago, Guinea-Bissau*. Wetlands International, Dakar / Gabinete de Planificação Costeira / ODZH, Bissau.
32.	GIRI, C. et al 2011	*Status and distribution of mangrove forests of the world using earth observation satellite datageb_584. In: Global Ecology and Biogeography, (Global Ecol. Biogeogr.) (2011) 20, 154–159*
33.	GONZÁLE, J. M. (2010)	ll Enquête sur les aspects socio-économiques de la Pêche Artisanale en Guinée Bissau
34.	IBAP (2006)	Estratégia Nacional para as Áreas Protegidas e a Conservação da Biodiversidade na Guiné-Bissau 2007 – 2011
35.	Indjai, B., Barbosa, C. e Catarino, L. (2014)	Mezinhos da terra e curas tradicionais Nas Ilhas de Canhabaque e do Parque Naci onal Marin ho João Vieira e Poilão
36.	Indjai, B., Catarino, L. e Mourão, D. (2010)	MEZINHOS DE ORANGO. Plantas Medicinais e Pessoas da Ilha da Rainha Pampa
37.	IPIMAR/CIPA (1996):	*V Campanha nas águas da República da Guiné-Bissau, Maio/Julho de 1995 - NI "CAPRICÓRNIO". Relat. Cient. Téc. Inst. Port. Invest. Marít., 23, 202 pp.*
38.	Limoges, B. et Robillard, M.J. (1991)	Proposition d'un plan d'amenagement de la Réserve de la Biosphere de l'archipel des Bijagós. Vol. 2. Les espèces

		animales: distributions et recommandations. CECI / UICN / MDRA, Bissau.
39.	MADR (2002)	Carta de Politica de Desenvolvimento Agrário
40.	MADR/DGFF (2010)	Projecto de "Apoio ao Reforço de Capacidades Nacionais da Guiné-Bissau em matéria de Gestão Sustentável de Terras e Luta Contra Desertificação": Documento de Política Florestal
41.	MDRA/CPDA (2002)	Carta de Politica de Desenvolvimento Agrário
42.	Ministério da Economia, Plano e Integração Regional (2006)	Documento de Estratégia Nacional de Redução da Pobreza
43.	Ministério da Economia, Plano e Integração Regional (2011)	DENAR II (2011 – 2015): Segundo Documento de Estratégia Nacional de Redução da Pobreza
44.	Ministério das Pescas (PGBDZC-GB) (2008)	Plano Estratégico de Desenvolvimento das Pescas
45.	PENNOBER, G. 1999	Analyse spatiale de l'environnement côtière de l'archipel des Bijagos (Guinée Bissau).
46.	República da Guiné-Bissau (2012)	Archipel des Bijagós, Motom Moranghajogo. Proposition d´inscription sur la liste du Patrimoine mondial
47.	SÁ, J. et al	Inventaire des Zones Humides. Rapport National de la Guinée-Bissau (não publicado).
48.	Scet International (1978)	Potentialités agricoles, forestières et pastorales, 3 volumes
49.	SCHWARZ, C. (2002)	A importância das conchas e da sua exploração no grupo de ilhas da Formosa, Nago e Chediã. Tiniguena, Bissau
50.	Schwarz, C. e Monteiro, H. (2006)	Missão de Avaliação do Impacte de uma população de hippopotamus amphibius nas bolanhas da Tabanca de Carantabá, Região de Gabu. (Relatório Interno)
51.	Schwarz, C. et al (2006)	Elaboração de uma estratégia de contagem de hipopótamos para o PNO. IBAP
52.	SILVA, C. (2010)	Lista de Mamíferos da Guiné-Bissau
53.	Vié, J-C- (2001)	Liste systématique des vertébrés de Guinée Bissau a l'exception des Oiseaux. IUCN, Bissau.
54.	World Bank (2010)	GUINÉ BISSAU. Para além de Castanha de Caju: Diversificação através do comércio. Estudo do Diagnóstico de Integração do Comércio para o Melhoramento do Quadro Integrado Assistência Técnica para Assuntos do Comércio Internacional
55.	World Bank (2011)	Guiné-Bissau: Memorandum Económico do País