Ministry for Coordination of Environmental Action
National Directorate of Environmental Management

Ministry of Tourism
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National Directorate of Land and Forest

Rapid and Participatory Assessment of the Conservation Areas in Mozambique

Maputo, November 2006

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Rapid and Participatory Assessment of Management of the Conservation Areas in Mozambique

This document is a result of a Workshop on Rapid Assessment and Prioritization of Protected Areas Management (RAPPAM), which was held in Mputo, from the 10 to 12 July de 2006, with the technical and financial support of WWF. Facilitation and report were provided by Almeida A. Sitoe, in coordination with the group of reference group constituted for this purpose which was made of Rito Mabunda, Alexander Belokurov, Cornélio Ntumi, Alessandro Fusari, Madyo Couto, Sónia Silveira, Marcelino Foloma and Julieta Lichuge.

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Acronyms and abbreviations

CA	Conservation Area
ACTF	Trans-Frontier Conservation Area
CBD	Convention of Biological Duversity
CITES	Convention on International Trade of Endangered Species of Fauna and Flora
DNAC	National Directorate of Conservation Areas
DNFFB	National Directorate of Wildlife and Forests
DNTF	National Directorate of Lands and Forests
IIAM	Institute for Agrarian Research in Mozambique
IUCN	World Union for Conservation of Nature
MICOA	Ministry for Coordination of Environmental Affairs
MINAG	Ministry of Agriculture
MITUR	Ministry of Tourism
NBSAP	National Biodiversity Strategy and Action Plan
ONG	NGO
PFNM	Non-wooden forest products
PN	National Park
RAMSAR	Convention on Humid Lands of International Importance
RAPPAM	Rapid Assessment and Prioritisation of Protected Areas Management
RF	Forest Reserve
UEM	Universidade Eduardo Mondlane
UIF	Unity of Forest Inventory
WWF	World Wide Fund for Nature
FNP	Forum Nature in Danger
CTV	Centro Terra Viva

1. Introduction

Mozambique possesses a diversified inhabitants and ecosystems distributed into about a territorial extension of 80.000 Km^2. About 62 million of hectares of a total country area is covered by different density forests. About 80% out a total of 18 million inhabitants are from a rural population who their main economic activity is agriculture; but their survival is increasingly dependent on the natural resources.

The forest, fauna, marine and coastal resources provide a significant contribution either to the (Gross Domestic Product) GDP as to the rural family economy. Estimative from the Ministry of Agriculture indicated that during the period of 1996-2001, the contribution of forests and wildlife sector for GDP, was about 4% (Alberto, 2004).

Mozambique is a signatory of several international agreements and treats aiming at the sustainable protection and use of important biodiversity components. The CITES – a International Convention on Commerce of Fauna and Flora Species in Danger of Extinction seeks to assure that the international trade of plant and animal species does not threat the survival thereof. The Convention of Biological Diversity (CBD) is one of the main instruments that defend the conservation of biological diversity, sustainable use of the components thereof and a fair and equity share of benefits resulting from the use of genetic resources.

Taking into account the CBD recommendations, a National Strategy of Biodiversity Conservation for Mozambique/*Estratégia Nacional de Conservação da Biodiversidade para Moçambique* (MICOA 2003), was elaborated highlighting some measures of conservation, in particular: *(i)* the establishment of a system for protected areas or areas where some special measures were undertaken, with regard to the nature conservation; *(ii)* the promotion of protection for ecosystems and natural inhabitants, as well as the maintenance of feasible specie populations in their natural environment; and *(iii)* the respect, preservation and maintenance of knowledge, innovation and local community practice, which involve traditional standards of living relevant for conservation and sustainable use of biological diversity.

On the other hand, the Strategy of Developent of Forests and Wildlife/ *Estratégia de Desenvolvimento de Florestas e Fauna Bravia* (República de Moçambique 1999) establishes as ecological objective the protection and conservation of flora and fauna, highlighting the rehabilitation and occupation of national parks and wildlife and forest reserves, as well as the expansion of conservation areas. This objective is defined in the following forms: “Improvement of protection, management and use of conservation areas of forests and wildlife, with the aim at providing contribution for local and national sustainable development, appropriate land use and biodiversity conservation.

Researches on the biological value of Mozambique indicate high biodiversity and endemism, stating an special importance of some regions that have national and international value as follows:

(i) **Gorongosa Mountain- Rift Valley – Complex** of Marromeu characterised by a coast with an extensive area of growth of mangroves, prairies and swamps, as well as tropical forests and humid forests of mountains.

(ii) **Chimanimani Complex,** where there is a diversity of exceptional habitat and species. Nearly 1000 species of vascular plants were registered in this area, of which 45 are endemics and more than 160 species were registered as being endemics of afro mountain areas of Oriental Africa (MICOA 2000 quoting Dutton and Dutton 1975).

(iii) **Endemism Centre of Maputaland,** there is a floristic diversity that embraces about 3.000 species of vascular plants and 472 species of birds of which 47 subspecies are endemics or almost endemics of this centre.

(iv) **Archipelago of Quirimbas,** distinguish an important marine diversity to the centre representing East African Coast and several species of vascular plants in the coastal area (MICOA 2000 quoting van Wyk 1994).

These areas include particularly coastal region with terrestrial ecosystems as well as marine and respective transition zones. A preliminary assessment shows faulty covering of functional elements of ecosystems by Conservation Areas, especially characterised by the lack of inclusion of such essential elements, such as the *Serra de Gorongosa* ridge of Mountains, the *Complexo de Marromeu*, the marine regions of Marshy Coast and Coastal Dunes, *inter-alia*..

2. Objectives

2.1. Overall Objective

The overall objective of RAPPAM implementation in Mozambique is to provide useful information, in order to improve the administration of protected areas, at the national level and establish a representative and operational system of protected areas.

2.2. Specific Objectives

Specifically, with this task it is intended to:

1. Carry out a deep, systematised and impartial assessment concerning the state of management protected areas and ability to reach institution objectives and imperatives of conservation.
2. Identify and analyse several pressures and threats that turn defective the protected areas in Mozambique.
3. Establish an important basic information to follow up and monitor the effectiveness of the progress of management the protected areas.

4. Build capacity of the main stakeholders involved in the management of protected areas, so that they are able to dominate the methodology and can also periodically carry out subsequent assessments.

3. The state of Conservation Areas

3.1. Legal Framework

Successive legislative instruments created several categories of Conservation Areas among National Parks, Reserves and Hunting Block. Mozambique possesses a network of protected areas comprised by 6 national parks, 6 wildlife reserves, 14 forest reserves and 3 integral reserves and 12 hunting Block, covering a total area of 129.803 Km^2, the equivalent to 16% of the national territory, all of them providing a habitat of wide biological diversity and, in some cases, with occurrence of endemics species. From the decade fifty's, 17 forest reserves were established, with a total area of 450 000 hectares. The expansion of the Forest Reserves and establishment of mechanisms of its use and exploitation constitute priorities of the sub-sector. The decade sixty's was characterized by massive increase of Conservation Areas highlighting particularly Hunting Block and conversion of old Hunting Block and reserve into National Parks. It was also in the decade sixty's that legal instruments were established to support Conservation Areas, establishing the rules of use and legal mechanisms of conservation that are still used today.

The main legal provisions that define and guide the management of Conservation Areas in Mozambique are the following: The Policy and Development of Forests Strategy and Wildlife (8/97), the Law of Lands (19/97), the Regulation of Law of Lands (66/98), the Law of Forests and Wildlife (10 / 99), the Law of Environment (1997), the Regulation of Law of Forests and Wildlife (Decree 12/2002) and the General Regulation of Maritime Fishing (43/2003). Even so, this package of laws and regulations are still considered insufficient, and several legal instruments of decade sixty's (colonial period), are still in use particularly the Regulation of Hunting Block that was not updated.

Lack of updated specific legal instrument which regulates the Conservation Areas is currently the base for discussions in course, in order to develop a national strategy of Conservation Areas, taking as base the actual situation of Conservation Areas, and the general trends on conservation of biodiversity and sustained management of natural resources. It is relevant to stress that there is a great base of sustainability for development of that strategy. Parts of this basis are the laws and regulations in force and the National Strategy for Conservation of Biodiversity (NSCB), which recognises the Areas of Conservation as a priority. The Forests and Wildlife Law (FWL) classifies the protection zones in: *(i)* national parks, *(ii)* national reserves and *(iii)* zones of use and cultural historical value (FWL article. 10 nº 2, RLFFB art. 3). The Regulation of the Marine Fishing, in spite of being rarely used, establishes parks and marine reserves. The law of lands contains some clauses on protected and semi-protected areas that include the strip along the marine coast and along islands, bays and estuaries until a distance of 100 metres far away to the interior, the strip until 250 metres far away along the margins and reservoirs. Many of these "semi-protected" areas are not considered into the context of Conservation (CA) and do not have any management regime that can place them in a comparable position to CA.

The terminology of the laws and regulations of Conservation areas don't make specific reference to the term *"Area de Conservação*", but of course refers to the *"Zonas of Protecção."* However, through the given definitions, it include areas of a total protection (e.g. National Parks) and areas for extraction (e.g. National Reserves). Besides the National Parks, whose denomination is sufficiently clear, other CA are not clearly defined in the sense comparable to classification and categories of conservation areas of IUCN, being necessary to establish a clear rule on this aspect. In this document, is used the term *"Area de Conservação"* to designate the group of protection zones (national parks, national reserves, forest reserves) and areas used for conservation purpose of the nature in a certain way (hunting block and private game farm and communities).

CA suffered a great decadence during the period of civil war (mainly in the decade eighty's), where the infrastructures were abandoned and destroyed, the CA management was ignored, and the roads of access were obstructed. This degradation period was followed by another equally destroyer's, after the war (particularly decade ninety's), that consisted of settlement of displaced populations who came back (opening farms in CA), the illegal extraction (poaching, illegal cut of wood). All these were associated to a weakened institutional capacity building, characterised by a faulty structure of human resources and financial difficulties to cover the basic operations of CA, and consequently, it resulted in a system of Conservation Areas very weak and with needs of urgent and costly intervention for its rehabilitation. These characteristics are still visible in the most of CA and comprise the largest difficulty of the objective materialisation for conservation of biodiversity in Mozambique.

Even so, there are some exceptions such as the Reserve of Niassa that has really ever been abandoned as it was not seriously affected by the war and is considered to be in stable situation in post-war period (MICOA 2003). Also the National Park of Bazaruto , due to its location, in the islands, was not directly affected by hostilities, it was managed to maintain a reasonable level of ecotourism and sport fishing. Equally, Hunting Block surrounding Marromeu do not seem to have been negatively affected, probably because of ecological conditions (marshy area and dense forests) that turn the area into a difficult access one during a certain period of the year.

The Areas of Conservation network is in rehabilitation process and several activities are in course to turn these areas operational. International agreements for establishment of CA Cross border were signed and resulted in the National Park of Limpopo and in the Area of Conservation Cross border of Chimaimani, among other, that improved in a significant way the management and conservation of biodiversity. Additionally, new Areas of Conservation were established, particularly the National Park of Quirimbas, established in 2002 seeking to cover ecosystems not well represented and in danger.

In general, the state of the Areas of Conservation depends on the resources (humans and financial) and available infrastructure to turn activities operational. On the base of those aspects three groups can be distinguished: *(i)* CA relatively new, with one great international investment and with a capacity to operate – this group includes the National Parks of Limpopo, Quirimbas, Bazaruto and the Reserve of Niassa; *(ii)* CA without a

plenty of international investment, but with established management and management plan – this group includes the National Parks of Gorongosa, Banhine, Zinave, Forest Reserve of Derre; and *(iii)* CA without neither a manager nor a management plan – to this group belong most of the Forest Reserves, for example the Forest Reserve of Inhamitanga and Nhampacue.

3.2 Management and tutelage of Areas of Conservation

The Ministry of Tourism, through the National Directorate of Conservation Areas (DNAC) is responsible institution for administration and management of the National Parks, National Reserves and Hunting Block, while the Ministry of Agriculture, through National Directorate of Lands and Forests (DNTF) is responsible for forest reserves and wildlife management of the protected areas (with particular focuses to wildlife farms). Other Ministries that play preponderant role in management of protected areas are the Ministry for Coordination of Environmental Affairs (MICOA), the Ministry of Fishing and the Ministry of the Public Works and Habitation through National Directorate of Waters.

3.3 The Objectives of Establishment of Conservation Areas

Great part of Conservation Areas network in Mozambique was established in the period between 1950 and 1970, in the period that the conservation objectives had another meaning. For instance, the Forest Reserves were in majority established as extractive reserves, serving as reserves of wood production for the State. With the signature of the Convention of Biological Diversity and whereby the whole conservationist movement took place in Summit of Rio de Janeiro in 1992, the conservation of nature won a new dimension that forced the need of adjustment of initial objectives. Additionally, due to the long period of abandonment, a lot of Areas of Conservation lost their conservation purpose. For example, the Park of Banhine had objective for protecting Ostrich and Giraffe, currently has a great ostrich population, but the population of giraffes are almost extinct. The current objectives of National Park of Banhine as established by the proposal of management plan, are other and they include social and cultural values other that the biodiversity of ecosystems (DNAC 2004). Another example is the Forest Reserve of Licuáti that was aimed for conservation of "chanfuta" for wood production for the State but currently few examples of commercial chanfuta can be seen due to the illegal exploration that affected the area in the post-war period. Currently, the area is more turned for community development with outlines of local generation of revenues (Sitoe and Enosse 2003). On the other hand, the lack of control during many years motivated the establishment of human populations inside of the Areas of Conservation, having converted part or almost the totality of CA in agricultural and residential areas. As consequence, some CA requested reconsideration in terms of limits, objectives and categorization. In the assessment of the situation of the Forest Reserves, Muller et al (2005) presented suggestions of objectives redefinition, redefinition of limits and classification of RF inside of the different categories of CA of WWF.

3.4 Distribution of conservation areas and representation of ecosystems

Although there is an extensive network of Conservation Areas (see Illustration 1), only a small part of diversity inhabitants and ecosystems owned by the country is represented in the network of CAs. Inhabitants and afro-mountainous, aquatic and marine ecosystems, for example, in spite of being extensive and diversified they are not well represented in the current network of conservation areas (MICOA, 2004). According to the same source, this fact is partially justified by the proclamation in the colonial period of great part of conservation areas in the country for exercising economic objectives rather than ecological.

Areas with great biological diversity like Chiperone and Namuli chains of mountains did not receive any especial statute in conservation terms and the physical limits of some conservation areas, do not coincide with the ecological borders, such as the specific case of the National Park of Gorongosa, where the *Serra de Gorongosa* ridge of mountains, a vital perennial aquifer for ecological integrity of the current Park is out of the Park limits. Aware of this, MITUR is carrying out a study seeking to include the *Serra de Gorongosa* ridge of mountains in the National Park.

Mozambique has been developing with the neighbour countries Conservation Cross-border Conservation Areas (CBCA), which are destined to conservation of ecosystems that surpass frontier limits of the respective States, presupposing common management of these areas, between the relating countries. Thus, ACTFs were created that include the Great Limpopo with Zimbabwe, and South Africa, Lebombo with Swaziland and South Africa, Chimanimani with Zimbabwe, and is in course the establishment of ACTF ZIMOZA with Zambia and Zimbabwe. It is expected that the contribution of this type of Conservation Areas for establishment of a representative system of inhabitants and existing ecosystems in Mozambique is significant.

Many of the current established conservation areas during the colonial period (especially the Forest Reserves) they had never had any kind of management type from its proclamation. This was worsened by the civil war that determined the degradation and abandonment of many protected areas. Recently, many of these areas are abandoned, less developed or without any type of management, besides the effort performed by the government, through the Ministry of Agriculture and of the Ministry of Tourism, in order to revaluate these areas and draw strategies with the aim of their rehabilitation. In addition, the protected areas have been managed in an isolated way, instead of a holistic approach as integral part of plans of use and benefit of land, MICOA (2003).

An Study carried out by WWF Moçambique for DNFFB (Muller et al 2005), seeking to evaluate network of forest reserves in Mozambique, found out that there is little or no management at all in the forest reserves, and recommends urgent taking of measures to assure sustainable use of forest resources, with a strong component of socio-economical

approaches. Additionally, it is found out that Mozambique should adhere to the efforts in course in African Continent, as to upgrade the degree of part of forest reserves for protected areas, according to the categories of WWF.

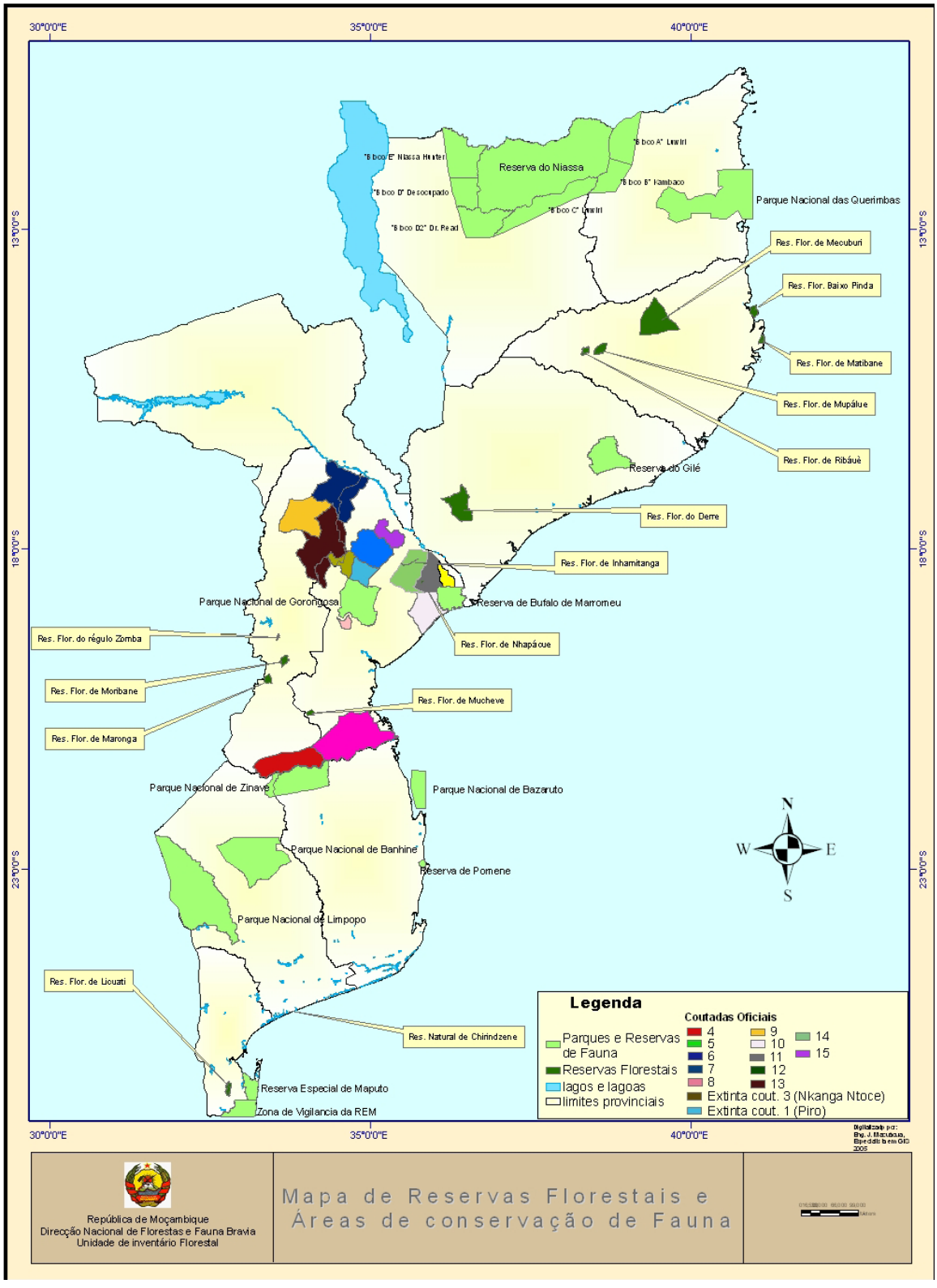


Figure 1. Distribution Map of Conservation Areas in Mozambique

3.5 General knowledge of biodiversities in Mozambique

The National Strategy for Conservation of Biodiversity (MICOA 2003) presents basic information of knowledge state of the biodiversity in Mozambique. That information is summarised in this following sections.

As far as the floristic plants are concerned, Mozambique possesses about 5 500 species of plants, of which it is deemed that 250 are endemics (Table 1), such as some species of sort of Aloe, Bristles and Protea are endemic plants from Chimanimani hill in Manica, and *Icuria dunensis*, discovered species in 1999 in the perennial coastal forest of Moebase, Zambézia Province, and it was thought that this could be endemic plants from this area although aspects pertaining to auto-ecology of this species have not been studied yet.

Table 1. Species of plants that occur in Mozambique

	Families	Genders	Species
Spermatophytes	173	1375	4810
Pteridophyts	20	37	103
Briophyts	-	-	-
Marine algae	59	165	338
Algae of fresh water	32	76	207
Mushrooms	5	59	183
TOTAL	289	1712	5641

Source: MICOA (2003)

A total of three hundred plant species are included in the Red List of plant species for Mozambique (Izidine and Flag 2002, see Table 2), which indicates the species that are under different disturbance levels. Out of these, stand out 32 species in the "Vulnerable" category and 23 species in the category of "Shortcoming Data", indicating lack of information in relation the to Mozambican forest. Among the mentioned species in the Red List, it is relevant to refer the black wood/*pau preto (Dalbergia melanoxylon*), Tule (*Militia excelsa*) and the palm tree *Raphia australis* that are included in the categories "Low Risk", subcategory "Almost in danger."

Table 2. Endemic species of plants in Mozambique

Endemism category	Number of species
Extinct	1
Very threatened	6
Threatened	6
Vulnerable	109
Low risk (almost-in danger)	16
Low risk (little concern)	23
Shortcoming data	139
Total	300

Source: Izidine and Flag (2002)

The Mozambican wildlife terrestrial mammals are characterised by species of small, medium and big size, where stand out species such as elephant (*African Loxodont*), buffalo (*Syncerus caffer*), leopard (*Panthera pardus*), lion (*Panthera leo*), pala-pala (*Hippotragus niger*) and others.

In decade seventy's, in Mozambique there were about 227 species of mammals, of which 216 belong to terrestrial species. However, due to recently occurred changes, many of them related with anthropogenic factors, like clandestine hunting, uncontrolled forest burning, disordered exploration of forest resources, inappropriate agricultural practices and occupation of new areas with different purposes, it is thought that some species are extinct, as the case of the White Rhinoceros (*Ceratotherium simum*), Mzanze (*Damaliscus lunatus*), Sitatunga (*Tragelaphus spekei*) or, critically threatened as the case of the Black Rhinoceros (*Diceros bicornis*), Mabeco (*Lycaon pictus*), the Giraffe (*Giraffa camelopardalis*), Matagaiça (*Hippotragus equinus*), Chango of the Mountain (*Redunca fulvorufula*), Chita (*Acinonyx jutabus*). On the other hand, it is believed that some subspecies of mammals are endemics in Mozambique, like Zebra of Burchell (*Equus quagga subsp. burchelli*), the blue bi-ox-horse of Niassa *(Connochaetes taurinus subsp. johnstonii*) and Impala of Johnston *(Aepyceros melampus subsp. johnstonii*), that occur to the North of Mozambique, in the Province of Niassa.

Table 3. Species of animals of Mozambique

Group	**Number of species**
Mammals	216
Birds	735
Reptiles	167
Amphibians	79
Insects	3074
Total	**4271**

The numbers herein referred to are just an estimate indicator; hence a continuous work of collecting and systematisation of information should be carried out. Therefore, methodologies for a fast survey of biodiversity should be adopted, and a broad data base should be created and articulated between the different stakeholders.

As far as the marine species are concerned, the dugong (Dugong dugon) is only protected in the area of the National Park of the Archipelago of Bazaruto, where the largest population of these species live in the Eastern Africa, but the situation thereof in the rest of marine coast is ignored. All species of marine turtles are protected by Law and considered as being threatened or in danger of extinction, but the few protected nesting or feeding places are protected marine areas. .

3.6 Socio-economical aspects

An important peculiarity of Conservation Areas in Mozambique is the fact that a large part or almost all of them have many people living in (*Table 4*). In some cases the Conservation Areas were already established with people living inside and in other cases, populations occupied CAs, after the establishment of them, mainly during the period of the civil war in Mozambique, and in the period that proceeded to Peace Agreements. This enables a socio-economical approach in management of CAs in Mozambique gains a significant importance.

The Strategy of Development of Forests and Wildlife (Republic of Mozambique 1999) recognises that, in spite of the National Parks and Reserves serving as important habitats of wildlife conservation, some of them are being occupied by the rural population, constituting a focus of difficult conflicts to be solved, if no measures are taken on time. For instance, in decade of ninety's, in Maputo Reserve many camping of populations in the East and South were settled, and it was also surrounded by growing areas of agglomerates of displaced people and refugees. Almost all Hunting Blocks have good habitat conditions, although some of them have experienced population pressures because of the population's placement.

Table 4. Human population who live inside the Areas of Conservation

Area of Conservation	Number of inhabitants
Gorongosa National Park	15.000
Quirimbas National Park	55.000
Banhine National Park	2.000
Bazaruto National Park	3.500
Limpopo National Park	20.000
Zinave Zinave National Park	2.000
Gilé Reserve	3.200
Maputo Special Reserve	5.000

The legislation on Conservation Areas does not clarify if human populations should stay inside of CAs or not. However, the emphasis that the legislation of lands and forests and wildlife provides to the necessity of community involvement seems to admit that human settlements can coexist with the conservation.

That is why practically, different approaches haves been experienced on the forms of community involvement, including activities of zoning/*zoneamento*, transfer of the populations to other places, separation of part of CAs for the general use of community *inter-alia*. These approaches are made with more or less difficulties depending on the amount of people involved, its distribution within the CAs and the way they use the resources of CA.

The presence of human settlements inside of the Conservation Areas is a phenomenon that affects in a significant way the conservation process, due to the practices of land use and biological resources that are contradictory with the conservation objectives. The cattle breeding, the itinerant agriculture, the use of forest burning for farming preparation, and also for driving away wild animals, are *inter-alia,* common practice of inhabitants of the Conservation Areas. On the other hand, the communities in CAs are negatively affected by the presence of wild animals that invade their agricultural fields, attack people and destroy houses. This phenomenon, thoroughly well known as Human – Wildlife conflict, is resulting on conflicting interests between the local communities and managers of CAs.

Due to the rural frameworks of the dwelling populations inside or in the vicinities of CAs, as well as its pattern of natural resources use, CAs are very important sources of resources for day-to-day survival, including the crop of plants and animals for food, medicines, construction materials, domestic utensils, among others. In some cases, CAs are also sources of income generation, not only for the employment that benefits few people, but also for the collect of natural resources for commercialisation, particularly the manufacture of coal, cutting of stakes and bamboo for construction, inter-alia.

4. Fast assessment and Prioritising of the Conservation Areas Management (RAPPAM)

4.1 General objectives of RAPPAM in Mozambique

The information produced in RAPPAM, has been of several usefulness for the system of Conservation Areas, for Mozambique that includes: *a)* providing an information to sustain conservation policy in elaboration under the aegis of the Ministry for Coordination of Environmental Action (MICOA); *b)* identification of Conservation Areas in major risk and defining priority actions to minimise them; *c)* selection of Conservation Area that deserve special treatment; *d)* prioritising financing in Conservation Areas and attracting sustainable financing and; *e)* to developing a management plan for the system of Conservation Areas.

4.2 Methodology

The RAPPAM methodology was applied (Ervin, 2003) Portuguese version without any modifications to be considered. This methodology establishes five steps, from the establishment of the reference group up to the production of the final report. The steps are as follow:

Step 1: Formation of reference group with the objective of preparing a workshop, including revision of methodology, adaptation of the questionnaire and selection of Conservation Areas to be evaluated. The working group was led by the Ministry of the Tourism in collaboration with both the Ministries of Agriculture and the Coordination of

Environmental Action and it was composed by representative delegates of the following institutions:

- Ministries involved in management of Conservation Areas.
    - MITUR – the Ministry of Tourism– National Directorate of Conservation Areas, Trans frontier Conservation Areas;
    - MINAG – The Ministry of Agriculture–National Directorate of Lands and Forests; Unit of Forest Inventory; Institute of Agrarian Investigation of Mozambique;
    - MICOA – the Ministry for Coordination of Environmental Affairs– National Directorate for Environmental Administration;
    - MCT – the Ministry of Science and Technology
- Academy
    - Universidade Eduardo Mondlane–Department of Forest Engineering, Department of Biological Sciences and Center for Land Tenure.
- NGOs
    - CTV - Centre for Live Land
    - IUCN - World for Conservation of Nature
    - WWF - World Fund for Nature

Step 2: Selection of representative Conservation Areas to system of Mozambican Conservation Areas to be object of assessment with recourse to RAPPAM.

The evaluated CAs was selected by Reference Group to cover diversity of CAs (national parks, national reserves, Hunting Block, farms of wildlife) in different areas of the country (marine and terrestrial areas, coastal areas, interiors, north, centre and south of the country) and models of different management (state, private, community and co-managed). *Table 5* presents list of proposed CAs for assessment

Table 5. Conservation Areas of Mozambique

Designation	Province and District (s)	Eco region / Ecosystem	Administration model
PN of Quirimbas	C. Delgado: Quissanga; Ibo; Pemba-Metuge; Meluco; Ancuabe; Macomia	Coastal Eco-region and Coastal marine/Forest and Miombo	State in partnership with ONG
PN of Gorongosa	Sofala: Gorongosa, Muanza	Savannas and humid areas	State in partnership with ONG
PN of Zinave	Inhambane: Mabote and Guvuro	Mopane	State

PN of the Archipelago of Bazaruto	Inhambane: Inhassoro; Vilanculos	Marine Eco-region	State in partnership with ONG and private
PN of Banhine	Gaza: Mabalane, Chigubo	Mopane	State
PN of Limpopo	Gaza: Chicualacuala	Mopane	State in partnership with ONG and private
R of Niassa	Niassa: Mecula, Mavago	Miombo	Private
R of Gilé	Zambézia: Gilé	Miombo	State
R of Marromeu	Sofala: Marromeu, Cheringoma	Humid Zone	State
R of Pomene	Inhambane: Massinga		State
R of Maputo	Maputo: Matutuine	Coastal forest	State and private
Hunting Block/ 04	Manica: Machaze		State and private
Hunting Block/05	Sofala: Machanga		State and private
Hunting Block/ 06	Sofala: Maringué		State and private
Hunting Block/07	Manica: Tambara		State and private
Hunting Block/ 08	Sofala: Inhamatanda		State and private
Hunting Block/ 09	Manica: Macossa		State and private
Hunting Block/ 10	Sofala: Marromeu; Cheringoma		State and private
Hunting Block/11	Sofala: Marromeu; Cheringoma		State and private
Hunting Block/ 12	Sofala: Marromeu; Cheringoma		State and private
Hunting Block/ 13	Manica: Macossa		State and private
Hunting Block/14	Sofala: Marromeu		State and private
Hunting Block/15	Sofala: Macossa		State and private
Licuati	Maputo: Matituíne	Coastal forest	State and Community
Bobole	Maputo: Marracuene		-
Mucheve	Sofala: Chibabava	Draught Forest	-
Nhapacué	Sofala: Marromeu, Cheringoma	Humid Forest, coastal forest	-
Inhamitanga	Sofala: Cheringoma	Humid Forest, draught forest, coastal forest	-
Moribane	Manica: Sussundenga	Humid Forest , Miombo	State and Community
Mock	Manica: Sussundenga	Humid Forest	-
Maronga	Manica: Sussundenga, Manica	Humid Forest	-
Derre	Zambézia: Morrumbala, Nicuadala	Miombo	State and Community
Mepalué	Nampula: Ribaué	Mountain forest	-
Ribaué	Nampula: Ribaué	Mountain forest	-
Mecuburi	Nampula: Mecuburi	Miombo	State and Community
Matibane	Nampula: Nacala	Coastal forest, marine eco-region	State and Community
Low Pinda	Nampula: Memba	Coastal forest	-

Step 3: Collection and analysis of information of each Conservation Area, which was led by the representatives of MITUR, MINAG and MICOA. Here, the Administrators and representatives of Conservation Areas who were requested to contribute with great part of the information, including the main processes in course, management situation, main problems and threats faced in the management of Conservation Areas and priorities of CAs under its jurisdiction.

Step 4: Management of questionnaire, in a Participatory way in a workshop where participants are administrators and managers of ACs or their representatives.

They were selected and divided into three groups *(i)* National Parks; *(ii)* Hunting Reserves; Hunting Block, and Finance of the Wildlife; and *(iii)* Forest Reserves. It is believed that this rearrangement has jointly agglutinated CAs with characteristics and similar objectives, in order to facilitate definition of concepts and comparison among CAs. Each group was facilitated by a member of the reference group in coordination with workshop facilitator.

From a total of 50 invited participants to the workshop, representing 37 CAs, preliminarily selected by the reference group *(Table 5)*, as well as representatives of State institutions, teaching and investigation institutions, NGOs, *inter-alia*, were present 50 participants *(annex 2)* representing 19 CAs *(Table 6).* The CAs whose representatives were not present in the workshop were excluded from analysis, due to the lack of information. Majority of excluded were Hunting Block for Hunting, whose management is basically private and their representatives did not answer to the invitation, and the forest reserves of Provinces of Manica and Maputo are in charge of the respective Provincial Services of Forests and Wildlife, whose representatives were not present.

The workshop was held from 10 to 12 July 2006 in the Maputo City following a programme that is established in Attachment 1.

Table 6. Conservation Areas evaluated during the workshop

Group 1: National Parks	
1	National park Quirimbas
2	National park Gorongosa
3	National park Zinave
4	National park of the Archipelago of Bazaruto
5	National park of Banhine
6	National park of Limpopo
Group 2: Reserves for Hunting and Finance of the Wildlife	
7	R Niassa
8	R Chimanimani
9	R Gilé
10	R Marromeu
11	R Maputo
12	Community programs of Tchuma Tchato

13	Finance of Wildlife Paulo Ubisse
Group 3: Forest Reserves	
14	RF Inhamitanga
15	RF Nhampakwé
16	RF Derre
17	RF Mepalué + Ribaué
18	RF Mecuburi
19	RF Matibane

Step 5: Data analysis and report elaboration, in which the facilitator of RAPPAM compiled all the basic information and outputs of the workshop, including questionnaire; observations were provided along the workshop, including analysis of participants' recommendations in the workshop. The report was discussed by the reference group and later submitted to the participants of the worshop, in order to assure the consistency of the document with the finding out of the workshop.

4.3 Outputs

The outputs are presented by group (National Parks, Hunting Reserves Hunting and Forest Reserves), with objective of motivating comparisons among CAs of the same category, but at the same time among groups are made comparisons, with the aim to establish differences among categories of CAs.

Table 7. Profile of Conservation Areas

Conservation Area	Establish ment date	Area of CA	Annual budget	Specific Objectives of management	Critical Activities of CA	Responsible for the information
National park of Quirimbas	06-06-2002	7.506	500.000MTN 1.000.000USD	Conservation of biodiversity and improve Participatory management of natural resources	Inspection, scientific investigation, community development, development of the tourism, monitoring for protection of marine zones, management of man-animal, zoning conflict	César Augusto
National park of Gorongosa	08-01-1966	5.370	3.900.000MTN	Protect, keep and to use the natural resources in a sustainable way	Inspection, community development, investigation (hydrology, vegetation map), development of tourism, negotiation of transferring management of the park	Roberto Zolho
National park of Zinave	26-06-1973	6.000	1.277.000MTN	Conservation of the biodiversity	inspection, maintenance of access roads, construction and rehabilitation of infrastructures, development of tourism, mapping population inside of the park and in the stopper zone	Ricardina Matusse
National park of Archipelago of Bazaruto	25-05-1971	1.600	1.032.000MTN +6.250.000MTN	Protection of the dugongs and marine turtle and biodiversity in general	Inspection, monitoring of biodiversity, monitoring of socio-economics activities, environmental education, support to local communities, construction and maintenance of infrastructures, maintenance of circulating means, monitoring of tourism	Rafael Funzana
National park of Banhine	26-06-1973	7.000	1.086.000MTN	Protection of the ostrich and giraffe	Inspection, establishment of camp of research centre, rehabilitation of landing track, maintenance of access roads	Armando Nguenha and Eurico Agostinho
National park of Limpopo	27-11-2001	10.000	1.500.000 EUR	Assure local communities' participation in development and management of natural resources, to promote responsible tourism	Development of tourism, development of management infrastructures, protection of natural resources, inspection and sensitising, replacement of population	Gilberto Vicente
Reserve of Niassa	04-07-1964	42.200	450.000USD	maintain, manage and to develop biodiversity, provide activities of quality tourism, to reduce pressure on the natural resources	manage human establishments, manage man-animal conflict, inspect and control stealthy hunting, manage uncontrolled forest fire, monitor legal hunting, ecological investigation, inventory of wildlife, infrastructure development, community involvement in management	Baldeu Chande

Reserve of Chimanimani	18-08-2003	1.000	2.000.000MTN	Conservation of biodiversity and development of community tourism	Establishment and development of infrastructures, communities' involvement in management, man-animal conflict management, forest fire and hunting stealthy control as well as illegal mining, control of agricultural expansion, control of extraction of forest products	Simão Balane
Reserve of Gilé	08-06-1960	2.100	1.267.800MTN		Inspection and control of stealthy hunting	Felismina Langa, Alessandro Fusari
Reserve of Marromeu	08-06-1960	1.500	1.400.000MTN	Protection of population of buffalos	Inspection and control of stealthy hunting, infrastructure development, forest fire control, community involvement management, demarcation of reserve limits, man-animal conflict management, monitoring and sense of wildlife	Atanásio Jujumane
Reserve of Maputo	23-07-1960	700	1.682.000MTN	Conservation of biodiversity	Inspection, control of exotic species, placement of fence for elephants, extension of Futi corridor, community involvement in the management, control of forest fire	Momade Nemane
Community programs of Tchuma Tchato	1994	2.500	800.000 MTN +365.000USD	Promote conservation and rational use of natural resources, to solve conflict among communities, private sector and State	Terrestrial and fluvial inspection, promotion and community involvement in the management, man-animal conflict management, identification of corridor of elephants, monitoring of sport hunting, development of infrastructures	Cornélio Miguel and Luís Namanha
Finance of Wildlife Paulo Ubisse	2001	300	There is not information	Promotion of tourist activities	Investigation, sense and monitoring of wildlife, inspection and control of stealthy hunting, man-animal conflict management, forest fire control, development of infrastructures	Paulo Barros and Beautiful Sansão
Forest reserve of Inhamitanga	22-07-1957	16	There is not budget	Protection of hygrophilous forest and important animal species	No activity	Maria Augusta
Forest reserve of Nhampakwé	06-06-1955	170	There is not budget	Protection of sub-hygrophilous forest and protection of palm tree *Borassus aethiopum*	Forest and wildlife inspection	Maria Augusta
Forest reserve of Derre	22-07-1957	1.700	There is not budget	Protection of forest areas, with priority to settling of umbila	Forest inspection with communities' involvement	Jorge Manjate

Forest reserve of Mepalué + Ribaué	22-07-1957	80	There is not budget	Conservation of nascent of the river Lúrio, forest conservation always green of mountain	inspection	Aly Awasse
Forest reserve of Mecuburi	22-07-1957	2.300	3.000 MTN	Conservation of the basin hydrographical of the river Mecuburi and preservation of wood species for bars railways	Community inspection, bee-keeping	Aly Awasse
Forest Reserve of Forest Matibane	22-07-1957	199	77.000MTN	Conservation of settlement of mecrusse	Community inspection, forest fire control, transformation of the reserve in National Park	Aly Awasse

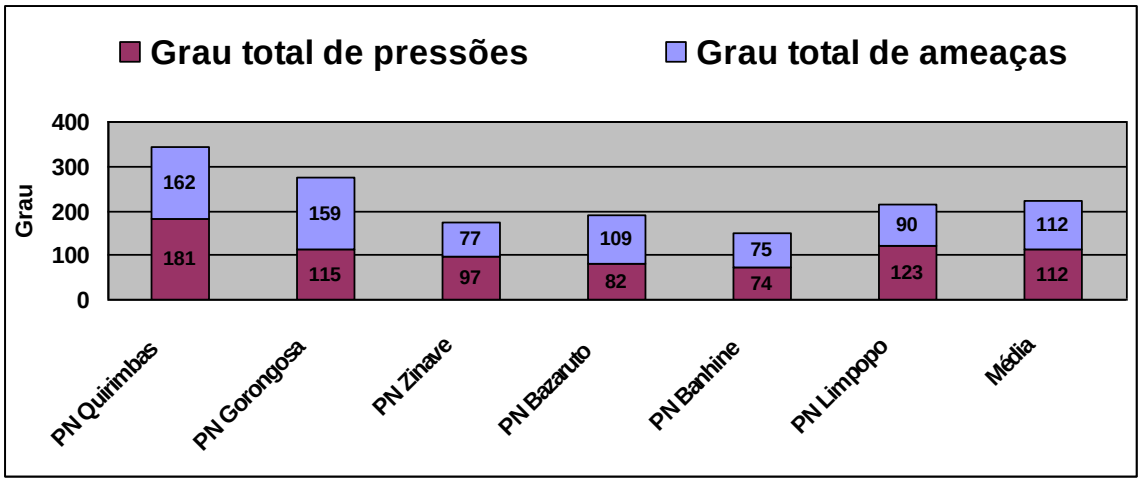
4.3.1 Pressures and threats to environmental integrity of Conservation Areas

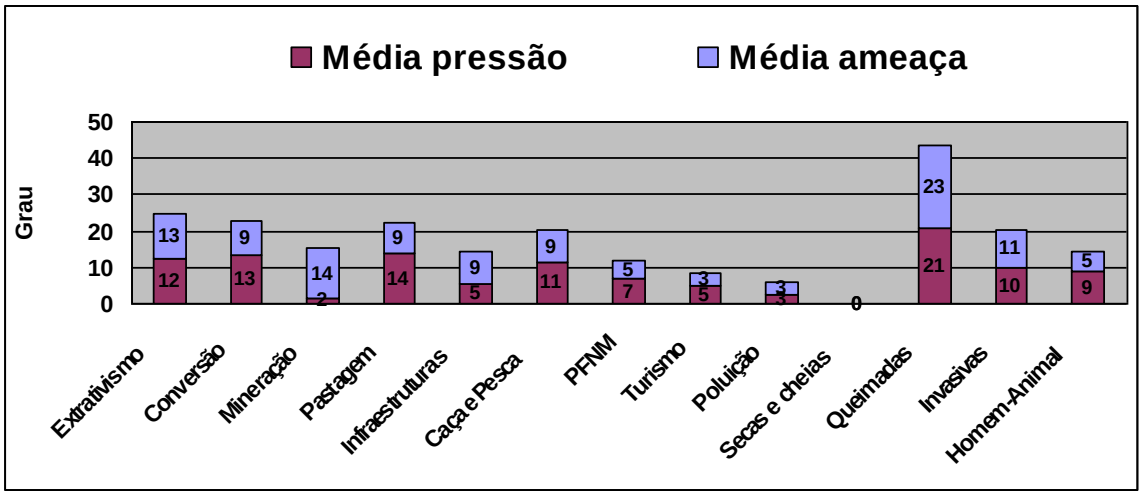
The pressures and threats suggested in the methodology RAPPAM were evaluated before the workshop took place, with the aim to estimate its efectiveness under the context of Mozambique. Slight modifications were introduced to include aspects such as Human-Wildlife Conflitcs while semi-natural phenomenon was separated in form of droughts and floods and uncontrolled forest burning, considering that these are phenomenon of local importance. The construction of bridges was included in a point called infrastructures, which included *inter-alia*, roads and bridges, gas-pipes and pipelines, lines of energy transportation of energy. Thus, the final list of pressures and threats is as follows:

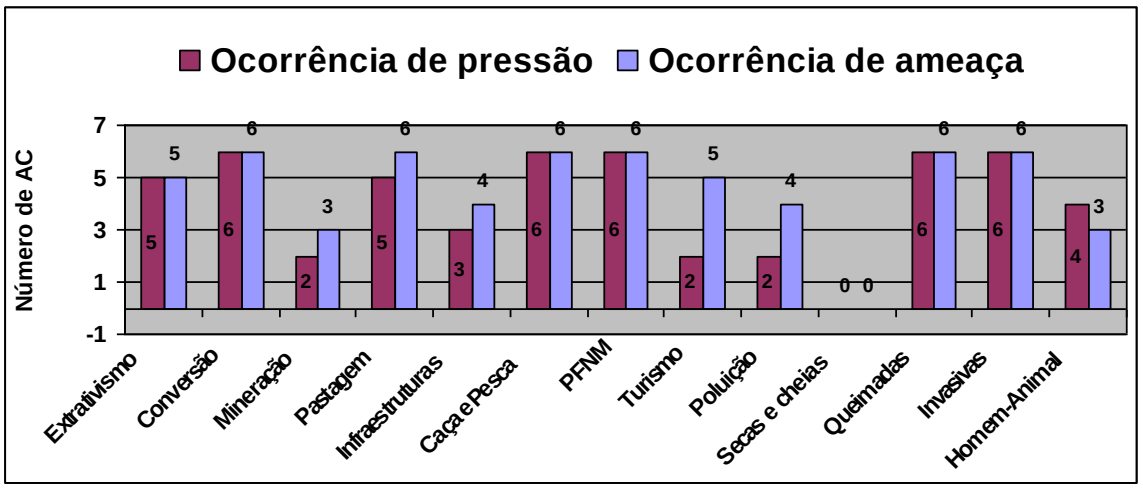
- **Wood Cutting** – refers to a legal or illegal exploration of wood, firewood cutting, manufacture of coal, cutting of stakes for construction or any other form of cutting of trees for several purposes;
- **Conversion of the use of the soil**– includes transformation of protected lands in dwelling, establishments, agriculture, reforestation, and other uses contrary to conservation objectives;
- **Mining -** includes all forms of excavation, searching, mining and exploration of underground resources (for example activity of prospectors, exploration of precious and semi-precious stones, search of gas and oil), and also the residues produced by such activities;
- **Grazing** – pasturage of domestic cattle (for example, bovines and goats) and forage collection;
- **Infrastructures** – bridge construction, highways, bridges, gas-pipes, cables of electrical energy transportation or others;
- **Hunting and fishing** – includes legal hunting practices, that threaten resources of Conservation Areas, hunting and fishing for illegal trade and subsistence hunting;
- **Collection of non lumbermen's products (PFNM)** – it consist of collecting of non timber products for commercialisation or subsistence, such as victuals, medicinal plants, construction material, resins and other resources (for example mushrooms, honey, medicinal and other plants).
- **Tourism and recreation** – include trails, camping's, shipwalks, use of motorised vehicles, and other recreation types that can disturb the process of conservation of biological resources or to them associated;
- **Pollution** – includes any inadequate form of disposition of residues of legal activities (e.g. fuel and package of tourists' victuals), as well as illegal activities (e.g. pouring out of toxicant materials);
- **Droughts and floods** – natural phenomenon that result in a reduction of rain that can affect dynamics of populations, and affect the situation of conservation of species and inhabitants.

- **Uncontrolled forest burning** – forest burning of natural origin and anthropogenic that extends for extensive areas without control, destroying inhabitants and killing species of animals and plants.
- **Invader exotic species** – include plants and animals introduced intentionally or unaware by humans (e.g. Chromolaena, Lantana, Hyacinth-of-water, Polygonum cuspidatum, trout, landworm, mussel-zebra).
- **Human-Wilde conflict** – includes all forms of conflicts between man and wild animals, particularly agriculture and homes destruction, attack to people and domestic animals, transmission of diseases, *inter-alia*.

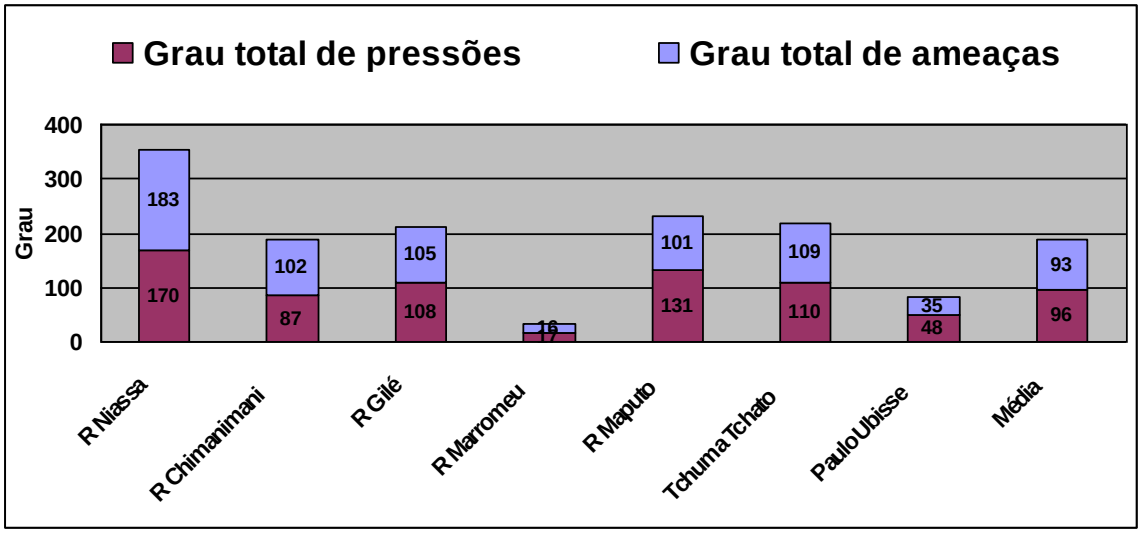
A. National parks

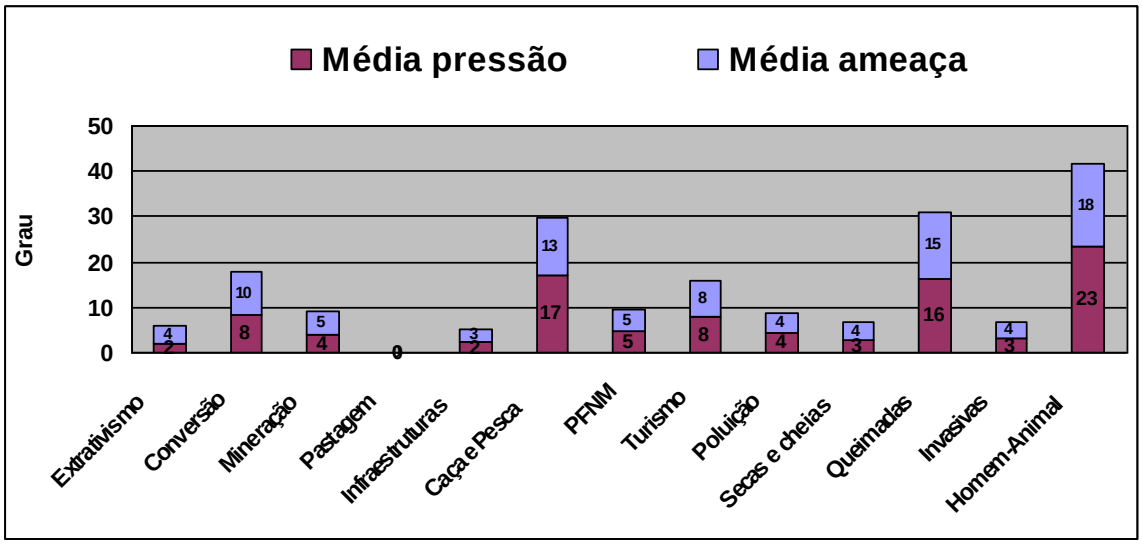


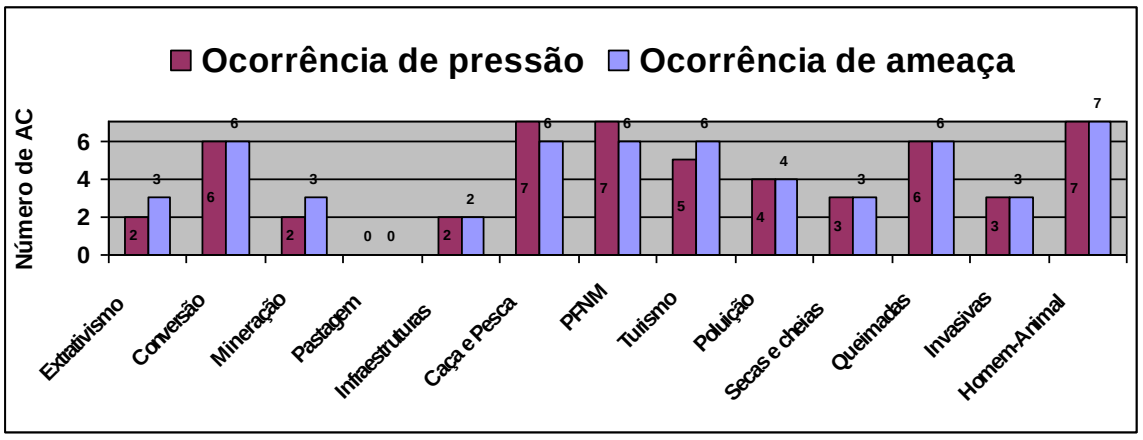




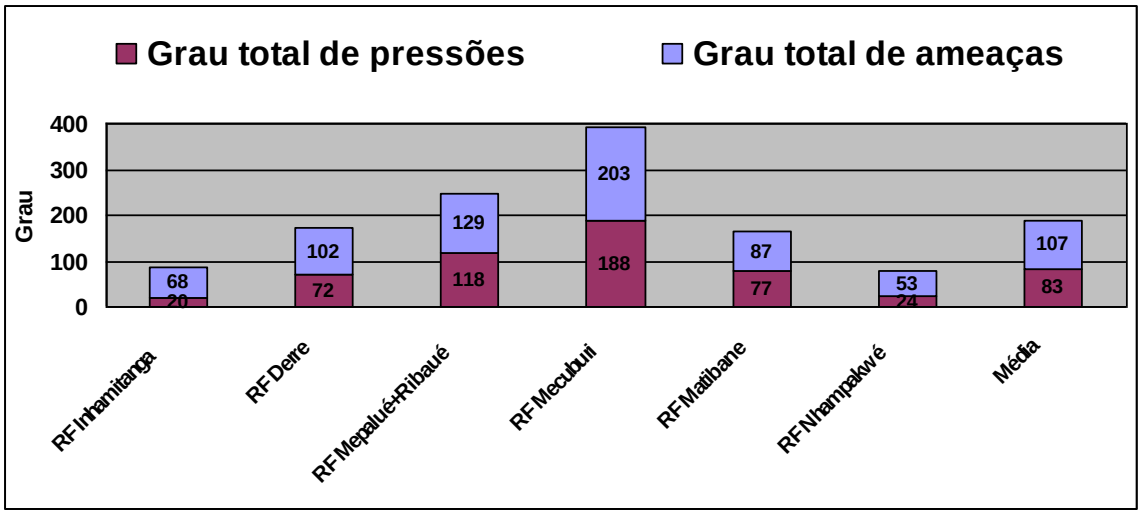
B. Hunting Reserves

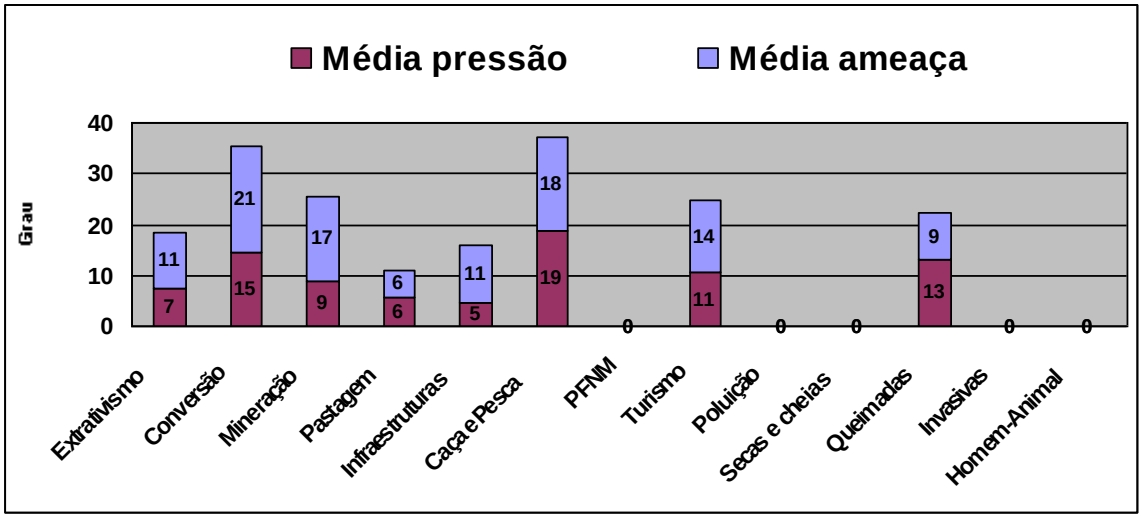


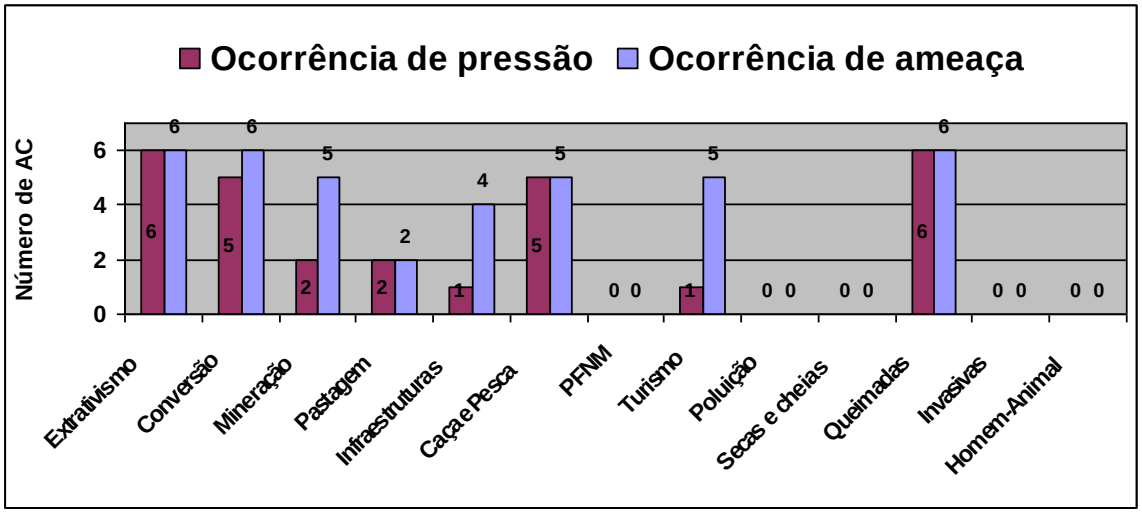




C. Forest Reserves







Picture 2. Pressures and threats in the Areas of Conservation

Analysis of pressures and threats in the National Parks shows that uncontrolled forest fire, cutting of trees for several purposes, conversion of land use, the pasturage and hunting and fishing are currently the main pressures. These are also seen as the main threats to the conservation in the forthcoming years. In the Hunting Reserves, man-animal conflict, uncontrolled forest burning, hunting and fishing, and the conversion of land use are the main pressures and threats. The Forest Reserves present a standard particularly different, being hunting and fishing, conversion of land use, and mining as pressures and threats to conservation. In general, the pressures and threats indicated as the most common and dominants in CAs, such as uncontrolled forest burning, conversion of land use, hunting and fishing are associated to human presence in conservation areas, and to the lack of setting plan of these in conservation activities (*Picture 2*).

The practice of zoning agriculture with use of fire for cleaning the area, the cutting of trees for construction material, firewood and sometimes manufacture of coal, subsistence hunting with use of the fire to drive away animals and to smoke meats, *inter-alia*, are common practices of rural populations that live inside and in the surroundings of the Conservation Areas. As the corollary, uncontrolled forest burning was indicated as pressure and threat in all the conservation areas irrespective to its category, the conversion of land use, hunting and fishing and collection of non-timber forest products were reported as pressures and threats in almost all (80-90%) of evaluated Conservation Areas (*Picture 2*). It is noted that, in spite of the collection of non-timber forest products (PFNM) reported in all CAs, its impact does not seem to affect the biological conservation.

All activities indicated as the main pressures, are equally reported as threats in the future for considering that there is no practical strategy in short term to solve the subject of coexistence with population in the conservation areas. At the same time, it does seem to have no solutions in short term to establish alternative sources of income generation for local communities or forms of altering the customary practices that are contrary to the conservation. Activities for the planning of CAs, such as zoning, that have already been introduced in some CAs, were indicated as possible initial steps to establish order in the use of the resources of CAs, seeking to guarantee that this planning is implemented and reinforced to produce effects.

As far as the drought and flood are concerned, does not seem to have many pressure between the conflict man-animal and invasive species. However, during the discussions held before and after the questionnaire application, it was clearly noted that there is a shortcoming definition on the conflict man-animal, that the participants defined as a difficult complex phenomenon to be characterized in terms of existing questionnaire.

With regard to droughts and floods, it was stated that a short term assessment, as the case of this methodology, is difficult to have perceivable effects, which can be evaluated as pressures or threats. Notwithstanding, there is a perception that these phenomenon have a

negative effect, which is not correctly represented in the questionnaire. An inadequate representation of this phenomenon is recognised for invasive species, but at same time, does not have a sufficient knowledge to display the effect of these species in AC.

The National Parks, *Parque Nacional de Quirimbas, Gorongosa and Limpopo* present a degree of pressures and threats that are above of the average of the National Reserves. One of reasons of high pressure in cases of Quirimbas and Limpopo, can be relating with the fact of being new AC (established after 2000) in a zone of density of inhabitants. For example, in the *Parque Nacional de Limpopo*, it was estimated a number of 4.350 of inhabitants with more than 5.200 cattle, living inside the reserve and about 20.000 living outside around the reserve (MITUR 2003), while the *Parque Nacional das Quirimbas* has about 55.000 of inhabitants according to (statistic data of MITUR).

Sensibilisation to communities is in course in order to conservation, but there is still many work to be done, in order to reach a wished level The *Parque Nacional de Gorongosa* appear with a high level of pressures and threats, especially due to the open of roads around the reserve (Inchope-Caia, Gorongosa-Muanza), which will allow exploiters of firewood and coal, human settlement and other forms of activities, which have a negative impact inside the Reserve. In addition, the prospecting of gas in Gorongosa-Marromeu complex, the plan of construction of the Bue-Maria dam on Pungue river, the prospector operations *inter-alia*, are very especial aspects that place the *Parque Nacional de Gorongosa* in a pressuring and threatening situation.

The *Parque de Banhine, Zinave e Bazaruto* are the reserves that show a level of pressures and threats slightly low. The difficult access and reduced number of inhabitants (2.000 inhabitants in Banhine and 2.000 in Zinave) are the main characteristic of Banhine PN and Zinave PN, while Bazaruto PN is situated in an insular zone and is as a stable organisational framework, which has not been affected by the war, place it in a position with a low pressure, with regard to the set of AC.

The Reserves of Niassa, Maputo, Gilé and Tchuma-Tchato show a total level of pressures and threats above of the average of the hunting reserves. The clandestine and subsistence hunting, the conversion of land use, and uncontrolled forest burning are main pressures and threats. The Reserve of Marromeu and the *Fazenda do Bravio Paulo Ubisse* have low pressures and threats

The localisation of the Reserve of Marromeu, in a swampy area of difficult access and without people living inside it, is the most protected reserve, while the *Fazenda do Bravio Paulo Ubisse*, for being is slightly small, about (is the smaller Hunting Reserve 300 Km^2 is the smallest Hunting Reserve assessed in this assessment), and with a private management it represents a management pattern that results in low pressure and threat.

The Mecuburi, Mupalue, Ribaue and Derre Forest Reserves possess the most total level of biggest and threat. The Forest Reserve of Mecuburi was established in 1957 and it is the major forest reserve with a total surface of 230.000 ha. It has been under land conflict involving farmers who wish to produce cotton. Several proposal have been made in order

to separate a part of the Reserve, (e.g. see Gomes e Sousa 1968) and there is a management plan with a settlement of zones/*zoneamento*, which imply the definition of large surface for multiple purposes and cordon zone. Nonetheless, while there is no reinforcement of implementation of the management plan and the proposed settlement of zones/*zoneamento*, conflicts happen and consequently they cause pressures and threats to the objectives of conservation.

Although the Mepalue and Ribaue Reserves are small, they are located in a very fragile zone and with a high populational density about (1300 families) (Costa, 2002), which wuring the wars it is used as a refuge area. The subsistence hunting and fishing, mineralisalion of precious stones and uncontrolled forest burning are the main threats to a set of Forest Reserves. In the Derre Forest Reserve, which has 160.000 ha surface, live there about 15.000 inhabitants who are involved in subsistence agriculture, using forest burning to clean their farms. In fact, Mantilla et al (2005) indicate that agriculture is the main threat and they estimate that about a half of the Reserve surface is occupied by either commercial or subsistence activity (2005). So the its wealth consisting of timber trees brings about a high pressure and threat due to ilegal exploration of wood being high.

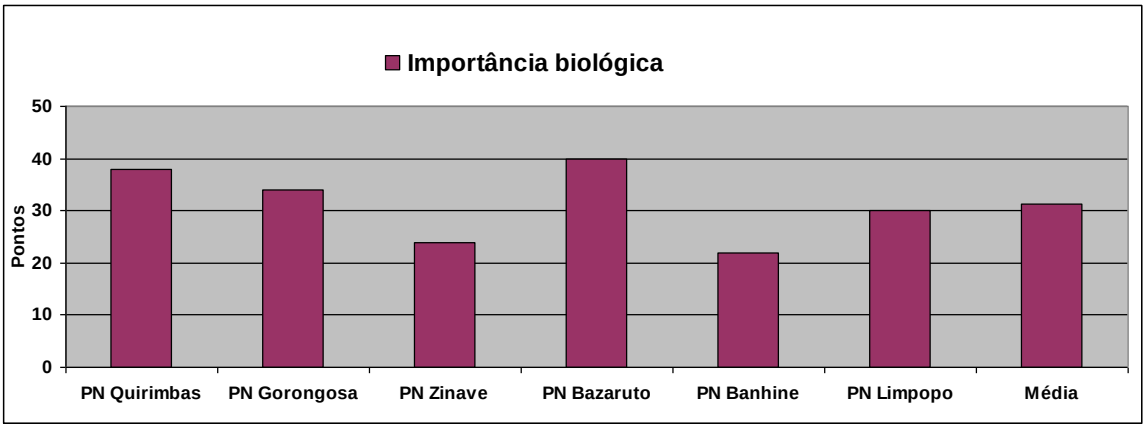
4.3.2 Context

a) Biological Importance

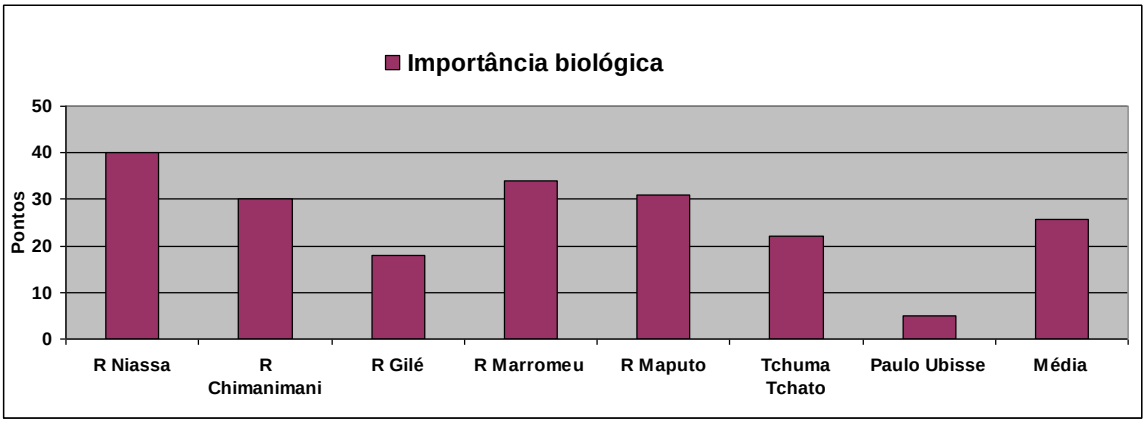
In the context of the RAPPAM methodology, the biological importance is an aggregate index that includes the emerging of scarce and threatened species, biodiversity (genetics, species and ecosystems) endemism, representativity of functional ecological units, representativity of diversity of ecosystems and key species, *inter-alia* .In its whole, the biological importance can be difficult to understand and interpret, particularly in case of Mozambique, where there is a few information about endemic species and species in danger of extinction (but see Izidine and Bandeira 2002), there is no updated inventory of biodiversity and there is a very little knowledge on the population dynamics, which includes information on a minimum feasible populations of key species. The interpretation of this indicator cannot represent a true situation of biological importance, but reveals a lack of knowledge on this matter.

The results displayed in this section are based on an actual knowledge and need to be carefully addressed, taking into consideration the previous indicated aspects. In general, the AC, especially the *Parques Nacionais,* are situated in places with a high biodiversity and represent the main ecosystems of Mozambique.
However, it is believed that due to the historical time, when the majority of AC were created and of the established objectives of some AC (e.g.. Forest Reserves), its design is deficient and does not cover the actual needs of conservation.

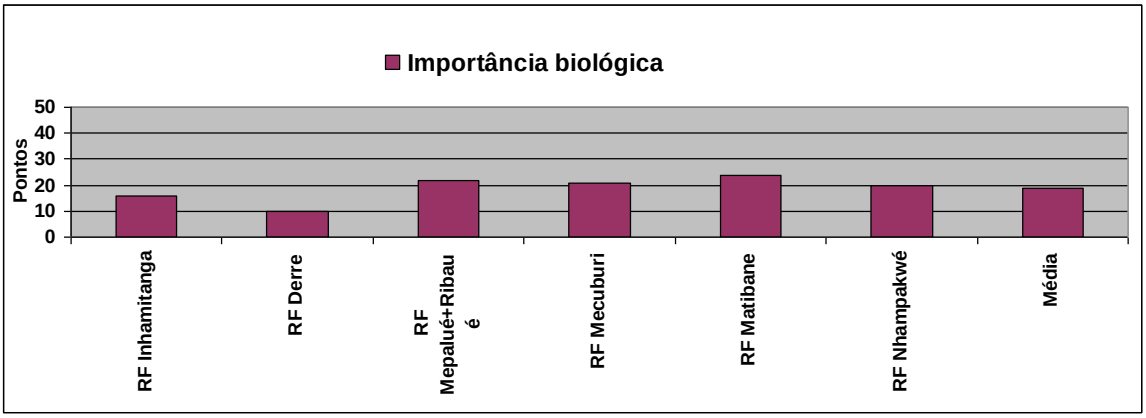
A. National Parks



B. Hunting Reserves

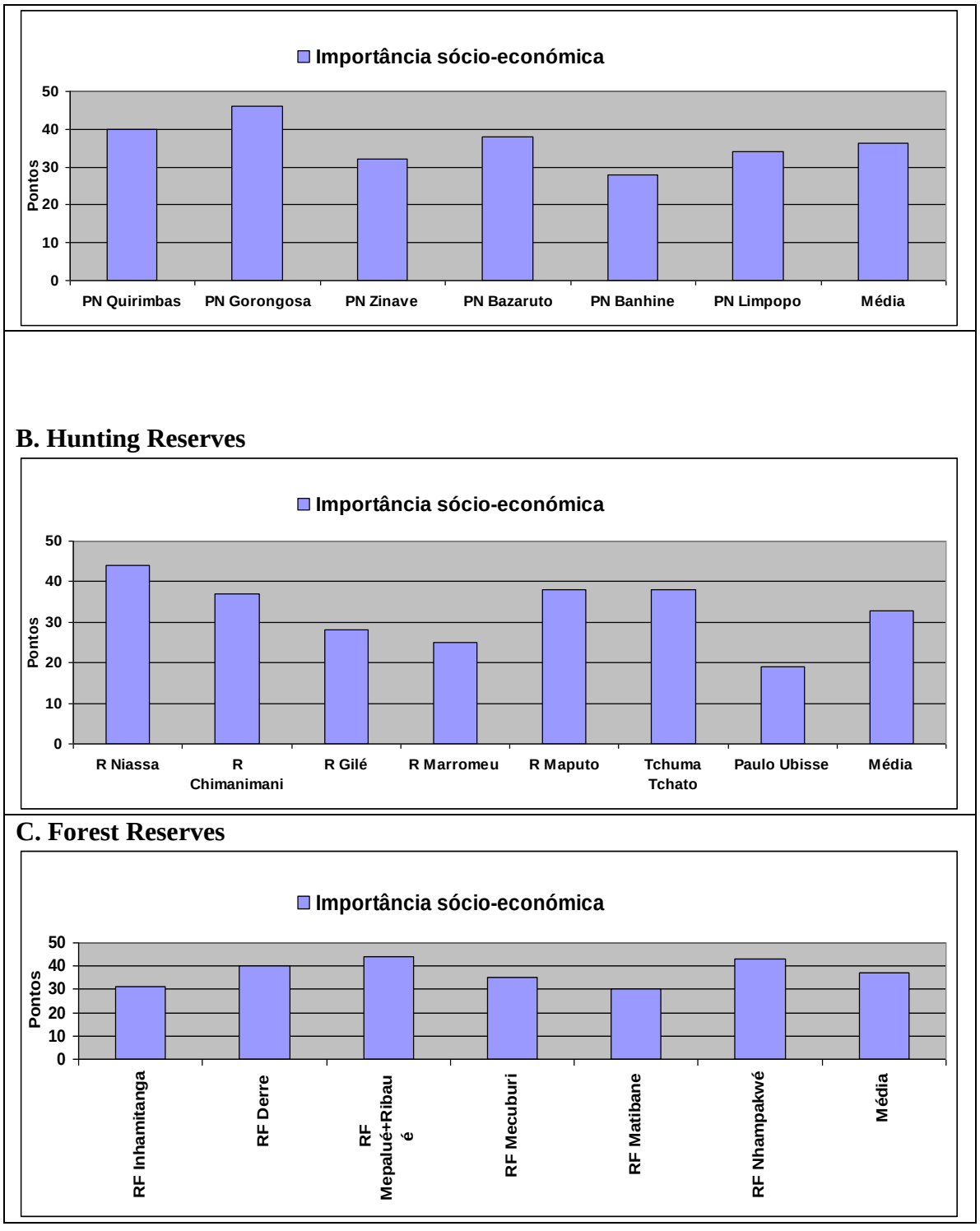


C. Forest Reserves



Picture 3. Biological importance of the Conservation Areas

A. National Parks



Picture 4. Social and Economical importance of the Conservation Areas

Due to their constitution that include marine and terrestrial ecosystems, the *Parques Nacionais de Bazaruto e Quirimbas* appear as being especially biologically very important, while the Niassa Reserve its importance is associated to its territorial

extension, where live an enormous list of animals and plants, which include protected species, such as the (ALoxodonta) Elefant and endemic species such as the blue taurino/*boi-cavalo* (Connochaetes taurinus subsp. johnstonii) of Niassa and *impala* of Johnston (Aepyceros melampus subsp. johnstonii) (MICOA 2003). Quirimbas is the sole marine AC o Mozambican Coraline Coast representing only 16% of marine landscape of the *Complexo Quirimbas-Mtwara,* Bazaruto is the major marine AC in the region of Dune Coast/ Costa das Dunas, representing a protection of 34% of marine landscape of the *Complexo do Arquipélago do Bazaruto*. Both reserves include an important coral reef and sea-catgut layer, with scarce species, such as dugongs, marine turtles, dolphins, sharks, seaweeds and others.

The *Parque Nacional de Gorongosa* and the Reserve of Marromeu are zone of a great biological importance, due to localisation thereof, which is a zone of confluence of diverse kind of inhabitants.

However, it is believed that two areas do not complete function units, if some elements of fundamental ecological value are left out. For example the *Serra de Gorongosa* should be an integral part of *PNGorongosa* and the *Complexo de Marromeu* should be part of the *Reserva de Marromeu*.

The Forest Reserves, show in general, a reduced biological importance. This situation can be due to the initial definition nature of Forest Reserves, many of which were established with the objective of assuring some reserves to the Government aiming at producing some wood species, which although they are scarce, they are not necessarily in risk of extinction

For example, the Forest Reserve of Derre, was created for protection of *umbila* wood (Pterocarpus angolensis) and the Forest Reserve of Matibane was established for protection a *mecrusse* wood (Androstachys johnsonii).

Although some Forest Reserve has a high biological value) e.g. Matibane and Mupalue-Ribaue), this is due to the localisation thereof, in endemism areas. It is believed that there are still many species to be identified, especially in the very specific and few studied mountainous habitat in the Mupalue-Ribaue Reserves.

b) Social and economic importance

All the Conservation Áreas have a high social and economic importance irrespective the category thereof. This fact is relating to the high presence of human settlements inside of CA's and in their vicinity. The high dependence of natural resources for diverse purposes, including construction material, energy, medicines, food (silvestre fruits, hunting meat and fishing), as well as lack of alternative means for income generation, consequently, put the CA's to represent a great social and economic importance as the employment opportunity. And being an area of extraction of subsistence products and in some cases of income generation, (e.g. the production of coal and cutting of slip to sell). Differences

between AC are not great and are related to a number of inhabitants living inside or in the boundary of CA. Therefore, the Reserve of Marromeu and the Forest Reserve of Inhaminga, for example, both inhabited, they appear themselves as having a reduced social and economic importance.

On the other hand, the *Fazenda do Bravio Paulo Ubisse*, with a private management and with a low interference of local communities, it displays a social and economic importance slightly low, under the assessed parameters by this method.

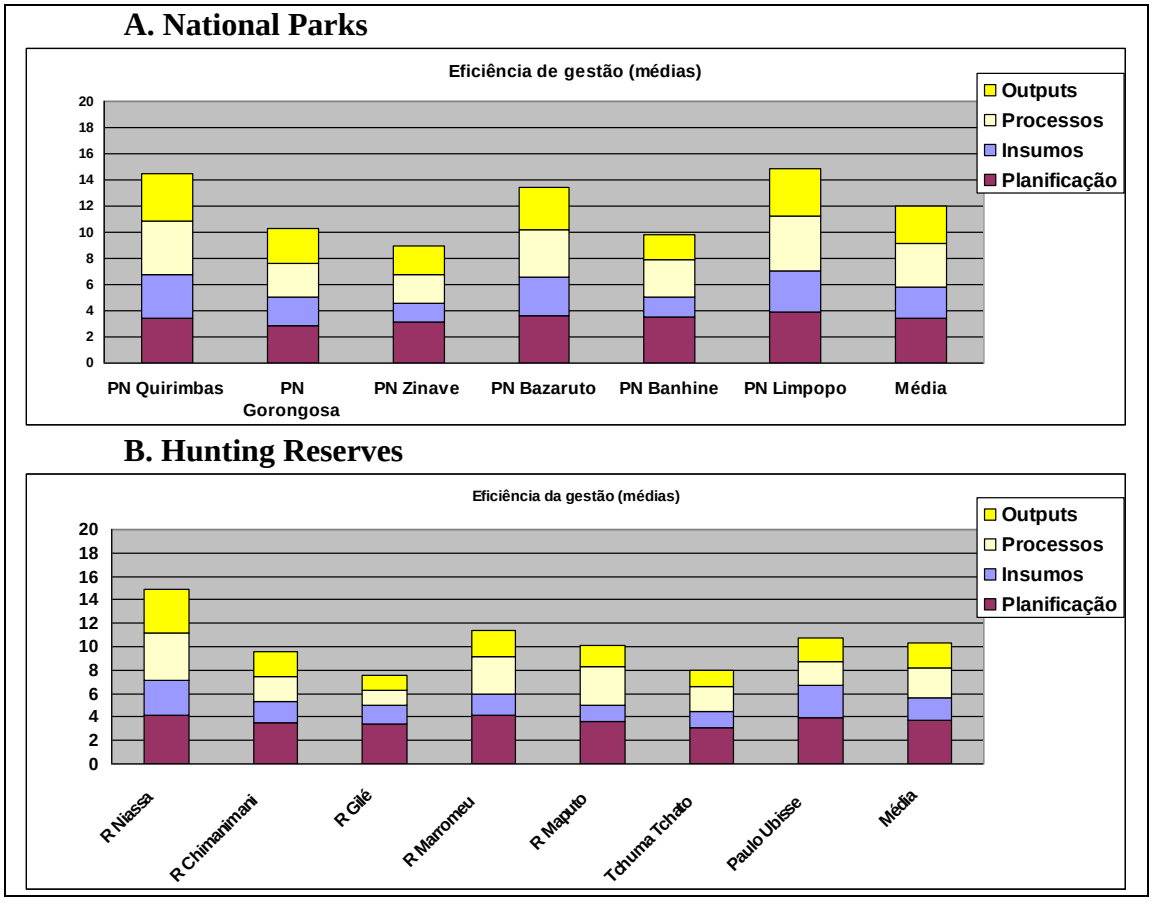
c) Vulnerability

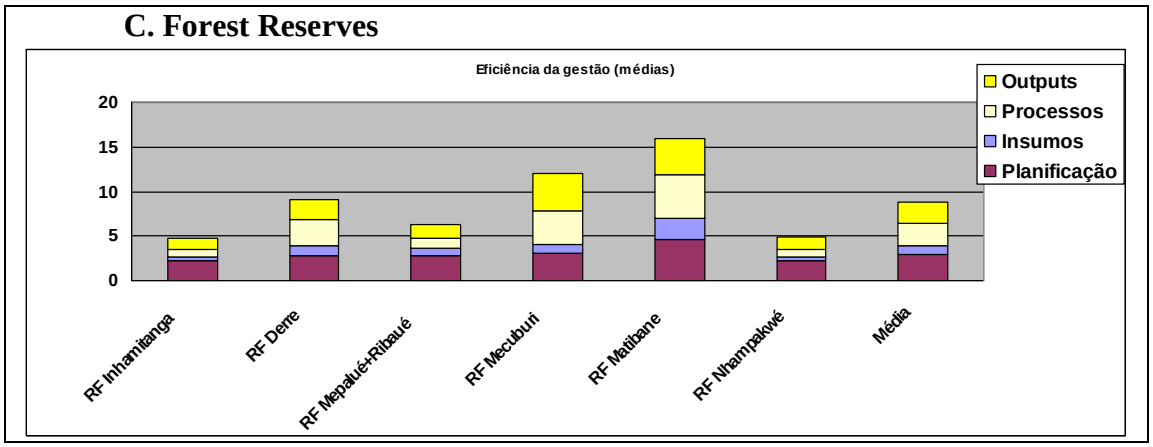
The vulnerability expresses the level of susceptibility with which the illegal activities are carried out in the AC, including weakness in implementation of rules and regulations, management aspects, conflicts, *inter-alia*. The existing of products with a market value)e.g. commercial woods, hunting animals), and the consequent demand thereof, as well as the easy access for illegal activities that are associated to weak institutional capacity to refrain the illegal individuals, are some of the common reasons that lead AC's to become vulnerable.

It is noted that although is indicated with a level slightly low, the corruption, the pressure on managers of CA and difficulty of recruting and mantain qualified and skilled personnel who are be able to carry out the protection activities, were indicated as the reasons, which cause the actual level of vulnerability. A very particular case reported in the Forest Reserves of Inhaminga dna Nhampakwé is a political instability, manifested by the presence of armed men at District of Cheringoma, during the last two years. However, it is believed that this situation, does not itself jeorpadise the objectives, so the Forest Reserve of Inhamitanga appear with the lowest level of vulnerability.

4.3.3 Global Management efficiency

The CA general efficiency is evaluated by using a set of elements that include planning (objectives, legal support, sign of CA), the inputs (human resources, communication and information, infra-structures and financial resources), processes (planning, decision making, research, assessment and monitoring) and the outputs. Therefore, the management global efficiency indicated in the *picture 3* shows variability among the CA. The National Parks, which are relatively new such as (Quirimbas, Limpopo and Bazaruto), with foreign funding and with human and financial resources, as well as the resources that have a functioning management mechanism, such as the Niassa Reserve, the Matibane and Macuburi Forest Reserves, which have a foreign funding project that ensures resources for basic activities of conservation, have efficiency above the average. Contrarily, the Banhine and Zinave National Parks that are exclusively functioning on the basis of the State Budget, or even the Inhamitanga and Nhampakwe Forest Reserves that do not own any functioning structure and no resource is received, have their efficiency low. Comparatively, the National Parks have major efficiency in relation to the Game Reserves and these, themselves, have major efficiency than the Forest Reserves. These differences may be due to the level of inputs and outputs, which vary in the same direction as the management efficiency. Details on each of the components are analysed as follow.

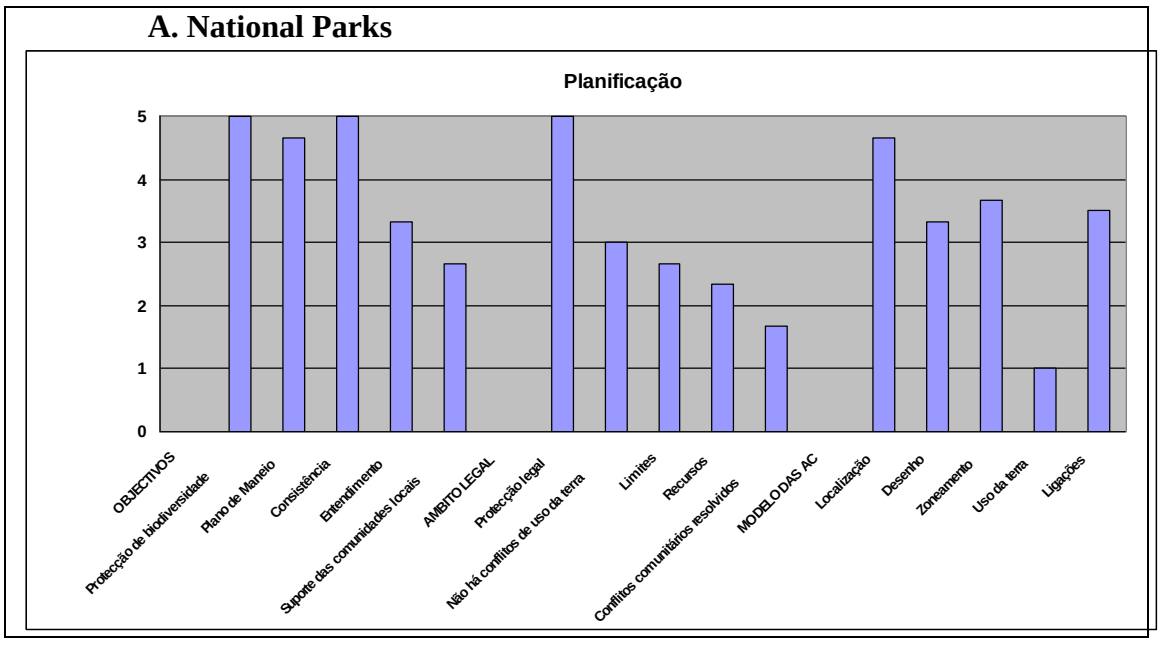


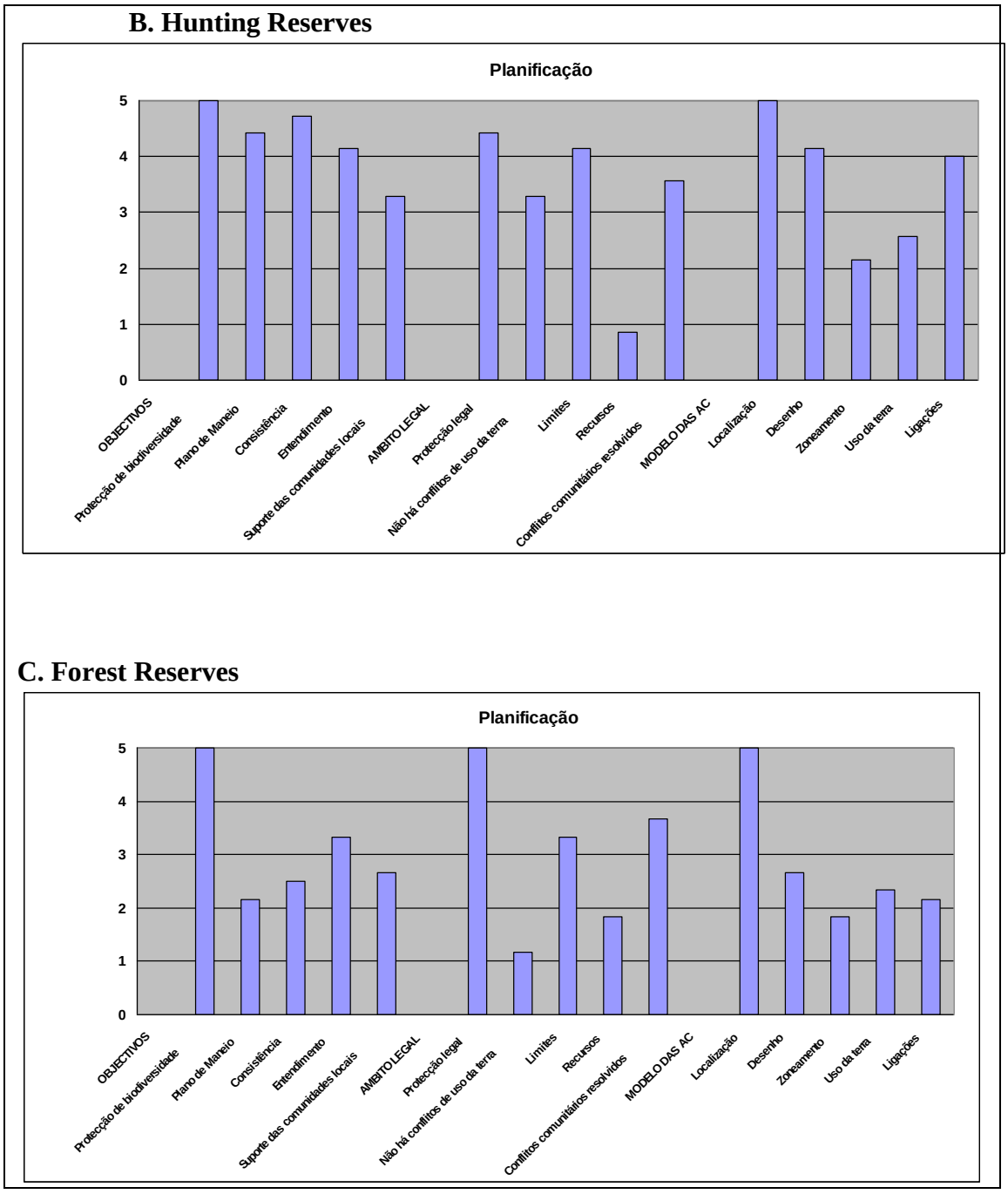


Picture 1. Management Global Efficiency Rating in Conservation Areas

a) Planning

In relation to the planning, the CA have the protection objectives duly defined, a legal protection based on the laws and regulations. In fact, all the CAs considered in this assessment have been regulated by the law as conservation areas indeed. The localisation of CAs is also strategic for conservation objectives. In this case, the main problems are related to the poor support to the local communities, resulting in several conflicts not resolved, some of which related to the standards of the land use, contrary to conservation, either in the conservation areas or out of the conservation areas. Despite the charts of CAs being publicly established by the law, there is no demarcation in the field that may enable local communities and other land users (including other State organs) to recognise the ACs limits, which result in duplication of assignment of lands, (e.g. the attribution of the licences for mineral research and exploration within the CAs)





Picture 2. Planning Average Rating in Conservation Areas

The National Parks and the Game Reserves have the recent and written management plans (some have already been approved and others on the way to). However, the Forest Reserves present a low value in this point, reflecting the lack of updated and written management plans. There are extreme cases among the Forest Reserves, such as the Nhampakwe and Inhamitanga Reserve, which have not any management entity; and the Matibane, Mecuburi and Derre with written and updated management plans. The CA's with updated management plan include the settlement plan for integration of the local

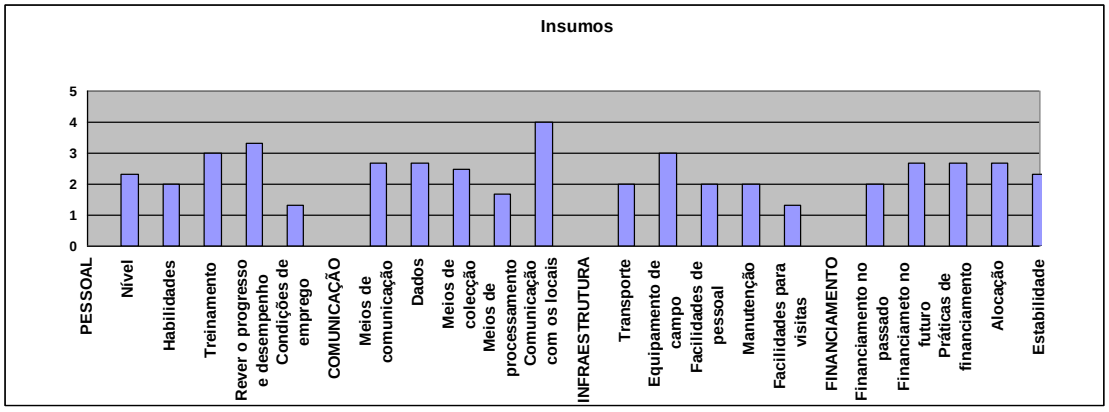
communities, therefore, observing the obtained punctuation, it suggests difficulties for implementation of the settlement scheme, associated with the few available resources for implementation of the protection activities.

b) Inputs

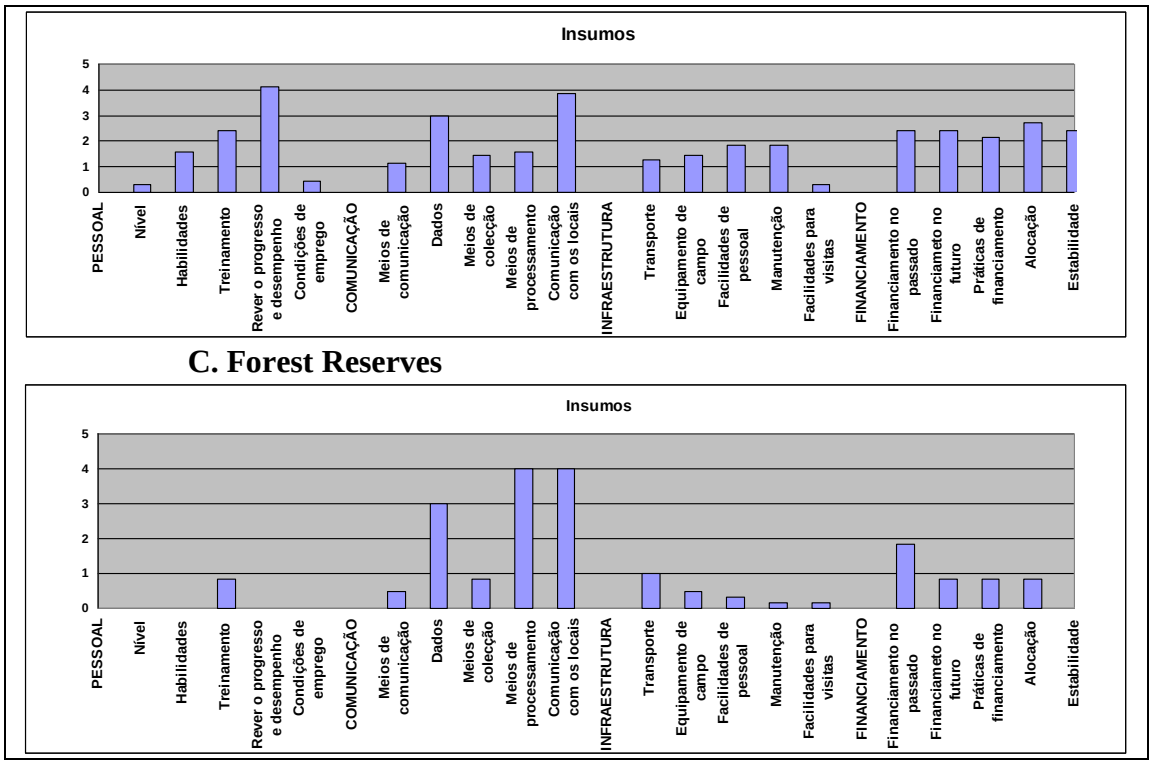
Generally, for all the CA's, inputs are low and out of reach to cover the minimum needs of the CA. Particular emphasis is given to the Forest Reserves that present the lowest inputs among the CA. Starting from the almost inexistent staff to perform the conservation activities, inexistence of infra-structures for functioning, an almost total lack of funding, the Forest Reserves have a favourable environment to ensure the conservation, evaluated by the communication level with the local communities. This is supported not only by the outputs of this assessment, but also by the previous studies (Sitoe and Enosse 2003, Muller at al 2005), who verified that, generally, the neighbouring communities of the Forest Reserves are sensitised about the protection activities of the resources. But the state work and other projects did not go through sensitisation stage.

The level of inputs in the National Parks and in the Game Reserves do not also meet the needs for their normal functioning. However, considering that some National Parks and Game Reserves have foreign investment projects, this can ensure staff with some qualification level, as well as some basic financial resources. Generally, the National Parks have a major level of inputs than the Game Reserves and these, in its turn have major than the Forest Reserves.

A. National Parks



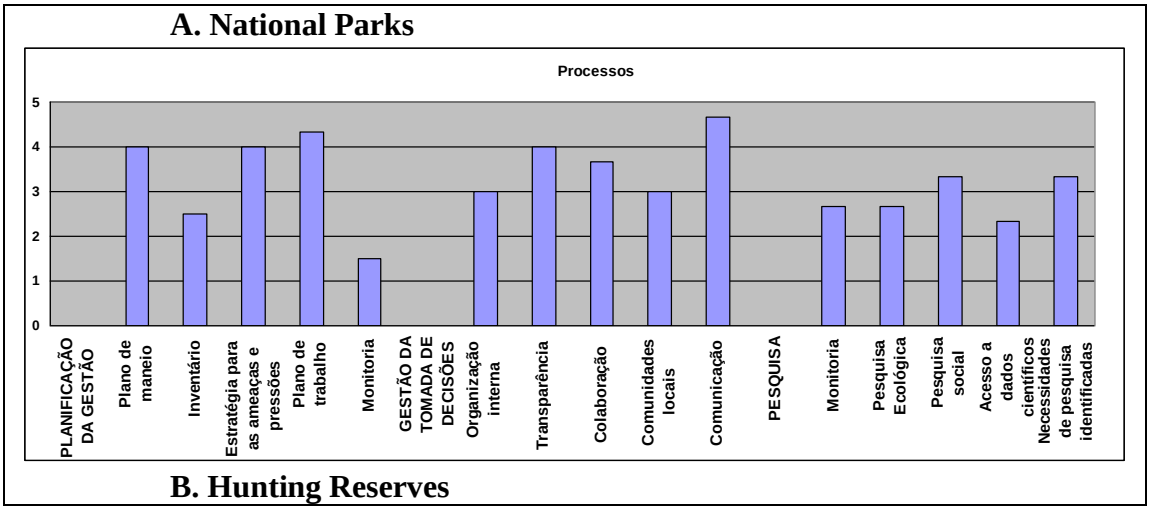
B. Hunting Reserves

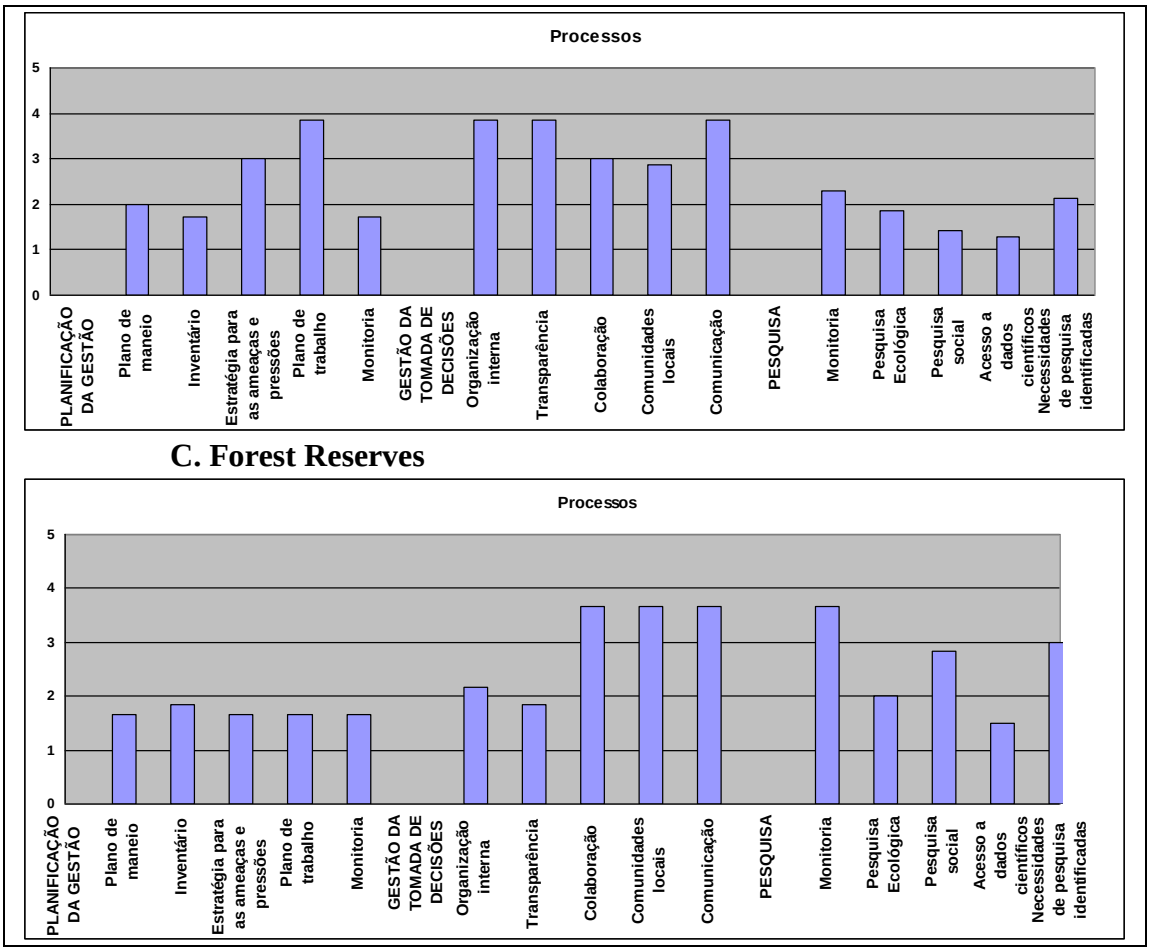


Picture 9. Inputs/Resources Average Rating in Conservation Areas

c) Processes

In relation to the processes that include management planning, decision making process, research, assessment and monitoring, the level is generally very low in all the CA categories. There are differences between CA with a similar standard to other parameters, where the National Parks are in better condition than the Game Reserves and these, major than the Forest Reserves. For this situation, it is suggested once again, a need for an intervention on Forest Reserves, where processes are practically paralysed.





Picture 10. Processes Average Rating in Conservation Areas

While the decision making process is generally clear, transparent and homogenous among different categories of CA, the management plan has a tendency to be a differing element. The lack of management plans, inventories, and even the work plan in the Forest Reserves is contrasted by the most favourable situation in the National Parks and in the Game Reserves, which have, at least, a work plan and an action strategy in order to mitigate threats. Research is deficient in all the CA, highlighting the lack of either ecological or social investigation programmes, as well as monitoring of the long-term processes.

Processes needing major attention are pointed out the inventories of cultural and natural resources, incorporation of the research outputs and monitoring in planning and regular access to the research data and recent scientific guidelines.

4.3.4 Outputs

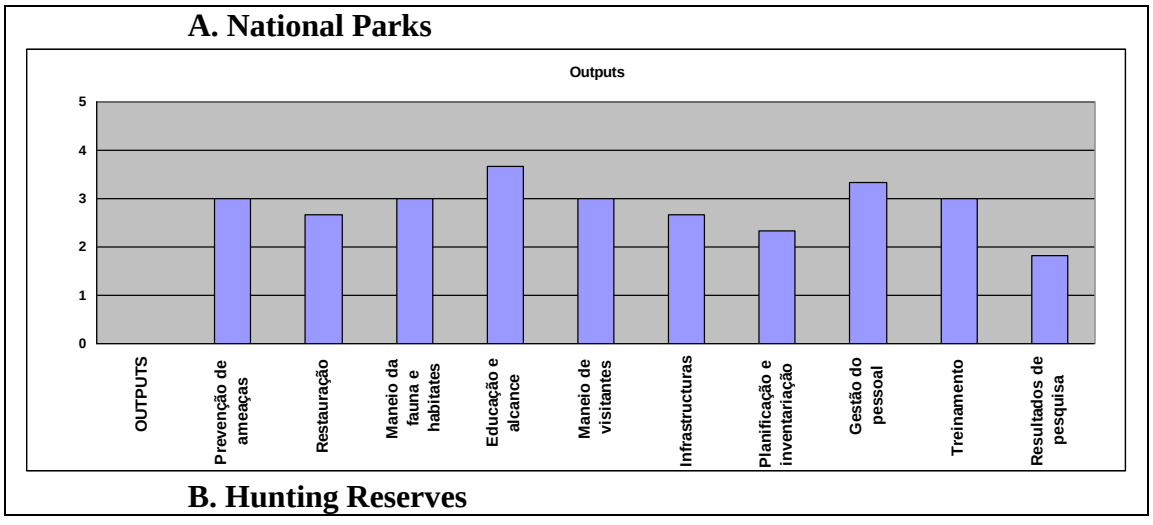
The outputs of the activities in the last two years show that less was done to reduce threatens and pressures within the CA *(picture 7).* This observation is coherent with the

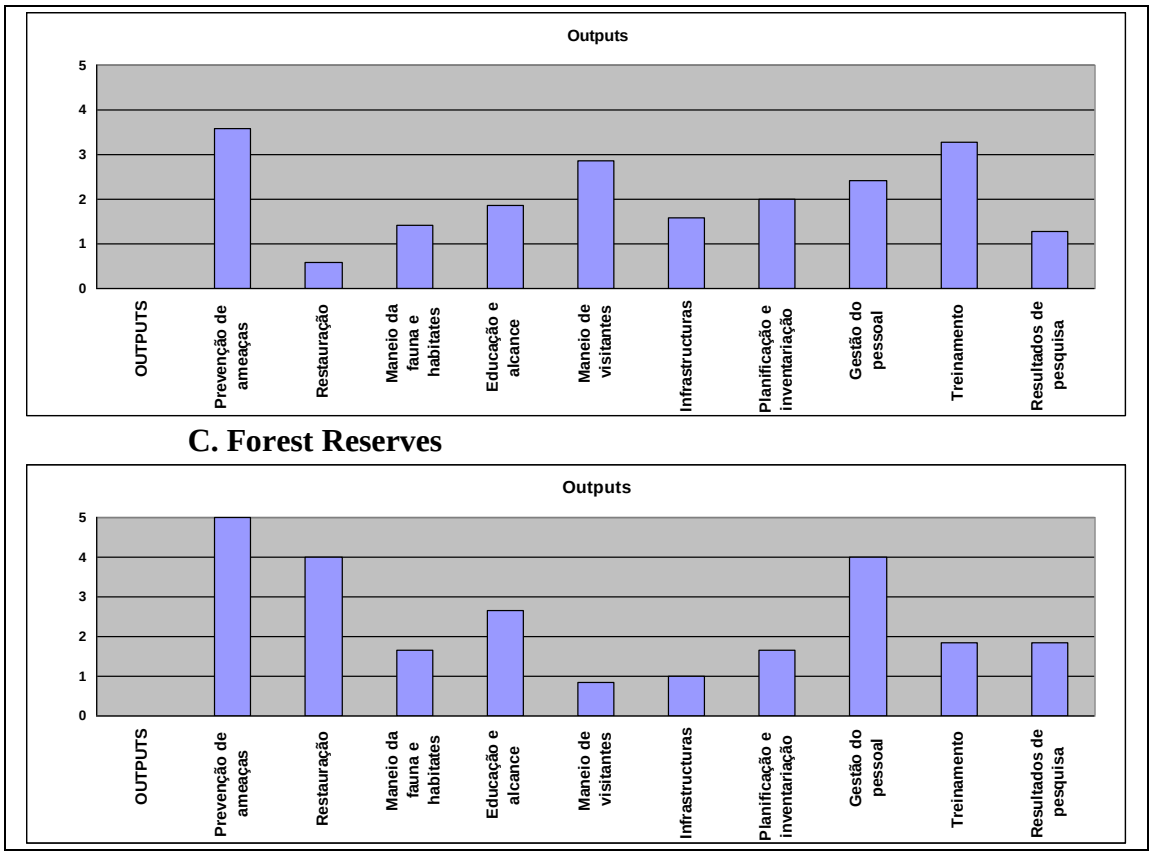
level of resources given for functioning an investment of the CAs. This is a very important finding as it clearly highlights how the present pressures can continue in the next years, because less job is being done than what is meant to be in order to reduce this level. The low level of the research and monitoring outputs is once again highlighted, as well as the poor development of the infrastructures and the restoration of the place and mitigating actions. However, it is encouraging to observe that a positive work has been undertaken for divulgation and education actions in the community, as well as monitoring, supervision and assessment of the employees. These activities may have impact in a medium-long term, if they are capitalised, followed up and supported with the improvement of other actions evaluated with low performance.

4.3.5 Conservation Areas System

The RAPPAM approach includes a section of the system assessment of CA as a whole, including the particular design of the CA network, the CA policies and the ambit of those policies. This analysis may enable to identify common critical points that affect the employees of the CA. A global assessment on the Conservation Areas System shows a deficient situation with a set of inadequate policies and a less favourable political environment for the protection of bio-diversity. Next, will be the presentation of CA network assessment in its respective components.

The overlapping of functions in different State owned Companies (MITUR, MINAG, MICOA) contributes somehow to a less clear situation on the role of the CA's and the responsibilities of each institution in the conservation process. The strategy and the Action Plan for the Conservation of Bio-diversity (MICOA 2003) already indicated that lack of co-ordination among different institutions, associated with lack of clarity of mandate of the same, and their responsibility to assume determined activities, is one of the suffocating lumps for the implementation of the strategy.

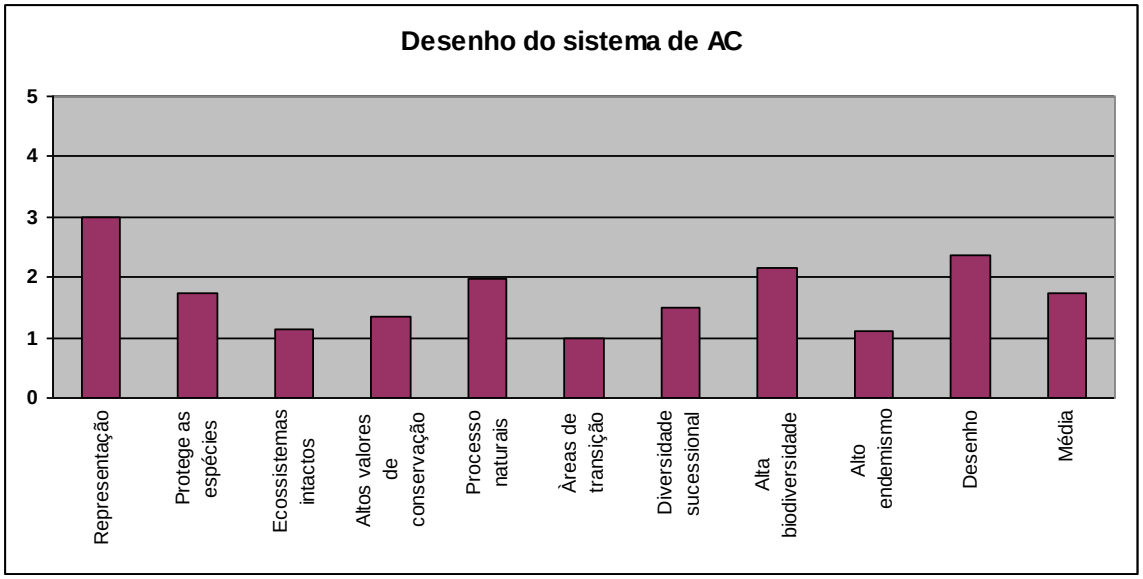




Picture 11. Activity Outputs Average Rating in Conservation Areas

a) Design of the Conservation Area Systems

In general, the design of the CA's is not satisfactory. The rating for the majority of the components of CA network design is negative (Picture 8), suggesting a need for intervention that enables the CA design. The set of CA's does neither properly represent an intact ecosystem and the transition zones, nor the zones with the high level of endemics. Despite the fact of introducing the concepts of a biological corridor within the Conservation Areas across the borders, this concept is still deficient for the CA's without international connections. Issues concerning Gorongosa National Park and the Reserve of Marromeu have already been mentioned. Due to deficiency of their design, some important elements have been left out (*Serra da Gorongosa* and the *Ramsar Area* of the Marromeu complex respectively). On the other hand, we understand about existence of a set of rare species (plants and animals) or under extinction danger that could be protected, but they are not included in the CA's system. The CA's do not represent gradients of successive states, many of them representing less altered natural ecosystem, but, at the same time, with a strong presence of people that put the conservation process in danger. At same time, there are elements considered of high biodiversity and endemism that are not protected or are misrepresented in the CA system. For instance, the areas of marine conservation, which still represent a little of marine biodiversity and important elements, such as the Swampy Coast and the Sand-hill Coast in the Central and the South region of Mozambique.

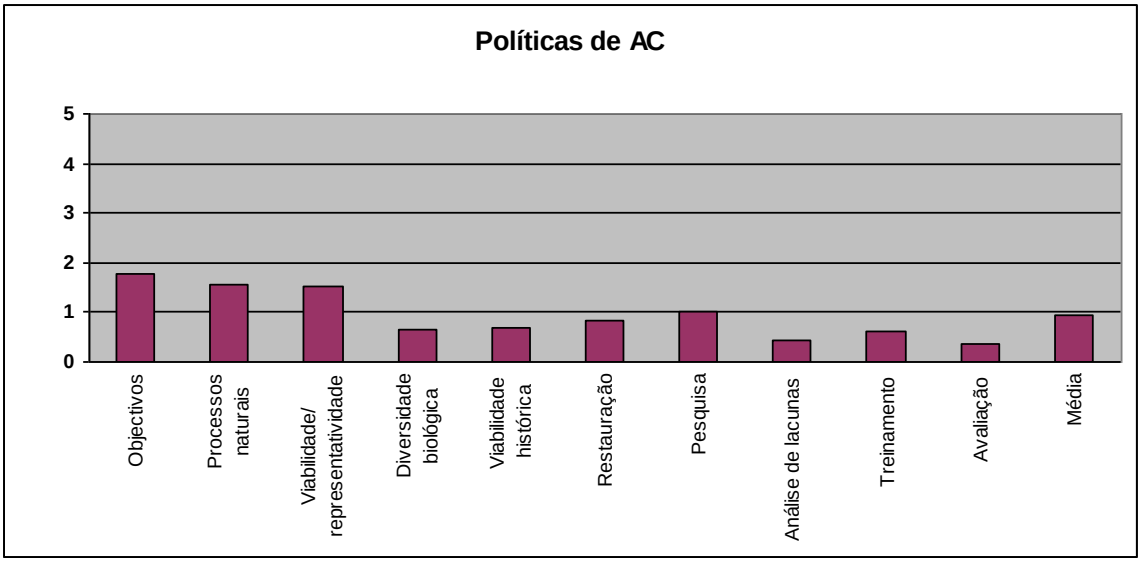


Picture 12. System Design Assessment in Conservation Areas

b) Policies of the Conservation Areas

The policies of CA's are completely inconsistent with the conservation needs *(see item 13).* The lack of a National Strategy for Conservation Areas has been indicated as being the cause of a less favourable scenario for conservation. We believe that, the policies presently under elaboration process, may change the CA's policies.

The supervision of functions in the different Governmental institutions, the lack of clear definition on the role of the communities residing in the CA's and the poor involvement of NGO's has been a basis of the discussions about the CA's national strategy. It is important to notice that the National Strategy for Biodiversity Conservation (NBSAP) has been worked out and approved in the ambit of the agreement of Biological Diversity (MICOA 2003). Therefore, it does not appear to have concrete actions for its implementation. Most of the shortcomings of policies as referred to in the assessment are recommended for implementation. The poor monitoring and evaluation of the CA's management plans, the lack of bio-diversity inventories, the regular revision of CA's system, the continuous research on the critical issues and others, are particularly critical elements that have weakened CA's policies.

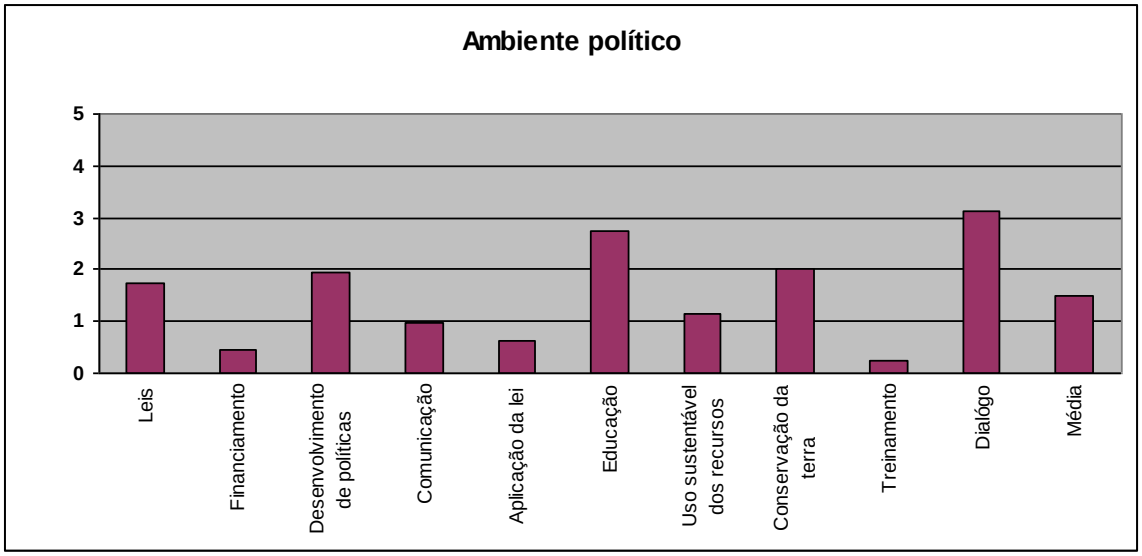


Picture 13. Policy Assessment in Conservation Areas

c) Political context

Notwithstanding the fact that conservation policies are not generally favourable, it is important to notice that the dialogue about conservation between the State and NGO's and other civil organizations is positive. However, this dialogue has a lot to improve in order to become effective the CA's management. Another important aspect is the (formal and informal) education that shows positive signs and promises to establish solid and lasting basis on the environmental issues.

Some negative aspects that should be taken into account include inadequate and unsafe funding, deficient application of the existing laws, inadequate training of the CA's staff. The laws are considered inadequate and omitted in some cases, propitiating a less favourable environment to ensure conservation. The lack of a plan for land use as well as the lack of specific regulations for CA's are indicated as the main deficiencies creating environment for land use conflicts, superposition of interests, etc.

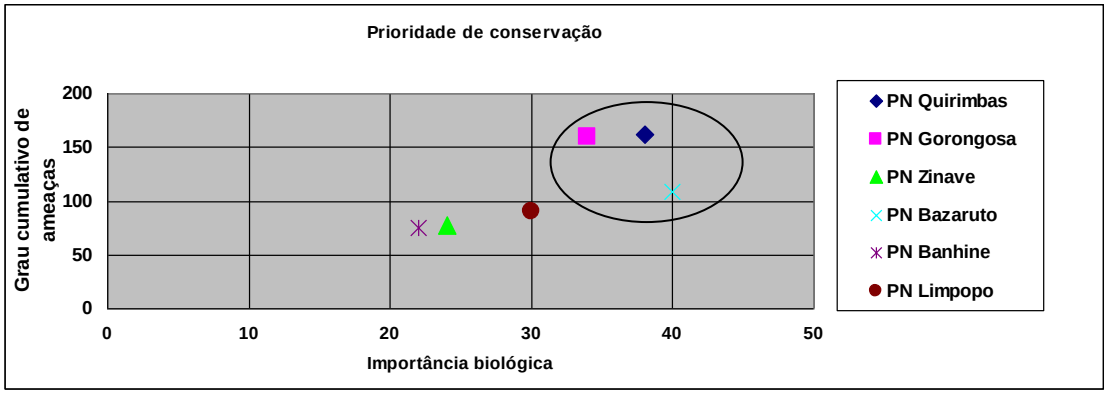


Picture 14. Assessment of the Political Context of the Conservation Areas System

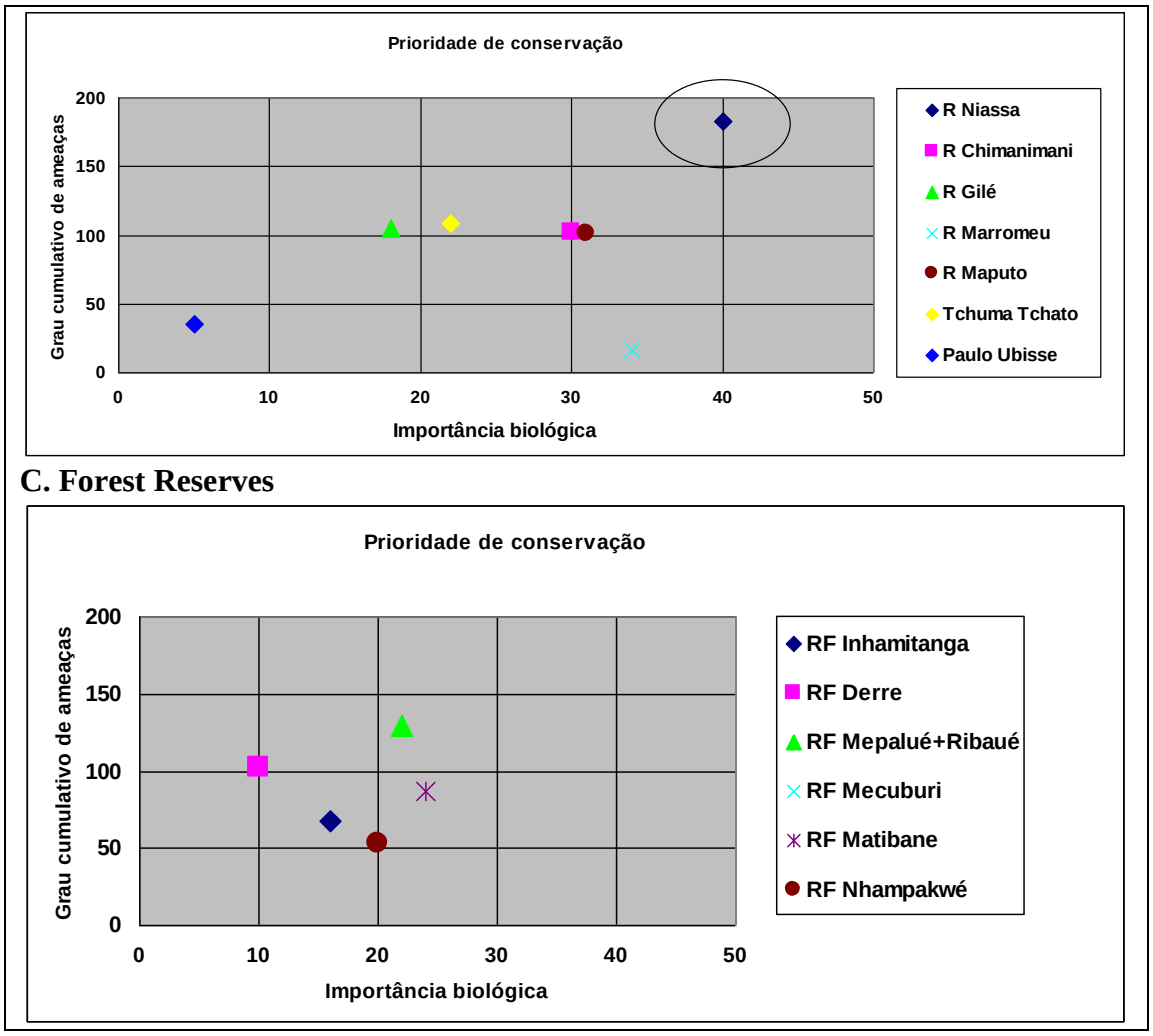
4.3.6 Priorisation of the Conservation Areas

A joint analysis on the biological, socio-economic importance and the level of threats, suggests the establishment of priorities among the CA's (Picture 15). So, the Quirimbas National Park, Gorongosa National Park and the Niassa Reserve are presented in one group that may be considered of a high priority, either in socio-economic or in biological point of view. It has previously been mentioned that these CA's contain a high biological and socio-economic importance.

A. National Parks



B. Hunting Reserves



C. Forest Reserves

Picture 15. Sócio-economic and Conservation Priority of Conservation Areas

On the other hand, there is Marromeu Reserve and Game farm *Paulo Ubisse*, whose priority is low. It is to notice here that the low priority does not mean the absence of action need, but it is defined in terms of biodiversity loss risk, due to the threats and pressures and, at same time, the (biological or socio-economic) importance represented by CA's. It has previously been shown that, as the geographical localization of Marromeu is put in a situation of apparently low risk, how could the private management model of Game farm *Paulo Ubisse* Game farm *Paulo Ubisse* represent reduction of threats.

Finally, the big CA group including all the Forest Reserves and the Reserves of Maputo, Gilé and Tchuma-Tchato can be considered as moderate priority, requiring naturally some attention and effort of activities in such a way to ensure protection of biological and social value therein. Generally, it is noticed that Forest Reserves present more socio-economic importance and the intervention in these CA's should consider this aspect with a special prominence.

Tabela 1. Giving Priority to the Conservation Areas

Level of Priority	Conservation Area Category		
	National Park	**Hunting Reserve**	**Forest Reserve**
High	Quirimbas Gorongosa Bazaruto	Niassa	
Moderate	Banhine Zinave Limpopo	Gilé Maputo Tchuma-Tchato	Mupalué+Ribaue Derre Mecuburi Nhampakwé Matibane Inhamitanga
Low		Paulo Ubisse Marromeu	

5. Findings/Conclusions

One of the shortcomings for implementation of the RAPPAM approach was the lack of information about biological importance. This lack has been denounced by the questionnaire itself, which showed lack of (either ecological or social) investigation programmes, and the lack of access and dispersion of the little existing information. It is important that the conservation strategy takes into account this aspect and seeks mechanisms to establish connections with the national and international scientific community.

Within the FR, where the initial work has already been one, it covered only community sensitisation and elaboration of management plans. There's a need to ensure the implementation of these plans through an allocating process of (human and financial) resources, and take advantage of the momentum, when the local communities are sensitised about the need to co-operate in the conservation.

Poor allocation of funds for the functioning of CA's has been indicated as one of the major hindrances of CA's. The general list of inputs is very desolate, but we believe that this situation may improve with the financial decentralization for the CA's initiated in 2004. As a sign, there are some CA's still receiving few resources and they now show some performance. But, others that do not completely receive any resource, show a total absence of action.

6. Recommendations

During this assessment, several recommendations have been presented in reply to the weak and strong points identified in the assessment. For those, who are aware of the situation of CA's in Mozambique perhaps the following recommendations presented are

not new. Previous studies on the CA's produced recommendations and identified strategic actions repeated in this assessment. Therefore, it is important to notice that, with RAPPAM approach it was possible to formalise these recommendations, once their importance was confirmed again, using participatory methods.

It is also important to indicate that Costa (1998), Biodiversity Conservation Plan and Strategy (MICOA 2003), Sitoe and Enosse (2003), Muller at al (2005), where the management plans of CAs have been worked out (see DNAC 2004, MITUR 2003) among other documents, present specific details of the CAs and the action is needed. From the recommendations given on these documents, few of them had a follow-up. So, the participants of the assessment workshop stressed the need for implementing the outputs of the undertaken assessments.

The following recommendations were derived from the participants based on the assessment results. These have been grouped into different categories so as to facilitate their references.

A. About application of RAPPAM approach

- Repeat the assessment within five years to compare the cognition of the present threats and pressures (follow-up and monitor)
- Undertake detailed assessment at the level of each Conservation Area as a way to improve the level of research about CAs considered as priorities (starting with some pilot areas);
- The man-animal conflict was underestimated in the assessment, perhaps because of its complexity. The understanding of the participants is that man-animal conflict is more serious than the indication of the assessment results. Therefore, this is an issue that should carefully be addressed.
- In the assessment, droughts and floods have not properly been presented. The participants remained with an impression that the period considered in the approach (five years) is very short to "understand" the effects of those processes. Nevertheless, they believe that these phenomena may have a negative effect in the conservation process.

B. About the participatory management strategy and community involvement

- The conversion of land use into different forms that conservation is not linked to the number of inhabitants residing in the conservation areas - a strategy to deal with this issue should be adopted;
- Need to develop strategies to fight against forest fires (with community involvement). The national strategy for forest fires, which is being prepared should directly mentioned the situation of forest fires in the CAs;
- The distribution and planning of the land use and the settlement of CAs may contribute to reduce the man-animal conflict and the conversion of land use.
- The cohabitation issue men/conservation area is essential for success of biodiversity conservation, but the present legal list does not clarify anything about

the existence of villages, farms and cattle within the CAs. It is necessary that this issue be taken into consideration as a way to reduce threats in the CAs.

C. About improvement of the CAs management efficiency

- Design of specific strategy for elephants and other animals that cause man-animal conflict (review the strategy of man-animal conflict developed by DNTF and the WWF strategy for the North of Mozambique.
- Ensure the implementation of the CAs management plans and establish mechanisms that can reinforce laws and regulations in force;
- Ensure follow-up and establishment of Matibane Conservation Area;
- Major attention should be dedicated to the processes to ensure ecosystem maintenance and key species;
- Ensure regular assessments of the management plans for the conservation areas.

D. About investigation and monitoring of the CAs

- Work out investigation programme for short, medium and long term, in co-ordination with the investigation institutions;
- Give priority to research needs and create an information reservoir produced to ensure sharing of information.

E. About representation of the important ecosystem in the CA's

- The Ramsar place of Marromeu is not represented in the conservation areas. Its inclusion in the Marromeu Reserve could be an initial step to give value to this world property.
- Mention the forest reserves in the biodiversity conservation context;
- It is necessary to design again/review in the conservation areas system, incorporating the transition areas and biological corridors, marine corridors and coastal corridors;
- Identify areas for conservation of special species, such as the endemic species and/or under extinction danger.

F. About capacity building of staff and improvement of working conditions

- Establish and fund a technical capacity building programme, CAs management and monitoring;
- Work out policies of incentives to retain the staff in the CAs;

G. About Conservation Areas Policies

- Reinforce/review the institutional involvement in the conservation areas, as well as the management tools and the tutelage organs. Find a mechanism that can ensure implementation of the conservation actions;
- Create suitable and feasible mechanisms to ensure implementation of policies

(adjust the law to the implementation or contrary);

- Review fitting of the conservation areas in the IUCN categories;
- Sensitise the judicial sector to point out effectively the conservation activities;
- Accelerate development of legal tools to facilitate communication with judicial sector, such as the case of designing statutes for CAs and supervisors;
- Create mechanisms to ensure transparency in decision making on conservation actions;

H. About inputs and resources for functioning and investment in the CAs

- It is urgent to design a strategy of sustainable funding to ensure the implementation of the conservation activities (raise funds to ensure the start of the conservation activities);
- Review the system of using the revenues generated from the conservation areas (transparency);
- The CAs that do not produce funds are those that presently need more funds. Thus, a mechanism should be found out to increase financial availability for these CAs.

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Annexes

Annex 1. Workshop agenda

Preliminary agenda for the RAPPAM Application Workshop for Assessment of the Protect Areas in Mozambique
Hotel Tivoli, 10 - 12 July, 2006

Monday, 10th July 2006
Morning Session

09:00 - 09:15 Welcome and opening session (DNAC/MITUR);
Self-introduction (each participant introduces him/herself)

09:15 - 09:30 The main challenges in the protected areas and the RAPPAM objectives (DNAC/MITUR)

Self-introduction - by the participants

09:30 - 10:30 Presentations
- The general list of the protected areas in Mozambique, including land and sea components (Almeida Sitoe and Helena Motta)
- The RAPPAM approach - its application and utility (Alexander Belekurov from WWF International)

10:30 - 11:30 Break and Picture of the group

11:00 - 11:30 Discussions

11:30 - 12:15 Explanation about organization and group work

12:15 - 12:30 Group work: Pressures and Threatens (question 2 from the questionnaire)

12:30 - 13:30 Lunch

Afternoon session

13:30 - 16:00 Group work: Pressures and Threatens

16:00 - 16:15 *Break*

16:15 - 18:00 Compilation of outputs

Tuesday, 11 July, 2006
Morning Session
08:30 - 09:00 Presentation in plenary of the group work outcomes

09:00 - 0930 Discussions

09:30 - 10:00 *Break*

10:00 - 12:00 Group work: Financial Resources; Planning processes; Decision making; Research, Assessment, monitoring and outcomes (questions 12 and 16 from the questionnaire).

12:00 - 13:00 *Lunch*

Afternoon session

13:00 - 14:30 Group work: ecologic, socio-economic context and vulnerability of the protected areas (questions 3 and 5 from the questionnaire)

16:15 - 18:00 Compilation of the outcomes

Wednesday, 12 July, 2006

Morning session

08:30 - 09:00 Plenary: Presentation of the group work outcomes

09:00 - 10:00 Discussion

10:00 - 10:30 *Break*

Preliminary conclusions

10:30 - 10:00 Group work: Discussion about the protected areas system: establishment and policies (questions 17 and 19 from the questionnaire).

12:00 - 12:30 *Lunch*

Afternoon session

13:00 - 14:30 Recommendations. Priority of the recommendations.

14:30 - 15:00 Assessment and closing of the workshop.

Annex 2. List of Participants

No	Name	Origin
1	Abel Nhabanga	DNAC/MITUR
2	Alessandro Fusari	ACTF/MITUR
3	Alexander Belokurov	WWF International
4	Almeida Sitoe	UEM – Facilitator
5	Aly Awasse	SPFFB of NAMPULA
6	António Reina	FNP
7	Arlete Macuácua	DNAC/MITUR
8	Armando Nguenha	National Park of Banhine
9	Atanásio Jujumane	Marromeu Reserve
10	Baldeu Chande	Niassa Reserve
11	Celso Inguane	UEM
12	César Augusto	Quirimbas National Park
13	Chade Dear	Montana University USA
14	Cidália Mahumane	DNAC/MITUR
15	Cornélio Ntumi	UEM/Biology
16	Cornélio Tchuma	Tchuma Tchato/TETE
17	Eurico Agostinho	National Park of Banhine
18	Felismina Langa	DPTUR/Gilé Special Reserve
19	Gilberto Vicente	Great Limpopo National Park
20	Helena Motta	WWF MCO
21	Iracema Maiópue	DNAC
22	Isabel Macie	DNAC
23	Ivone Semente	ACTF
24	Jorge Manjate	SPFFB Zambézia
25	Julieta Lichuge	DNAC
26	Madyo Couto	ACTF
27	Marcelino Foloma	DNTF
28	Maria Augusta	SPFFB de Sofala
29	Maria Julieta	IUCN
30	Momade Nemane	Especial Reserve of Maputo
31	Paulo Barros	DNTF
32	Rafael Funzana	Parque Nacional do Bazaruto
33	Raimundo Matusse	DNAC
34	Ricardina Matusse	National Park of Zinave
35	Rito Mabunda	WWF MCO
36	Roberto Zolho	National Park of Gorongosa
37	Rosa Cesaltina	MICOA
38	Sansão Bonito	DNTF/MINAG
39	Simão Balane	Reserve of Chimanimani MANICA
40	Sónia da Silveira	MICOA