THE MATA ATLANTICA BIOSPHERE RESERVE (RBMA): AN OVERVIEW

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1. INTRODUCTION

The Atlantic Forest Biosphere Reserve covers around 94.000 sqkm,along 3.000 km of the Atlantic Coast, covering 14 different Brazilian states.(see map 1). Although the remaining Atlantic Forest (some 10 % of the original vegetation) is rather homogeneous, the social diversity is very high as it includes large urban centers (Rio de Janeiro, Florianopolis, Sao Paulo,etc) and also many small traditional communities of peasants, small-scale fishermen and forest extractivist groups.

This paper aims at giving a brief description of the current status of the Atlantic Forest Biosphere Reserve (RBMA), emphazising the prevailing conservation and resource use patterns by existing traditional population. It points out also orientation of applied research aimed at a more intensive, sustainable use of the biodiversity in order to provide a better livelihood to the local population , living inside the proposed core areas and in the buffer zones. This paper is not concerned with large urban population living in capital cities of States, such as Rio de Janeiro, Florianópolis, São Paulo,etc...

It should be recalled that in the case of RBMA, in many of the core areas, which are existing restrictive protected areas,(national parks, ecological reserves,etc) there are

traditional dwellers, such as “caiçaras”, “jangadeiros (raftfishermen), “açorianos”, mainly small-scale fishermen, peasants and extrativist populations. These communities represent an important cultural diversity and because of their way of living, were, to a great extent, responsible for the conservation of the remaining Atlantic Forest, before the establishment of protected areas. On the other side, particularly along the coastal areas, the establishment of protected areas over their traditional territory has hindered land speculation by outsiders and the expulsion of these traditional communities from their ancestral land. However, many of these communities suffer from the constraints imposed by existing restrictive protected area legislation as traditional agriculture, fishing and forest extrativism are not allowed. Because of these constraints, conflicts are increasingly numerous and serious. However,there is a growing awareness by some social groups that this scattered population should stay where they are as they can greatly contribute for the conservation of the remaining Atlantic Forest. These traditional communities depend almost entirely on the traditional use of renewable natural resources and on biodiversity. They have a deep traditional knowledge of the natural cycles, of the resources of the forest, mangroves and estuarine areas.The same pattern of use of natural resources and traditional management practices also exist within caiçara communities living outside protected areas.

This paper recognises the role of the Biosphere Reserve in taking into account the importance of maintaining the biological as well the socio-cultural diversity. These communities, however, should not be seen in a static way, as they are continuously receiving the influence of the Brazilian urban-technological society. It is necessary to reorientate existing applied research in order to devise more intensive and sustainable use of biodiversity aiming at improving the living conditions of these traditional communites.This is a responsability not only of the Government, but also of research institutions, Ngos and of the communities themselves. Some new experiences , such as extractive reserves are in the process of being established along the coastal region of the Biosphere Reserve.and can be a focal point for the research and implementation of new technological approaches aiming using biodiversity in a sustainable way. .

This paper advocates that, although it is important to improve conservation in the existing protected area, it is also . essential to devise new ways and means of conserving

and using the high biodiversity of the Atlantic Forest in a sustainable way, particularly by the traditional groups in protected areas as well in surrounding areas.. It is argued that there are already legal mechanisms to improve conservation in the restrictive protected areas in Brazil.The Biosphere Reserve, however, can offer an alternative on how to solve conflicts of use of the biodiversity, reinforcing particularly the role of the traditional people in the conservation process.. In this aspect, the concept of BR can highly contribute to the on-going discussion in Brazil on how to improve the existing system of protected areas.

Given the large extension of the RBMA (a stretch of forest over 3.000 km), this paper concentrates on southeastern part , from the southern coast of Rio de Janeiro to Paraná, where most of the remaining Atlantic Forest still exist and where most of these traditional communities, particularly the "caiçaras" live.

2. THE PRESENT CONDITIONS OF THE ATLANTIC FOREST

The Atlantic Rain Forest is one of the seven moist forest areas of the Neotropics and the second largest after the Amazonian Rain Forest. This forest covered, at the time the colonisers arrived, in the XVI century between 1 million and 1.5 million square km.Today the remnants of the forest are around 94. 572 sq skm, or 10 % of the original area. The colonisation of Brazil took place along the coastal forest and the human impact started at the discovery, with the extraction of the Brazil wood for export (Caesalpinia echinata) used for dyeing, due to its red color. In the XVII,the valuable wood was already used for ship building, particularly in the Northeast coast. The first economic cycle for export was based on sugar- cane plantation along the coastal range of the Atlantic Forest, first in the Northeast and then in the southern provinces.In the XIX the devastation continued when coffee was planted in large areas of the southeastern sector (Rio de Janeiro and Sao Paulo), continuing afterwards to expand deforestation in the State of Paraná in the first decades of this century .Large scale deforestation for logging and cocoa planting continued in the Sixties in the Southern part of Bahia, when the highway Br 101 was open.

In addition to that, the first towns were erected along the 3.OOO km of the Atlantic Forest in colonial times and today,over 6O% of the 15O.000.000 Brazilians live in that region, particularly along the coast(see Map 2). The main cities, such as Sao Paulo, Rio de Janeiro, Salvador, Recife are located in the domain of the forest. Urban expansion since the Thirties caused additional deforestation for firewood and charcoal making.

Additional environmental degradation came from the rapid industrialisation of the coastal areas, as many of the most polluted industrial centers of the country , such as Cubatao(SP) are also located in the Atlantic Forest.

When von Martius, in 1837 described the forest as Dryades, its northern limits were at the level of Cabo Sao Roque, in the extreme northeast of Brazil .Nowadays,its actual northern limits are more than 1.000 km to the south, in Bahia State. The southern limit is situated in the north of the State of Rio Grande do Sul (see map 1)

. In general terms, the remains of forest are still continuous only from Rio de Janeiro to the south,with a width of some tens of kilometers, compared to the 15O km of the previous vegetation. From Rio de Janeiro to the north, the forest is discontinuous and in some northeastern states it has already disappeared.(Por, 1992).

2.1.. DIVERSITY OF SPECIES AND ECOSYSTEMS

Contrary to the Amazonian Rain Forest,Mata Atlantica is rather homogeneous and as one proceeds from the north to the south there is a mild and gradual change in the biotic composition. However, several types of ecosystems are found, in addition to the rain forest, ranging from coastal islands,mangroves to Araucaria forest in Paraná and Santa Catarina.

As Por (1992) points out, a remarkably similar climatic regime, a long and common geological history as well as t he similar type of soils are presumed explanation of this paradox.

The Atlantic rain forest has a very high precipitation rates, ranging in the northern part from 1.800 to 2.000 mm and in the southern part from 2.000 to 4.500 mm per year.Temperatures are also stable, the annual temperature average being 23-25 C in the northern part and 21 C in the south(a little lower in June-August)

a) **Flora diversity in the various ecosystems**

Rain Forest

Compared to the Amazonian Rain Forest, the Mata Atlantica is a much older formation. Due to the existence of fairly steep slopes, where light is more available,trees are lower and trunks are thicker. The general appearance of this rainforest is thicker and woodier than the more majestic Amazonian Rain Forest (Por,1992)

The Mata Atlantica is a typical neotropical forest, and despite the fact it extends well south of the Tropics of Capricorn, it maintains a diversity of tree species comparable to the other Neotropical forests. The Mata Atlantica is considered to have the maximum number of species in Brazil (Martins, 1971). There is a predominance of the Leguminosae, followed by Bignoniaceae, Lauraceae, Sapotacea.

There are a number of genera which are endemic to the Rain Forest, such as : the palms Arecastrum and Bactris; Baccharis (Compositae), Cabralea and Cryptocaria (Lauracea), Sloanea and Schinus, Tibouchina. The Atlantic and the Amazonian Forest have 156 genera and 5OO species in common (Rizzini,1979: Bigarella and Andrade- Lima, 1982). Species level endemism in the Atlantic Forest is very high: 53.5 % (Mori et al. 1981). particularly in the family of Chrysobalanaceae.

Many of these species are used by local populations for house construction, tool making, construction of dug-out canoes, medicine,etc

The non-arboreous vegetation is as diversified as that of the threes: lianes, epiphytes, shrubs, arborescent ferns and bamboos, grasses and mosses and lichens. The epiphytic flora of Mata Atlantica is well known for its richness and among the main taxa

are Bromeliacea,Gessneriaceae, Piperaceae, Orchidaceae, Araceae,Heliconaceae, Pteridophyta.

The Serra do Mar in the southeastern Brazil is the main area of Bromeliacea in Brazil, beeing more diversified than in Amazonia.There are many endemic genera in Southeast Brazil, such as Dyckia, Cryptanthus and Nidularium.Brieger (1969) also considers Mat Atlantic the richest area in orchids in Brazil.

The restinga dune forest: is a vegetal formation which grow in Holocenic sands, from the sea to the foothills of the Serra do Mar. In the Northeast, the restinga develops on two formations:" the tabuleiros" of the Barreiras formation and the seaward dunes. In the South, there are the sand dunes forming litoral cordons, in which low islands and lagoons can be found. (Araruama, Ilha Comprida). The most characteristic restinga vegetation is formed by thick arbust and small tree thicket, with many epiphytes, especially bromeliads. The rich resting vegetation has been increasingly destroyed by the expanding urbanisation of the coastal area.

M**angrove**:**and estuaries**. There are inumerous lagoons and estuaries along the coast area of the Atlantic Forest, and they represent essential resource units for local traditional population, particular for fishing. Seaward from the resting, mangrove forests are accompanying the Atlantic coast, where there is a certain protection from wave action. The mangroves accompany the belt of the Atlantic Forest from Santa Catatonia in the South to Rio Grande do Norte. Avicennia schaueriana, Rhizophora mangle and Laguncularia racemosa are the main species of the mangrove areas. This ecosystem is strictly protected by law, but deforestation take place in some areas, particularly for house construction,logging for construction. Traditional population also uses the resources of this ecosystem, particularly through fishing of several estuarine species, particularly fish , crabs, oyster, mussels. They also use mangrove trees for dying of nets,house construction, medicine, etc.

Alpine grassland: also called “campos rupestres”. They appear at high altitudes of Serra do Mar, where the forest recedes and spots of alpine grassland appear. The core area of these extended inland alpine grasslands is the Serra do Espinhaço, in Minas Gerais, and

extends into the State of Bahia. Mountain plateaus of over 1.OOO m are covered by an exuberant and highly specific grass and bush vegetation

"**Matas Ciliares"**: gallery forests or riverine forests are narrow forest belts along he rivers, natural refugia for the more mesophilic biota, as the rivers cut their their way through the increasingly arid Planalto. The gallery forests have a rich fauna, which forms a natural and smooth extension of the rain forest fauna. These forests serve as pathways for the area-expansion of the terrestrial animal world Along such riverine forest connections the two-way faunal transition between Western Amazonia and the Mata Atlantica became possible(Por, 1992)

The Araucaria Forest

Araucaria pine (Araucaria aungustifolia) is an extension of the Atlantic forest on the high grounds in the cooler climates of Paraná and Santa Catarina and it was almost entirely cut down until the 70's.

Rivers

Rivers of Mata Atlantica: are closely dependent on high pluviosity of the area and have a low pH, low nutrient content, and because of the closeness of the ocean, a relatively high percentage of chloride and natrium ions. There are the "clear water rivers"which originate in the high altitudes of Serra do Mar. These streams are an intricate network of torrents and waterfalls which sometines, after heavy rains, cover practically the whole of the forested slopes. These streams contain many endemic genera.The black flies (borrachudo) Simulium pertinax are a known nuisance for the tourist and local population along the coast. There are also the "black waters"rivers, where the pH is even lower than the " clear water rivers". The ichtyofauna of the clear water rivers is similar to the typical fish fauna of the Paraná system and the black water rivers have a specific fauna.

b)**.Fauna biodiversity**

The Atlantic Rain Forest is also known for its innumerous species of animals and birds. The area is rich in Anura, the dominant families of frogs are the Hylidae and Leptodactylide. Lynch (1979) analysed 183 Southeast Brazilian species of forest frogs of which 168 (nearly 92 %) are endemic to the Atlantic domain. This falls very little short of the whole area of Amazonia and the Guyanas, which are housing 202 known species.

The Mata Atlantica contains 15O species of reptiles, of which only 43 are shared with Amazonia and the endemism of the reptile fauna is very high. Rodrigues(1990) listed 5O lizard species in the Atlantic Forest domain, of which around 3O species are endemic .It also harbours several species of endemic turtles, many of them living in the mountain streams.

The Mata Atlantica contains 3O endemic general and 16O endemic species of birds. According to Haffer,(1974) and another calculation (Cacraft, 1985), there are 214 endemic species and subespecies. Among the ground living forest birds, the Tinamidae and Cracidae are very important. From among the 22 species of tinamus listed for the Brazilian fauna, 13 or 14 species occur in the Mata Atlantica, two of them being endemic.In the region, there are several endemic species of Amazona parrots:the red spectacled parrot A . petrei ("charao") and the blue-checked parrot A.brasiliensis ("chauá") and others.

The Serra do Mar is inhabited by a highly specialised and endemic fauna of forest mammals. Among the "xenarthran mammalians, the Bradypus torquatus (bicho-preguiça) is an endangered endemic species. The tapir, the peccaries and two species of deer, are also endangered by extensive hunting. The oncilla Felis tigrina (gato do mato) , a rare species of unknown distribution is among the Cites I species (Por, 1992). The rodent fauna is also characterised by high endemicity.

According to Kinzey (1992) there are 6 species of Mata Atlantica primates. Mono carvoeiro or " muriqui" (Brachyteles arachnoides) is the largest Neotropical monkey and also the presently most endangered species. Some of them live in Jureia Reserve.Leontopithecus rosalia (mico-leao) is also an endangered species. In 1991, a band of the black faced lion tamarin was discovered in the the southern coast of Sao Paulo.

Hunting is used by many traditional communities as means to get protein. However, these practices used by outsiders is responsible partial (in some cases, total) disappearance of mammals in Matt Atlantic.

3. DEFORESTATION

As it was mentioned earlier,the original extension of the Matt Atlantic was of a minimum of 1.OOO.OOO and a maximum of 1.5OO.OOO square kilometers. according to the Atlas dos Remanescentes Florestais do Dominio da Mat Atlantic(SOS Mata Atlantic) which was based on satellite pictures, approximately 95.000 square kilometers are characterised as forests of more than 90 % cover. Mori et al (1981),consider that for the Brazilian states of Bahia, Espírito Santo, Sao Paulo and Paraná the destruction has been between 65 and 93 %. According to the Mapa, Sao Paulo had in 1991 the largest reminiscent of the forests (34.448 of closed forests) On the other hand, Espírito Santo thant in 1968 had 3.650 km of dense forests,, in 1991 had only 784 sqkm of forest left. In the Northeast (map 3)The southern part of the state of Bahia was in 1976 still covered with 5.852 of forest, in 1991 the satellite picture showed only l863 sqkm of close forest.More to the north, Alagoas does not havy any dense forest left and Pernambuco only 15 km . In 1990 the Engenho Pitanga(sugar-cane mill) cut illegally 2.OOO ha of Mata Atlantic in Pernambuco.(Por 1992)

SOS MATA ATLANTIC, a non-governmental agency that monitors deforestation points out that in 1985, the total remnants of the Atlantic Rain Forest is 94.572 sqkm, divided per the following states (1994)

	Remnants in %	Area in 1985(ha)	Area in 1990(ha)	Deforestation in ha
Northeast				
	Remnants	Area 1985	Area 1990	Defor.1985-90
Ceará	4.0	-	-	-
Rio Grande Norte	12.7			
Paraíba	3.5	-	-	-

Pernambuco	4.6	-	-	-
Alagoas	11.4	-	-	-
Sergipe	15.3	-	-	-
Bahia	12.9	1.336.961	1.267.478	69.543
Esp.Santo	3.6	421.185	402.392	19.212
Southeast				
	Remants	Area 1985	Area 1990	Defor.1985-90
Rio de Janeiro	5.6	942.375	914.525	30.579
Sao Paulo	11.5	1.792.629	1.731.472	51.720
Minas Gerais	8.9	923.609	876.504	48.242
Southern States				
Paraná	26.8	1.646.818	1.503.098	144.240
Santa Catarina	18.5	1.627.206	1.731.472	61.720
Rio Grande Sul	8.8	706.023	656.717	49.450

Source:SOS:Mata Atlântica, 1994

The above mentioned work also indicates the total and the rate of deforestation in the various states from 1985 to 1990. Total deforestation was 536.480 ha or around 5% of lthe remnants in that period . The highest deforestation rate was in Paraná(144.240 ha) and Santa Catatonia (99.412 ha)

Graph 1

The graph below shows the remnants in 1985 and 1990, as well as those under protected areas, per State. As it can be seen from the graph, the largest remaining area under environmental protection is located in São Paulo, followed by Paraná, Rio de Janeiro, Minas Gerais, Santa Catatonia

4.THE MATA ATLANTICA FOREST PEOPLE

There are very few survivors of the indian population that inhabited the Mata Atlantica.The earliest human populations which left cultural signs were the "sambaqui`people". Sambaqui are large amounts of shell mounds, 5 to 20 ms high left by the primitive indian tribes in which bones and ceramics are found. The oldest "sambaquis are 7.000 years old and the youngest,around the first millennium BP. These indians lived primarily on fishing and shell harvesting. Inland and along the rivers, pre-ceramic tribes existent between 8.000-7.000 BP. In the first millennium BP also the Tupi-Guarani tribes originated in the north spread over the coast, dominating other tribes. By the time the Portuguese arrived the Tupi-Guaranis they were the major tribes, but old tribes such as the Guianases also subsisted.The most known tribes in the Matt Atlantic were the Carijós(South of Sao Paulo), Tupiniquins, along the Sao Paulo Coast; Tamoios in Rio de Janeiro, Potiguares in the Northeast.

Today there are some few communities of Guarani tribes living along the southeast coast, also migrating between Paraguay and the Brazilian shore.

Besides the indians, there is a rather diversified traditional cultures. In the Southeast coast, between Paraná and Rio de Janeiro, there are the "caiçaras", a racial mixture of Portuguese descendants, Indians and very little Negro contribution. The caiçara has a very marked dialect, taken particularly from the ancient Portuguese and Indians. They are slash-and-burn peasant s, still depending on a variety of manioc species, on small - scale fishing, handicraft and forest harvesting. Since the 5O's they have been expropriated from

their land and beaches by illegal or deceitful speculation of tourists and urban dwellers. In some areas of Cananéia, Iguape,Ubatuba and Parati, as well as in some islands they are still surviving. In most of the forested regions where protected areas were created,the caiçaras have their small villages and are suffering from the legal constraints imposed by parks and other restrictive protected areas.

Down to the south, in Santa Catatonia, also along the coast there are the " açorianos" from the Açores Islands that migrated to Brazil in the XVII century, being peasants and fishermen. In the Northeast,from Bahia to Rio Grande do Norse there are several villages of traditional small-scale fishermen, such as the "jangadeiros", raft fishermen.In the more mountainous areas of Serra do Mar, there are "caipiras", traditional farmers living in rather isolated villages.

However, the majority of the population living close to the remnants of the Mata Atlantic is formed by small, medium and some large urban concentrations, such as Florianópolis (SC), Santos (SP), Rio de Janeiro (RJ), Sao Paulo (SP), Vitória (S), Salvador. These urban centers are in continuous expansion, being a crucial threat to the forest and adjacent ecosystems.

5 .MAIN PROBLEMS

A)**Logging:**

According to Hueck (1972) there are 2.OOO species of trees in Brazil,of which 1/3 belong to the Atlantic Forest. Of the about 100 species of commercial importance, 30 were intensively extracted, a proportion superior to the Amazonian forests. Southern Bahia, for example, was the last important forested area to export large amounts of rosewood and palissander (Dalbergia spp.Aspidosperma polyneuron,peroba), "cedro"(cedrella),"pau-marfim"(Balfourodendron). "canela"(Nectandra).

Large forest tracks were cut not only for monocultivation for export (sugar-cane, coffee, cocoa), for charcoal making around the cities, but also for aforestation for paper

production. Thousands of ha. of Mata Atlantic were converted to "dead forests', made of eucalyptus and pinus, between the 6O's and 8o's, using fiscal incentives.

In recent years, deforestation has slowed down compared with past decades. Even successful experiences of replantation with native species started in some states. Victor (1975) predicted that between 1973 and 2.OOO the forest cover of the State of Sao Paulo would decrease from 8.3 % to 3.0 % and this did not happened. As Por points out: "Between conservation and reforestation, it seems that the seemingly fateful and irresistible disappearance of the Atlantic forest has slowed down."(1992,p.90)

As it was seen before, massive logging is not taking place in Mata Atlantic anymore, although is still a matter of concern, particularly in Paraná and Santa Catatonia. The are cases of clandestine sawmills operating in some areas.Palm heart (Euterpe edulis) is matter of concern, from Santa Catatonia to Sao Paulo, as this edible species is still taken from the forest. In Sao Paulo, most of the small-scale factories that canned "palmito"were closed. On the other side, recent Government decree authorises the commercialisation of planted palm-heart and for this purpose a specific authorisation is given to landowners who want to plant this species. ." Caxeta" (Tabebuia cassinoides), a light and fast growing wood in the swamps , which was highly priced in the quality pencil production was intensively used for industry until recently but now its extraction is limited.

b.Land speculation and rapid urbanisation

Associated ecosystems, such as "mangrove, restingas and coastal islands are still under threat as coastal land has a high price today.

In some areas, mangrove areas are cut to allow for house building, particularly for tourist purposes.This occurs particularly in the southern states. In the Northeast some logging is done in mangrove for making poles for construction, occurring particularly in Pernambuco, Paraíba and Alagoas. A particular threat comes from shrimp cultivation, as the Association of Shrimp Cultivators is pressuring the Government to allow the

construction of tanks in the mangrove, particularly in the Northeast.Overfishing by commercial/industrial fleet is also practised in many estuaries and mangroves in places such as Parati (RJ),Sao Paulo and Paraná

Some " restingas"are also under threat from house construction for tourists, particularly those associated with coastal lagoons, dunes and islands.Some "restingas"are under threat of rapid urbanisation in Rio de Janeiro (Marambaia, Sepetiba,etc) and Sao Paulo (Ilha Comprida). Along the coast of Santa Catarina, particularly near the capital Florianopolis there is a boom of tourist construction and it is affecting the fragile balance of coastal ecosystems in the region. Some dune areas are particularly under threat in Rio Grande do Norte. Also in some dune areas, industrial salt production has caused mangrove deforestation, as it occurred recently (1986) in the municipality of Galinhos (RN) where over 2.OOO ha of mangrove were destroyed, affecting also the livelihood of artisanal fishermen.

c)**. Road construction for tourist purpose**.

Although almost nothing of the primary forest cover is left in the Northeastern states of Pernambuco, Paraíba and Rio Grande do Norse, the approved plan to construct a tourist highway along the coast is matter of concern, as it may threat ecosystems such as mangrove,beaches and restingas and coral reefs.

d). **Industrial pollution**

The combination of aerial pollution and heavy rainfall in 1985 completed denuded the slopes of Cubatão of their original rainforest. The industrial complex of Cubatão (SP) is probably the most polluted areas of the world, situated only seven km far from the the forest reserve of Paranapiacaba. This pattern of land and resource degradation also occur in some other industrial areas closed to the Mata Atlantica. (Vitória, Rio de Janeiro) It has to be remembered that most of the industrial complexes are situated closed to the remnants of the Atlantic Forest. In the same area are located the most important harbours of the country,

particularly those built for mining export operations, increasing the danger of air pollution as it is the case of Vitória (ES)(See map 2)

6. RAISING AWARENESS AND CONSERVATION

Classic preservationist groups appeared in Brazil in the 3O's. The first Brazilian Conference for Nature Protection took place in 1934 and in 1937 the first national park was crated in Itatiaia in the Atlantic Forest.. A Forestry Service was established already in 1911, and in 1934 the first code regulating water and forest use was established. In 1954, the FBCN Brazilian Foundation for Nature Conservancy, the first organised non-governmental group was created. By that time, several Universities, particularly in the South organised courses and museums dealing with nature conservation.

In 1967 the Brazilian Institute for Forestry Development was created. In the Sixties, the main policy of IBDF was, however,the aforestation through fiscal incentives. In the Seventies,many tracks of Mata Atlantica were lost to become fields for eucalyptus and pinus homogeneous plantation. At the same time, partly to compensate these losses, several protected areas were created in Mata Atlantica and particularly in Amazonia, where important highways and large land settlement projects had started. In 1977, the Special Secretary of the Environment - SEMA was created at the Federal Level. Ecological stations, more restrictive protected areas and also APAs, (Areas of Environmental Protection),somehow similar to Biosphere Reserves were established.

In 1987 IBAMA - (Brazilian Environmental Institute) was established, putting together three main institutions: IBDF, SEMA and Sudepe (Superintendency for Fisheries Development. In 1989, a Ministry for the Environment was established, to which now belong IBAMA .

The Brazilian Constitution declared Mata Atlantica and the coastal area, together with Amazonia, Pantanal patrimony of the Nation. In 1985. The Consortium Mata Atlantica was established in São Paulo, to co-ordinate actions to further protect the Mata Atlantica in different states.

More recently, in February 1993, a federal decree (n.750) signed by the President has increased protection over ecosystems of Mata Atlantica. In its first paragraph it is forbidden the cutting of primary vegetation and of vegetation in advanced ecological stages of regeneration. At the same time, for the first time, it is mentioned that traditional population can continue using species of flora, for consumption, but it should be approved by environmental authorities. Uses of areas with secondary vegetation, in the first state of regeneration will be allowed, case by case, in those states which have more than 5 % of remnants of Mata Atlantica, which reduces considerably the number of states where it will be authorised. The details of this decree is being done state by state, pending on their specificities.

Along with the build-up of governmental institutions, new types of non-governmental environmental groups emerged, particularly in the Seventies, during the Military regime as environmental criticism was the only one tolerated by the Government.Some of them, such as Agapan in Rio Grande do Sul and SOS Mata Atlantica, established in middle 80's and a myriad of small conservation groups were also created to protected endangered species and habitats.

In 1992, a network of Ngo's working in the Atlantic Rain Forest(Rede de Ong's Matt Atlantic) was created, joined by 30 institutions. Now 122 institutions have joined the Network, covering 16 states. The objective is to assist monitoring deforestation, to interchange of information and projects, to establish joint regional strategies, to provide technical and informational subsidies to government institutions.

Some other joint activities are being undertaken at state-regional level, putting together Ngo's and Research Institutions dealing with some aspect of conservation and sustainable development. In the Mata Atlantica part of São Paulo (Vale do Ribeira and Litoral Sul) some 8 institutions have created a Council of Ngo's and Research Institutes to cooperate on research and project implementation in the field of sustainable use of

"caxeta"(Tabebuia Cassinoides) by local population, organisation of dwellers of Juréia-Itatins Ecological Station, planning and implementation of small-projects, planning and proposal of Extractive Reserves in the coastal area of Mata Atlantica.

7. PROTECTED AREAS

According toa recent study undertaken byNupaub (1994), there are 297 restrictive protected (Ecological Stations, National Parks, Biological Reservas,Ecological Reserves, Forestry Reserves, Biological Stations) areas in the Atlantic Rain Forest, reaching 2.489.682 ha (or 24.896 sqkm). Taking into consideration that the remnants of the Mata Atlantica occupy to day 9.564.100 ha (or 95.641 sqkm), according to the Atlas de Remanescentes Florestais do Dominio da Matt Atlantic (1994), some 26 % of this forest is legally protected. From the total number of restrictive protected areas, the federal ones protect 43 % (68 areas, occupying 1.070.143 ha) and the state ones protect 57 % (229 areas, occupying 1.419.539). Even so, 74 % of the remnants are not under legal restrictive use protection.

The Southeast Region(SP, RJ, ES. MG) has the highest number of restrictive protected area in the Atlantic Rain Forest (147 units), covering 1.616.099 ha ,(16.161 skm) and representing 64 % of the remaining forest. Within the region, the situation varies. São Paulo, for instance, has a high percentage of the Mata Atlantica under strict protection (47 % of the remaining forest) and Rio de Janeiro also has 56 % of the remnants of that forest under protection.

In the Northeast(BA, SE,AL,PE,PB, RGN) where the smaller remnants of the forest exist, there are 80 protected areas, (249. 167 ha) or only 10 % of the remnants of the Atlantic Rain Forest. In the State of Espírito Santo, for instance, only 11 % of the remnants of Matt Atlantic are under protection .(see map 3)

In the Southern States(RGS,SC,PR), there are 7O protected areas, covering 622.416, or 25 % of the remnants of the Matt Atlantic.

The question of human populations inside protected areas.

According to the Brazilian law, no dweller should live inside restrictive protected areas, such as National Parks, Ecological Stations, Biological Reserves, etc... It should be mentioned, however, that many of these protected areas were established in area where human communities were living. Many of these communities are formed of traditional people, mainly "caiçaras", small-scale fishermen , traditional forest harvesters, shifting agriculturalists,etc... In fact, many of rather preserved remnants of the Matt Atlantic were considered of marginal agricultural use (slopes, mangroves, swamps) and inhabited by traditional people, including Indians. Many of these traditional groups have developed, during decades and even centuries, a rather stable relationship with the forest, from which they depend on their livelihood. In fact, this scattered communities have a way of living based on extensive use of natural resources,such as fish, forest fruits and other wood and non-wood resources,etc... Many studies have shown the deep knowledge they have on the forest and associated ecosystems (Diegues, 1983, 1988, 1994; Marques, 1991, 1994, ; Mussolini, 1980 It is also true that, from the Sixties these communities, particularly those living along the coast started to be expropriated from their territories and resources by land speculators. In this sense, the establisment of protected areas over their territory controlled land speculation and hindered land expropriation, allowing for the survival of these communities. In some cases, this traditional population was simply transferred from their homeland. In other cases, however, due mainly to lack of financial resources, in the process of establishing protected areas,land purchase by the Government did not occur. Consequently, many of these communities stayed in the protected area, but were hindered to practice their traditional activities. The scarce social services previously located in the area, were, in many cases discontinued and the survival of these communities is threatened.

Until recently, these communities living inside protected areas were "invisible", as they were only tolerated. More recently, the question of their survival and their potential contribution to conservation have been highlighted through University studies and, mainly through their own social movements and organisations.(Diegues, 1994).

A recent study undertaken by NUPAUB (1994) along the various states of Matt Atlantic revealed that around 58 % of all restrictive protected areas, under federal and provincial management had some kind of human population. A more detailed study, covering the States of Espírito Santo, Rio de Janeiro, São Paulo and Paraná, where most of the remnants of Mata Atlantica is located, revealed that around 39 of the restrictive protected areas had human population inside. Around 15% of them have only traditional population (caiçaras, small scale fishermen, traditional forest extrativists, Indians) and 11 % had only non-traditional population (tourists, land speculators, "fazendeiros"). The majority of them,l however, (73 %) have mixed traditional and non - traditional populations. It should also be mentioned that around 21 % of the protected areas in the surveyed states have population that entered the area after the decree creating those protected areas.

This last figure indicates, however, a more serious situation concerning most of the protected areas in the Mata Atlantica: most of them lack management plans, personnel and financial means to become effective. In this sense, many of them are " paper protected areas., subject to a series of problems such as invasions by land speculators, sawmills,landless people,as well as fire, hunting, erosion, lack of effective surveillance by State and Federal Environmental Authorities.

8.THE MATA ATLANTIC BIOSPHERE RESERVE (RBMA)

In 1991, the Consorcio Mata Atlantica proposed the creation of the Biosphere Reserve of Mata Atlantica in the most conserved and protect area of this Forest:Southern coastal part of Sao Paulo and north of Paraná. To the core are belong some 730.000 ha of already existing protected areas. (see map.4)

The RBMA has been planned in four phases, starting with the approval of the segment of São Paulo and Paraná states (1991) and subsequently it icluded the remaining

areas of 14 states. According to the management proposal, the core areas will be formed by the existing restrictive protected areas.Buffer zones were proposed mainly to protect and develop continuous corridors of forest.

The main objectives of the Reserve are: to protect the biodiversity of the forest and to foster sustainable development; to raise living conditions of local populations; to integrate the actions of governmental and non-governmental organisations.

The Conselho da Reserva da Biosfera (Biosphere Reserve Council), responsible for policies and strategies and by the approval of the Action Plans, is composed by State representatives, Federal Government and Ngos. During the various national meetings, six priorities have been devised: regularization of land ownership in protected areas, recovery of degraded areas, sustainable development, particularly of traditional populations, training and environmental education, establishment of information and management systems. The funding for the establishment of the Reserve would come from national sources (25 %), and the remaining from international institutions.

8. THE MAIN PROBLEMS OF RBMA AND CHALLENGES

There is a serious effort of the Biosphere Reserve Council to put together a large number of environmental institutions spread over Mata Atlantica. The information, however only partially reaches a larger public than those already working in the field of environmental issues in the region.The Biosphere Reserve of Mata Atlantica, as it was established faces several problems.

a)**Lack of participation of local communities**

Local communities are not properly informed on the advantages of the Biosphere Reserve and have not participated in its creation. For many people it is a protected area as parks and ecological stations.

b) **Excessive concentration on protected areas issues**

sues.

The present Biosphere Programme is highly concentrated on solving problems related to protected areas, transformed into " core zones".It sets as a priority area the desapropriation of land by the Government in the existing parks and reserves. The fact that in many of these protected areas the land is still in private hands might be considered a constraint, but, in fact, alternative solutions(for instance,negotiation with private owners) should be sought as the amount of money to expropriate private lands is so huge that, in many case it will not be available in the short run. The way the present BR programme is organised may lead some people to think that the highest preoccupation is with protected areas (core zone) and that international recognition of the importance of Mata Atlantica will result in a higher degree of protection. Although is may be true, the main asset of the BR is the potential for conflict solving among different uses (and non-use) of the ecosystem and this is a crucial issue in the Atlantic Forest. In this regard, a higher priority should be given to " buffer zones" not only for forest recovery but also for projects based on sustainable use of natural resources by traditional peoples. . These zones have not yet been studied and assessed in order to know which kind of projects should be selected

c).Large size and management issues.

The large size of the area may be considered a serious constraint for the appropriate management of the Reserve. The main difficulty is related to the number of states associated and includes a variety of different administrations that might jeopardise effective co-operation among them in the implementation of the plan. Again, there is little concern of other sectors of state administrations (agriculture,human settlement, industry) with the Atlantic Reserve Although it might be politically sensitive, a few priority areas should be selected for implementation.

d**. Excessive number of priorities.**

Priorities should be in a more limited number as the present programme involves a myriad of priority activities in various thematic fields(protected areas, sustainable

development, second vegetation recovery, monitoring and, information, zoning,environmental education networking) and regions(Southern Region, Iguape-Paranaguá estuary , Green Belt around S.Paulo, Serra do Mar and Mantiqueira, Espirito Santo and Southern Bahia, Northeast. Difficulties in setting priorities can also be assessed through the large number of projects of different types published in Plano de Ação,(vol .2) 1992). In that publication there are 329 proposed projects, divided in 15 different subjects, presented a large number of government and non-governmental institutions, reaching US 60.O51.116.(no funds yet available)

During the 4th Meeting of the Biosphere Reserve Council, in 1994, a large number of pilot project areas were selected in the States of Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, Rio de Janeiro, Minas Gerais, Espírito Santo, Sergipe, Alagoas, Pernambuco, Paraíba, Rio Grande do Norte and Ceará. In each State, an average of three sites were selected and activities range from restrictive protected areas conservation to secondary forest management. Given the existing low level of funding, it is unlikely that all those pilot projects will be implemented.

10. PRIORITY FOR PROJECTS ON SUSTAINABLE USE OF NATURAL RESOURCES IN THE SOUTHEAST REGION

In our view it would be advisable to start a few pilot projects in one single, continuous area, where administrative and technical conditions already exist. The region between the southern part of Rio de Janeiro and the northern part of Paraná is probably the most adequate region where pilot projects in buffer zones could start. It is a stretch of coastal Atlantic Forest of around 600 km long, that could be divided in two sections:(see map 4)

a) Iguape-Paranaguá estuarine ecosystem, Atlantic Forest and its caiçara population

The first area could be the Iguape-Paranagua estuarine ecosystem, as it covers two states Paraná and Sao Paulo. It constitutes roughly the first area which was declared Biosphere Reserve in 1991.(see map 5) One important element in this area is the presence of an important traditional population, " the caiçaras", living inside the protected areas as well as in the buffer zones. In this area, there is a good number of Ngos and Universities already working and the Biosfere Reserve could be an integrative factor. In this area, the concept of Biosphere Reserve could contribute to solve the acute problem of presence of traditional and non-traditional dwellers inside protected areas and also those living outside protected areas suffering from high restrictions on the use of natural resources.

The caiçara population and the ecosystem

As it was mentioned before, the proposed area is inhabited by the caiçara population which is a mixture of Indian, Portuguese and to a less extent, of black African slaves. They live along the coast of Paraná, Sao Paulo and Rio de Janeiro, usually in small communities. This region was colonised by the Portuguese, already in the XVI century. From that time old colonial towns such as Iguape, Cananeia, Antonina still exist.The livelihood of the caicaras is based on small-scale fishing,shifting agriculture and forest harvesting.

The local population uses several ecosystems and their natural resources

Rain forest resources

The caiçaras from the region use biodiversity and natural resources from the forest in different ways. Many plants are utilised by the "caiçaras" for house construction, domestic utensils, fishing equipment, boat building, medicine, etc. Most of these species are concentrated in the lower part of the forest. The wood utilised by these traditional communities has a short life-cycle. They have also introduced exotic species, such as banana trees, cassava, sugar cane in their small cultivation fields.

The most common species used by the local population are the following:

Trees: Crecopia glaziovi (umbauba), Calypthantes sp (araçarana), Astrocaaryum aculeatissimum (brejauba), Aspidosperma compactinervium, (peroba), Vernonia discolor (cambara-guaçu), Ocotea sp (canela).

Some of these species are utilised by the caiçaras for different purposes such as food: Myrcia sp (araçarana), Euterpe edulis (palmito); Cariniana estrellensis (jequitiba branco),~wood construction.:Aspidosperma compactinervium (peroba), Attalea dubia (palmeira indaiá), Astrocarym aculeatissium (brejauba), Syaqrus pseudococos (pati), Euterpe edulis (palmito) ;craftsmanship- Mabea brasiliensis (canudo de pito), Cariniana estrelensis (jequitibá branco); boat building.: Malouetia arborea (guerana), Shizolobium parahybum (guapuruvu); fishing traps: Jacarandá (semiserrata (caroba), Qualea gestasiana (canaiba), Tibouchina sp (manacá da serra), Chrysophylillum viride (canela amarela).

There is also an irnportant diversity of birds and mammals in the forest many of which are hunted by the local communities (*).

Mammals	Birds
Didelphis marsupialis (gambá)	Tinamus solitarius* (macuco)
Cebus nigritus (mico)	Crypturellus notivagus (nhambú)
Cebus apella* (macaco prego)	
Nasua solitaria*(quati)	Pipile jacutinga* (jacutinga)
Tayra barbara~ (Irara)	Ara cloroptera* (arara)
Lutra platensis* (lontra)	Amazona brasiliensis* (papagaio)
Dasypus novencinctus (tatu galinha)	Ramphactus vilelinus (tucano)
Coendus villosus* (ouriço)	Furnarius rufus (joão de barro)
Cuniculus paca* (paca)	Turdus albicollis (sabiá)
Bradipus tridactylus (preguiça)	

Sand Bar Islands, Beaches and Dunes natural resources

The vegetation of these ecosystems has an important diversity in the studied area. The vegetation of the sand bar islands present well-defined zones and the diversifiication of species is higher behind the beaches. Along the beaches herbaceous species are predominant. Behind the dunes, there are swampy areas where many species of birds nest.

Because of the natural beauty of these habitats, they are currently under heavy pressure from modern tourism and land speculation. In particular in Ilha Comprida, a long sand bar island in the southern coast of Sao Paulo, more than 300,000 plots of land have been sold for house construction. This is far in excess of the carrying capacity of the island.

The "caiçaras" use to build their thatched roof houses and small villages in these beach habitats. They utilise wood for house construction and fishing equipment, such as Tabebuia cassinoides(caxeta). Some species have food value, such as Eugenia sp (pitanga)and Myrcia sp (araçá).

Mangrove ecosystems and natural resources

Mangrove ecosystems, located in estuaries, lagoons and river mouths are extremely important in the area. In the south of São Paulo, the Iguape-Cananeia estuary contains some 600 sq. km. of mangrove. There are several species of mangrove in the area and the more important are: Rhizohora mangle (mangue vermelho), Languncularia racemosa (mangue manso) and Avicennia tormentosa (seriuba). Other plant species associated with the mangroves include Conocarpus erecta, Hibiscus tiliaceus and Acrosticum aureum.

Fish are perhaps the most important resouree of the mangrove areas. The most common species are: Centropomus sp (robalos), Diapterus tombeus (carapebas), Mugil brasiliensis (tainhas), Cynoscion leiarchus (pescada branca), Cynoscion microlepidotus (pescada amarela), Micropogon opercularis (corvina), Scomberomorus cavalla (cavala), Tachysurus luniscutis (bagre amarelo), etc.

Among the crustaceans, the most important are: Cadisoma guanhumi (caranguejo guaiamum), Ucides cordatus (carangueijo-uçá), Penaeus brasiliensis (camarão rosa) , Penaeus paulensis (camarão rosa), Penaeus schmitti (camarão branco), Callineectes

bocourti (siri), and among the molluces: Mytilus edulis (marisco), Mytella falcata (sururu), Crassostrea brasiliensis (ostra), Tagellus gibbus (unha de velha).

Bird of the mangroves(and sand-bars) include: Amazonetta brasiliensis (marreca-ananai), Larus marinus dominicanus (gaivota), Phaetusa simples (andorinha do mar), Sterna superciliaris (trinta reis), Ardea cocoi (garça parda), Egretta thula thula (garça branca), Nycticorax _nycticorax (socó), Ajaia ajaia (colhereiro), Ceryle torquata (martim-pescador), Aramides cajanea (saracura do brejo), Porphyrula martinica (frango d'água azul).

Mangrove areas are utilised by the traditional population primarily as a soure of food. Bark is also utilised for tanning and wood is used for construction.

The mangrove vegetation , however, is being threatened in the area by land reclamation, house construction, mining, industrial and oil pollution. In the estuary of Iguape-Paranagua large areas of mangrove are still preserved and constitute the most important habitat of the estuary for the local community. It is also directly responsible for the natural productivity of thc adjacent sea.

Lagoons,estuaries and natural resources

There are many estuaries and lagoons in thr low coastal plains of the south of Sao Paulo and Parana and Rio de Janeiro The main one is the large lguape-Cananeia-Paranagua estuary, which is more than 200 km long. It has extensive tidal rivers, flood plains, beaches, mangrove and sandy barrier habitats.

The state of Rio de Janeiro is known for its lagoons and estuaries such as Sepitiba, Marica, Araruama. It is the most important ecosystem used by the caiçara population for fishing activities. The flora and fauna of these ecosystems are those existing in the mangrove, sandy barrier island and beaches.

Coastal and Ocean Ecosystems

The "caiçaras" also exploit the open sca, close to estuaries and beaches. In the rocky northern coast of Sao Paulo the local fishermen use the coastal area for fishing, although in their small canoes they do not go very often into the ocean. In the south, only few artisanal fishermen exploit the open sea with motor boats, particularly for shrimp fishing.

The traditional livelihood of the local "caiçaras" in the areas

Until the Sixties, the main activities of the traditional coastal population was subsistence agriculture combined with small-scale fisheries and gathering of fruit in the forest. Using a slash and burn system, they cultivated cassava, some rice, sugar cane and fruit trees, with the help of the family labour. For harvesting the rice the caiçaras worked as a community using communal work locally known as "mutirao".

Fishing, as well as agriculture was divided in two main seasons:The summer, from November to April, and the winter, from June to September. The mullet fishing played a particularly important role in the "caiçara" society until the Sixties, and is still today important in the more isolated communities. Mullet was the main source of animal protein and the whole community was organised to exploit this. The fish were caught by the use of beach seine and bamboo screen traps (cercos), and were dried and salte to be sold or exchanged with other goods in town. Today however the industrial fleet in the south has expanded and the population has declined.

In addition to fisheries and small-scale agriculture, the "caiçaras" used the forest products for building canoes, medicine, construction material. Additional animal protein was obtained through hunting. This was done only during certain periods of the year.

Understanding of tidal movements was critical to the success of fishing. This indicated the time for laying the nets, taking the fish from the traps, etc. The lunar cycle was also respected when it came to cutting the trees for making dug-out canoes. The physical and biological cycles also influenced myths and religious behaviour. Certain religious festivals were organised only after the main fishing season.

Another characteristic of the "caiçara" society was social equality. As the economy was based mainly on subsistence structure, with reduced surplus, there was no defined class structure. The community was poor and homogeneous, and social co-operation inside the village was high.

The cultural patrimony of the caiçaras now under threat is one of the richest in the whole country. They kept old traditions from the colonial period. At the same time they have developed their own festivals and rituals related to the communal work in the fields, and in the fisheries. Their culture is also closely linked to the coastal zone and to the marine environment upon which they depend. The cultural richness was based primarily on a wise use of the natural resources and respect of the natural cycles. As the population density was small and their techniques were energy saving, their economic activities had little impact on the environment and their resources.

The above described socio-cultural situation started changing from the fifties and sixties. Commercial fishing based on shrimp catch in the south and industrial sardine fishing in the northern coast was developed. In the Cananeia-Iguape region . fishermen from other southern States, using motor boats, started fishing for shrimp outside the estuary. The traditional local fishermen continued fishing inside the estuary, using simple techniques. Some few "caiçaras" were able to buy motorised canoes and went fishing outside the lagoon. In the northern area, larger purse-seiners from Rio de Janeiro and Santos began sardine fishing for industrial purposes.

At the same time roads were built linking the old coastal towns to the fast growing centers such as Rio de Janeiro and Sao Paulo.

In the Sixties a strong demand was created for highly valuable fish from the coastal areas, especially for shrimp and oyster. A few "caiçaras" were able to benefit from this business, as they bought motor boats. As this happened their dependence upon the urban based fish traders became stronger as they controlled the fish market. They also financed new equipment such as nylon nets and engines. Given the market pressure, outside trawlers started fishing close to the lagoon in Cananeia and inside the bays in the northern coast, competing with local fishermen. Traditional fishing spots of the local population were invaded by outside trawlers, causing many conflicts, where the poorer caiçaras were the losers.

Since the Sixties tourism and land speculation have also exerted strong pressure over local communities, particularly in Ubatuha, Parity and Iguape. Many "caiçaras have lost their land or are physically driven out of their ancestors' beaches. Their thatched roof houses and huts to keep fishing equipment have been burned by "jagunços- bandits paid by land development companies.

Only distant caiçara communities situated far from the main roads are able to resist the assault of the tourists and land "developers", and continue to live in the traditional way. In those communities the peasants/ fishermen still use a variety of fishing techniques exploiting a variety of habitats inland and on the sea.

The social and cultural life of the "caiçaras" is being disrupted. Deprived of their land, many communities lost access to the beach and fishing became difficult. Many local people were forced then to move to town where they live in poor slum areas, under-employed or unemployed. Others, although living on their beaches are employed as non-qualified workers in the construction industry or take care of the houses of tourists. The previous social cohesion and homogeneity is disappearing. Social marginality is now common in the area. The "caiçaras" more exposed to these disruptive processes are now using predatory practices over the living resources that before were used with respect. Living at the edge of survival, they are cutting mangrove roots to take young oysters which are-sold in the market and harvesting "palmito" (edible heart of palm tree).

As a result of the disruption of their mode of production their rich culture is being abandoned. Urban habits and values invade the traditional beaches. Traditional craftsmanship such as canoe making, sail cutting, medicine prepared from forest herbs, making of musical instruments and traditional songs and festivals are being lost in many communities.

Around the Sixties, the region was the only well conserved Atlantic Forest region in the State of Sao Paulo, and several protected areas were created In Ilha do Cardoso,(SP) one of the first state parks in the area, dozens of families of "caiçaras" were forbidden to practice their traditional way of living as the park was created. As a consequence, unable to make their traditional living, those families were forced to leave the island or were deprived from their cultivation fields..

In the subsequent years, several other protected areas were created there (Ecological Station of Jureia- Itatins, Area of Environmental Protection(APA) of Ilha Comprida in Sao Paulo, and she Biological Station , the Apa of Guaraquecaba, the National Park of Superagui) and today over 7O % of the whole region is environmentally protected. This restrictive trend has put a burden over the local population, as most of the traditional activities are restricted by law, particularly agriculture and forest harvesting. Local authorities complain that the development of the entire region is seriously jeopardised, as the State and Federal authorities do not create other economic alternatives for the

population that reach today around 150.000 inhabitants (Iguape-Cananeia in Sao Paulo and Guaraquecaba (Parana).If one includes Paranagua, an important export harbour in Parana, the total population is around 200.000 people.

There is today among local authorities and population a strong reaction against the type of environmental protection. There is a perception that jobs are not created because of the environmental policy of IBAMA and of the State Secretariat of Environment.

This negative feeling was clear during a recent (June 1994) public hearing for licensing the construction of a private electricity dam in Rio Ribeira, close to Iguape. Although it is clear that very few jobs will be created in the region and that the generated electricity will benefit only industries outside the region, local authorities have supported the dam construction against the will of environmentalists.

In this connection, there is area need to harmonise development and environmental protection and kin this sense, the RBMA can play a crucial role, creating income alternatives based on sustainable uses of renewable resources

In this action, priority should be given to the " caicara " population, given their high dependence on the use of renewable resources and their pattern of combining different activities, such as fishing, harvesting and small-scale agriculture in order to make their livelihood. Alternative sources of income should be found, however, also to the urban population, particularly through strategies based on tourism and services.

Government and Ngo institutions in the region

In Sao Paulo

NUPAUB/USP : The Research Center on H uman Population and Wetlands, from the University of Sao Paulo is an interdisciplinary research center which is working on the following projects:

a)Extractive Reserve in the Atlantic Forest - a feasibility study has been recently completed in Mandira village, Cananeia in co-operation with 2O caiçara families and with COPT: Center for Traditional Population of Ibama, responsible for the implementation of

the Extractive Reserve. The first reserve for 2O families is planned to be implemented soon in a mangrove area in Cananéia(SP).The second one is being studied in the south of Cardoso Island, for 5O artisanal fishermen families.

b) Management of caixeta wood (Tabebuia cassinoides), a light wood used for high quality pencils and other products. Caixeta extraction had been forbidden some years ago, generating unemployment for some 200 families. Now the Environmental Authorities have authorised the managed harvesting of the wood and Nupaub has set up, in co-operation with Esalq(Agronomy Faculty-USP) and S.O.S Mata Atlantica, a project for caixeta management. This project is working closely with the local Association of caixeta harvestors. As result, the first small-scale saw-mill has been reopened, using logs from the project area. This project has been funded by Ford Foundation and Finnida/Fanc .

c) Support to caicara population living inside protected area. This project aims at supporting local communities organisation, such as the Association of Dwellers of Jureia-Itatins Ecological Station. In June 1994 the first meeting of dwellers of protected areas in Sao Paulo and Rio de Janeiro was organised, in co-operation with Rebraf (Rede Brasileira de Florestas) and Proter,Ngos also working in the area. This meeting was held to discuss rights and obligations of the " moradores" (dwellers), as well as to pressure authorities to solve pending problems, such as authorisations for the sustainable use of natural resources in small areas where this population lives.

d)Research projects on women in fisheries, organised in co-operation with researchers of Laval University in Canada.

Other projects:

SOS Mata Atlantica: this Ngo has facilities in Iguape, and is operating mainly in environmental education projects.

Rebraf: Ngo working in agroforestry projects in the region. It has started with a bee keeping project in Jureia but aims at expanding its activities to agroforestry activities in the region

Proter: Ngo specialised in community mobilisation, is working closely with Rebraf and the Association of Dwellers of Jureia-Itatins Ecological Station where around 3OO

families live. From this population, there are some 100 caicara families. The remaining population works mainly in agricultural activities in the Station

AAO: Organic Agriculture Association has done a preliminary survey in the area in order to start projects involving local small farmers in organic cultivation and marketing of products.

Research Institutes: The Oceanographic Institute of the University of Sao Paulo , the Fisheries Institute and the Forestry Institute (from the Secretariat of Agriculture and the Environment Secretariat) have research facilities in Cananeia.

The Secretariat of Environment has facilities for surveillance of protected areas and projects of sustainable agriculture and handicraft projects in Jureia-Itatins Ecological Stations.It has also finished the coastal management plan for the entire region.

Ibama has facilities in Iguape and are involved in surveillance and management projects for " manjuba" (Anchovieta) management also in Iguape

In Parana

In the estuarine area situated in Parana, some projects have also started.

NUPAUB/USP has made a preliminary study on the caicara population of Guaraquecaba the area and the problems created by the protected area, proposing some alternatives for sustainable use of natural resources (1989)

SPVS (Sociedade de Proteção da Vida Silvestre) is an Ngo working in Guaraquecaba, where it has facilities. This Ngo has funding from national and international sources, and has concentrated its activities in the field of environmental education

The graduate course of Society and Environment, of the Federal University of Parana has chosen the Guaraquecaba area as a focal point for studies on sustainable development. This University also has a fisheries research center in the area..

b) Sao Paulo northern and Rio de Janeiro southern coastal region.

In this second sub-region, the Atlantic Forest also is very important,although the tourism has increased dramatically in the last few years, particularly in Ubatuba, Ilha Bela, Caraguatuba , Sao Sebastiao and Parati.. Contrary to the southern coast, there are small sand beaches very appreciated for tourist purposes by the high middle class. The construction of the BR-101 highway in the 7O's, along the coast, has changed the landscape of this area,allowing for the dramatic expansion of urban areas over mangrove and beaches. The local"caiçara" population has the same social and cultural features as described for the southern part of Sao Paulo but has social changes were more rapid there than in the first analysed region. Small communities , however,still exist in more remote areas of Ubatuba, Sao Sebastiao and Ilha Bela, where a State Park exist. "Caiçara "communites also live in isolated islands, as Montao de Trigo, Vitoria and Buzios, as well as in some islands of Paraty.

Some extensive protected areas have being created (Serra do Mar State Park), Picinguaba, Ilha Grande (RJ), Mamanguá.(RJ). As in Iguape-Paranaguá region, they were crucial for hindering land speculation, they also put strain on local communities.

In Sao Sebastiao there is a huge harbour for oil transportation and often oil spills occur,polluting neighbouring beaches.

Ngos and government institutions in the region

State Institutions

Sao Paulo Secretariat for Environment: is accomplishing the coastal management plan for the entire northern coast.It is also supporting mussel cultivation projects in Caraguatatuba, in addition to facilities for surveillance. SMA has also build-up a center in Picinguaba (Ubatuba) for environmental education and research.

Cetesb: State company dealing with environmental control, has projects for assessing pollution levels in the region

Instituto Oceanografico-USP,, Biociencias-USP and Instituto de Pesca have research basis in Ubatuba and Sao Sebastiao.

IEF (Rio de Janeiro Forestry Institute), is responsible for theestablishment and surveillance of protected areas in the southern coast of Rio de Janeiro

Ngos Institutions

Sao Sebastiao Tem Alma, located in Sao Sebastiao is very active in promoting and supporting projects on sustainable use of natural resources,environmental education, formal education for caiçara communities in the Island of Vitoria, Buzios and Montão de Trigo. It has also, in co-operation with Nupaub, organised several meetings to discuss and propose solutions for caicara problems (Encontro Caicara, Encontro das Ilhas). In December 1994, a Symposium called Internation Meeting of the Sea and Mata Atlantica Peoples was organized, focusing particularly in issues concerning the Mata Atlântica Biosphere Reserve.

Projeto Tamar: for the protection of marine turtles has a research-monitoring basis in Ubatuba.

Projeto Parati-Mirim: aims at the ecological and cultural conservation of Parati-Mirim area.

Eco TV-Paraty. This municipality has it own TV station that presents programmes concerning ecological and cultural issues of Southern coastal area of Rio de Janeiro

Nupaub/USP is undertaking a socio- ecological survey of Mamanguá estuary that partly is included in the Joatinga Ecological Station (Diegues A and Nogara,P. 1994)

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11. **SOME ORIENTATIONS FOR APPLIED RESEARCH**

As it has been mentioned, the caiçaras communities living inside and outside protected areas in the two selected areas should be the focus of analysis and proposals

Applied research should be concentrated on:

1.Better understanding on the knowledge traditional population (caiçaras) have on the biodiversity and on natural resources they use.As they use several ecosystems (forest, mangrove, estuaries) for different purposes (medicine,subsistance cropping, fishing,etc)according to seasons it is important to know better how this knowledge is now related to sustainable use of renewable resources. As in many cases, these communities are in a rapid process of social-cultural change, how these processes affect the previous knowledge and consequently, the present pattern of use of natural resources.

In-depth studies should concentrate, for instance, on the use of several native species of cassava and rice in the same field in order to avoid losses. In the case of cassava, over 10 different species are used in the same field cultivation. How the genetic bank is being preserved in some areas and lost in others?

Research should also be done on the knowledge and use of herbs and forest species as medicine. These species could be processed and commercialised.

2. Improving knowledge of traditional management practices.

The caiçaras communities do have special management practices concerning the use of forest and coastal ecosystems which have been adequately studied. These management practices embody detailed knowledge about the ecosystems, species, habits of species, seasons, etc. An inventory of these practices are essential to retrieve and use traditional management schemes in different projects.

3. Assessing new management practices

As the ecological situation has changed in some caiçara areas, some of the traditional management practices are not adequate any more. New practices, particularly in agriculture and fishing should be studied . These practices should start in the field of forest recovery in degraded areas (agroforestry), management practices of intensive used forest species , such as palm heart (Euterpe edulis), "caixeta"(Tabebuia cassinoides aquaculture (oysterculture, mussel cultivation,etc.). Some of these studies have already studied in different areas of Mata Atlantica, but have to be tested in community areas.

4. Creating "new commons": extractive reserves in Mata Atlantica

As it was mentioned, many of the caiçaras communities are under threat, particularly from land speculation.. In some cases,extractivist reserves can be an adequate social and economic institution in order to prevent resources degradation by outsiders (and sometimes, insiders), to introduce management practices, and to increase revenue of the "commoners". In many cases, the establishment of "extractive reserves" in Mata Atlantica represents a legal recognition of communal territories local communities informally use (ex. mangrove). As community organisation, establishment of committees of commoners are a condition for extractive reserves, communal participation is a essential step in the process. Economic viability is an essential factor for the success of these new extractive reserves and could be ensured by the complementary use of different resources of the various ecosystems, including new activities such as oysterculture, pal heart(palmito) planting, medicinal herbs production,etc.

An additional advantage of the "extractive reserves"is that applied research can be a continuous process, linked with production/ commercialisation and extension activities.

5. Conflict solving research

As it was mentioned before, the establishment of restrictive protected areas in territories previously inhabited by traditional people has created a series of conflicts between communities and park administrations. Very little is known about these conflicts, their nature, social actors involved and ultimately, the solutions.

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10 Priorities for projects on sustainable use of natural resources in hte Southeast Region

- **a) Iguape-Paranaugá estuarine ecosystem, Atlantic Forest and its caiçara population**
- **b) São Paulo northern coastal region and southern Rio de Janeiro**

11. Some orientations for applied research

- **a) better undestanding on the knowledge of traditiona population**
- **b) improving knowledge of traditional management practices**
- **c) assessing new management practices**
- **d) creating "new commons: extractive reserves**
- **d)conflict solving research**

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