

**SOUTH-SOUTH COOPERATION PROGRAMME ON ENVIRONMENTALLY
SOUND SOCIO-ECONOMIC DEVELOPMENT IN THE HUMID TROPICS**

WORKING PAPERS

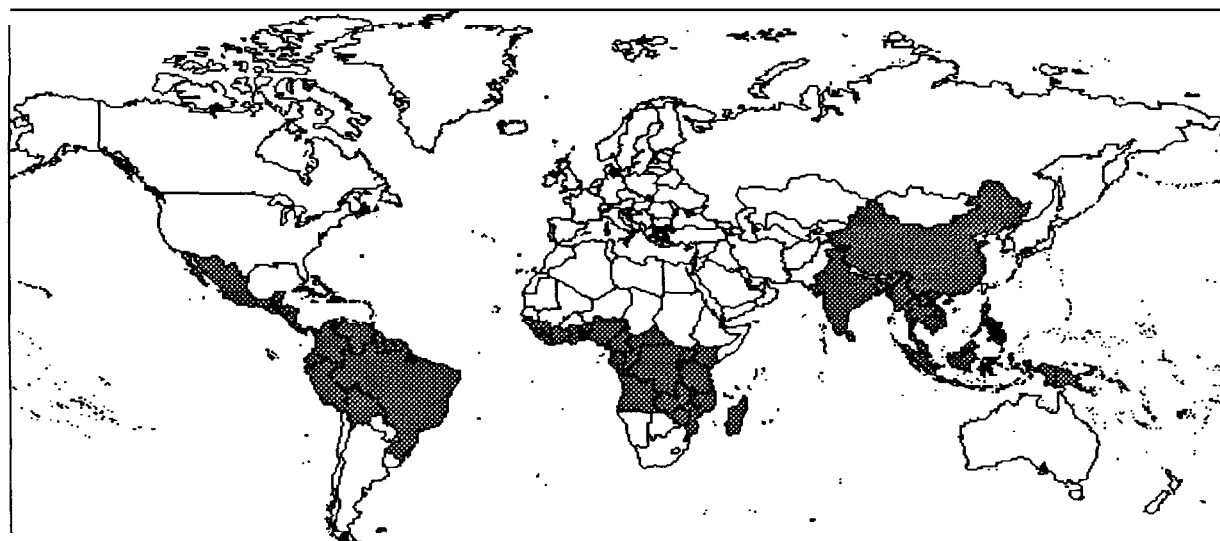
N° 1, 1995

**THE MATA ATLÂNTICA BIOSPHERE RESERVE :
AN OVERVIEW**

BRAZIL

by

Antonio Carlos DIEGUES



The Working Papers series is a publication of the *South-South Cooperation Programme for Environmentally Sound Socio-Economic Development in the Humid Tropics*. The series aims to disseminate the results of the research on Biosphere Reserves on such topics as (i) the prevailing conservation and resource-use patterns and, (ii) the ways of improving the traditional practices and orientation for applied research aimed at a more intensive and sustainable use of the biodiversity to provide a better livelihood to the local population in the buffer and transition zones. On more general issues, the Working Papers are also an attempt to identify key problems that will become areas of concentration for international cooperation.

The map on the front page has been produced by using a commercial software programme. The boundaries do not imply official endorsement or acceptance by UNESCO or the United Nations. Neither do the ideas and opinions expressed in the Working Papers series, which are solely engaging their authors.

The Working Papers series is published as necessary either in English, French or Spanish depending of the language used by the author.

© Permission to reproduce any material of the Working Papers series will be given without any previous authorization, provided that full reference to the author, title, series title, date, institution editor and place of publication are given.

Edited by: UNESCO

Division of Ecological Sciences
South-South Cooperation
Programme
7 place de Fontenoy
75700 PARIS (FRANCE)

Telephone: 33 - (1) 45.68.41.46
Telefax : 33 - (1) 40.65.98.97
Telex : 20.44.61 Paris
E-mail : scmcl @ unesco.org

Scientific Editor

Ignacy SACHS
ÉCOLE DES HAUTES ETUDES EN
SCIENCES SOCIALES (EHESS)
Centre de Recherches sur le Brésil
Contemporain (CRBC)
54 Bd. Raspail
75270 PARIS Cedex 06
FRANCE

Telephone : 33 - (1) 49.54.20.85
Telefax : 33 - (1) 45.48.83.53

Administrative Editor

Miguel CLÛSENER-GODT
UNITED NATIONS EDUCATIONAL,
SCIENTIFIC AND CULTURAL
ORGANIZATION (UNESCO)
Division of Ecological Sciences
South-South Cooperation Programme
1 rue Miollis
75732 PARIS Cedex 15
FRANCE

Telephone : 33 - (1) 45.66.41.46
Telefax : 33 - (1) 40.65.98.97

Publication Editor

Yann GUILLAUD
ÉCOLE DES HAUTES ÉTUDES
SCIENCES SOCIALES (EHESS)
Centre de Recherches sur le Brésil
Contemporain (CRBC)
54 Bd. Raspail
75270 PARIS Cedex 06
FRANCE

Telephone : 33 - (1) 49.54.20.85
Telefax : 33 - (1) 45.48.83.53

EDITORS' FOREWORD

The Biosphere Reserves or similar managed areas that are joining the *South-South Cooperation Programme*, are requested to produce an overview of their covering area containing first hand information on its conditions and urging problems.

These reports will be primarily used as background materials for the comparative projects agreed upon in the programme of activities established at the Chiang Mai meeting, held in Mai 1994. For more details please report to the newsletter South-South Perspectives (N° 1, October 1994 [28 pp.], UNESCO, Paris [France]).

Given the rich information value of these reports, there are being made available to a wide audience. They may be obtained by contacting UNESCO/MAB Secretariat, Division of Ecological Sciences.

For other documents available in the series, see the back-cover.

TABLE OF CONTENTS

INTRODUCTION	3
I- THE PRESENT CONDITIONS OF THE ATLANTIC FOREST	5
1) Generality	5
2) Diversity of species and ecosystems	7
a- Flora diversity in the various ecosystems	7
b- Fauna biodiversity	9
II- DEFORESTATION	10
III- THE FOREST PEOPLE OF THE ATLANTIC FOREST	12
IV- MAIN PROBLEMS	13
1) Logging	13
2) Land speculation and rapid urbanization	4
3) Road construction for tourist purpose	14
4) Industrial pollution	14
V- RAISING AWARENESS AND CONSERVATION	15
VI- PROTECTED AREAS	16
VII- THE MATA ATLANTICA BIOSPHERE RESERVE (RBMA)	19
VIII- THE MAIN PROBLEMS OF RBMA AND CHALLENGES	21
1) Lack of participation of local communities	21
2) Excessive concentration on protected areas issues	21
3) Large size and management issues	22
4) Excessive number of priorities	22
IX- PRIORITY FOR PROJECTS ON SUSTAINABLE USE OF NATURAL RESOURCES IN THE SOUTHEAST REGION	22
1) Iguape-Paranaquá estuarine ecosystem, Atlantic forest and its <i>caçara</i> population	23
a- The <i>caçara</i> population and the ecosystem	24
b- Rain forest resources	24
c- Sand bar islands, beaches and dunes natural resources	25
d- Mangrove ecosystems and natural resources	25
e- Lagoons, estuaries and natural resources	26
f- Coastal and ocean ecosystems	26
g- The traditional livelihood of the local <i>caçaras</i> in the areas	27
h- Government and Nginstitutions in the region	30
2) São Paulo northern and Rio de Janeiro southern coastal region	31
X- SOME ORIENTATIONS FOR APPLIED RESEARCH	33
BIBLIOGRAPHY	35

INTRODUCTION

The Atlantic Forest Biosphere Reserve covers around 94 000 km.², along 3 000 km. of the Atlantic Coast, covering 14 different Brazilian states (*Cf.* 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, Florianópolis, São Paulo, etc.) and also many small traditional communities of peasants, small-scale fishermen and forest extractive groups.

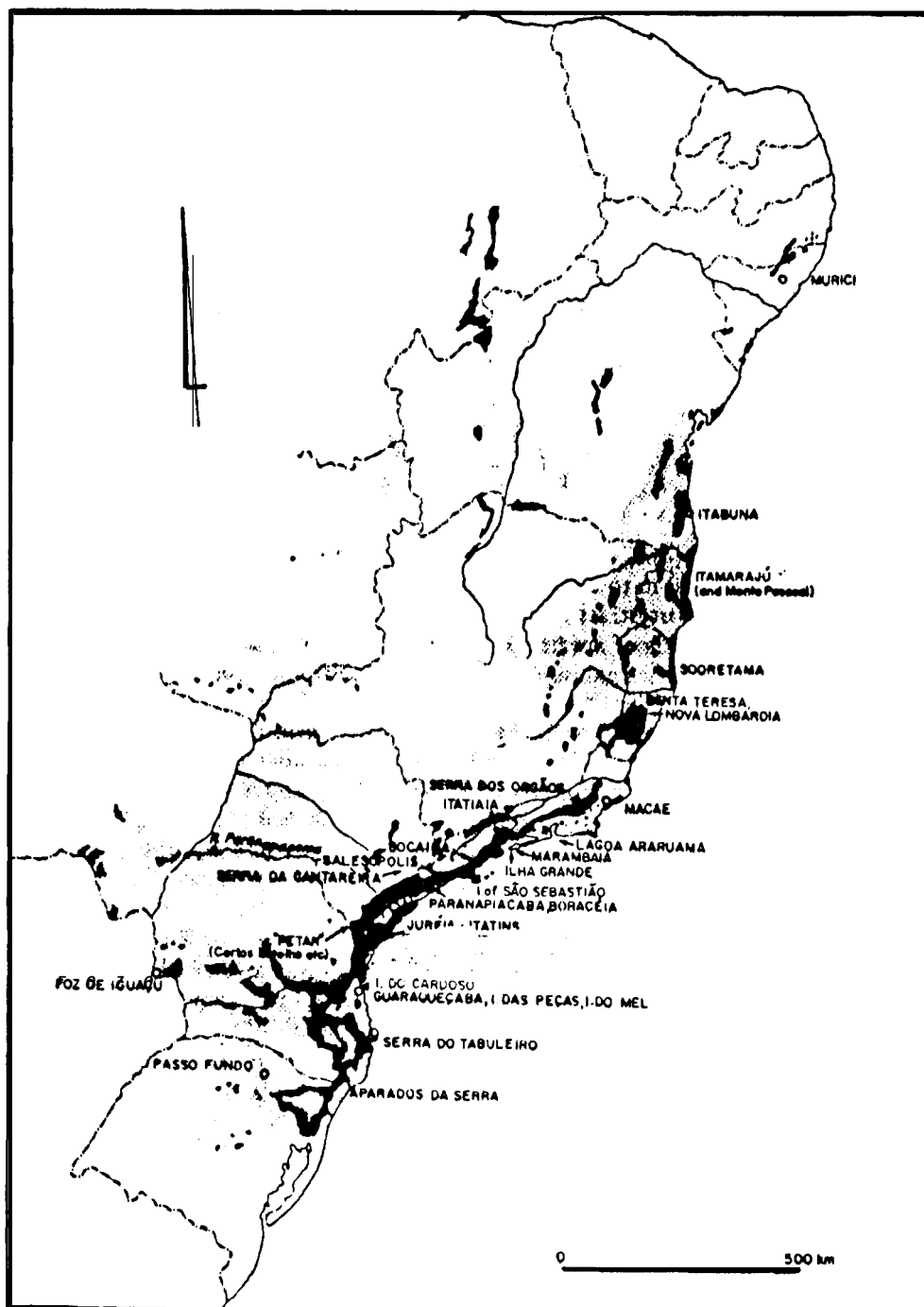
This paper aims at giving a brief description of the current status of the Atlantic Forest Biosphere Reserve (RBMA), emphasising the prevailing conservation and resource-use patterns by existing traditional population. It points out also orientation of applied research aimed at a more intensive, sustainable 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,...

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 extractive 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 communities. This is a responsibility not only of the Government, but also of research institutions, NGO's (Non Governmental Organizations) 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 at using biodiversity in a sustainable way.

MAP 1 : Remnants of the Atlantic forest (1990)



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 as 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 Biosphere Reserve 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 the 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.

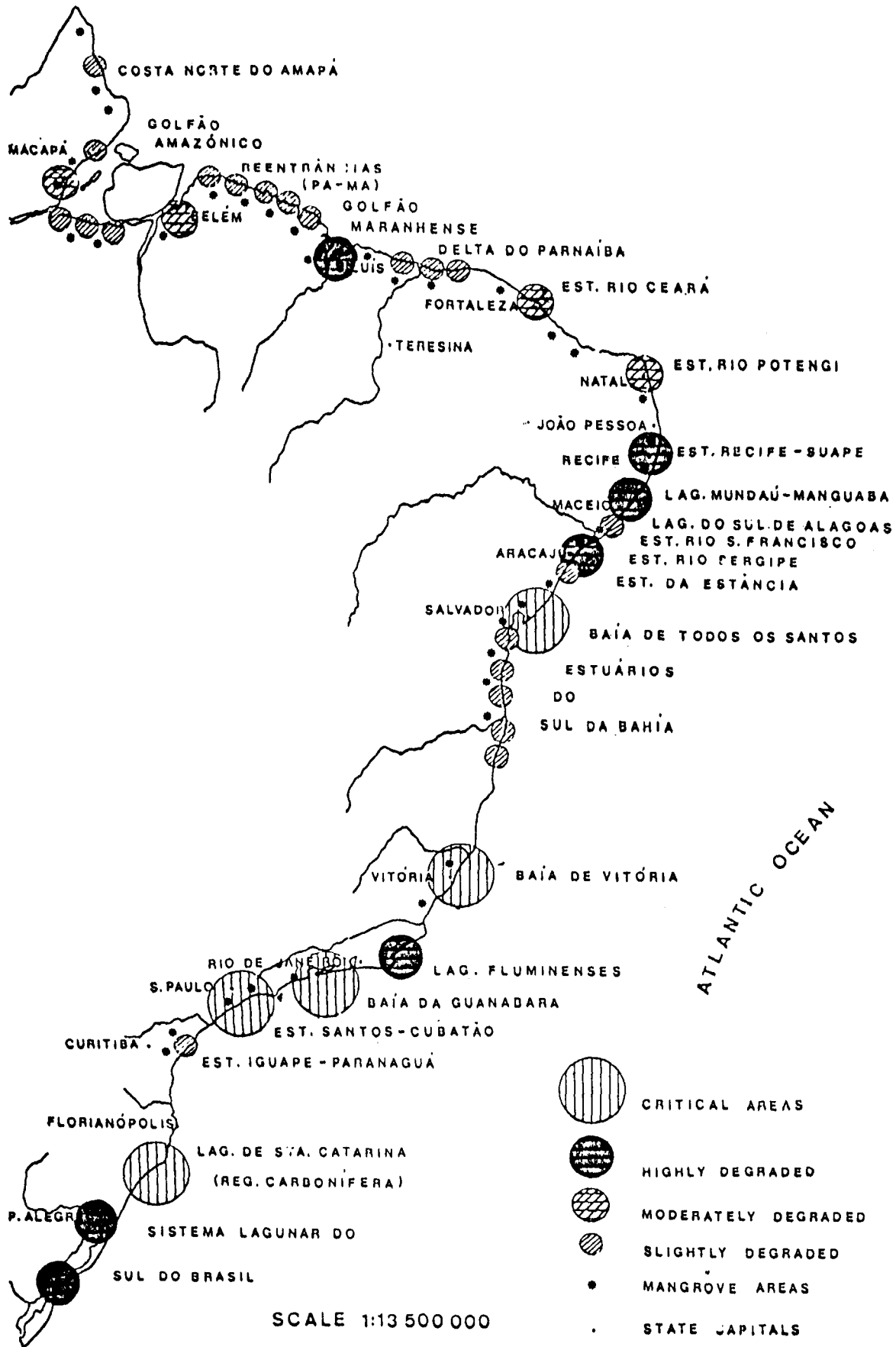
1- THE PRESENT CONDITIONS OF THE ATLANTIC FOREST

1) Generality

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 XVIth century between 1 million and 1.5 million km.². Today the remnants of the forest are around 94 572 km.², 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 XVIIth, 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 XIXth the devastation continued when coffee was planted in large areas of the southeastern sector (Rio de Janeiro and São 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 1960's in the southern part of Bahia, when the highway BR-101 was open.

In addition to that, the first towns were erected along the 3000 km. of the Atlantic forest in colonial times and today, over 60 % of the 150 000 000 Brazilians live in that region, particularly along the coast (*Cf.* MAP 2). The main cities, such as São Paulo, Rio de Janeiro, Salvador, Recife are located in the domain of the forest. Urban expansion since the 1930's caused additional deforestation for firewood and charcoal making.

MAP 2 : Levels of degradation of estuarine ecosystems in Brazil



Additional environmental degradation came from the rapid industrialization of the coastal areas, as many of the most polluted industrial centers of the country, such as Cubatão (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 São 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 (*Cf.* MAP 1).

In general terms, the remains of the forest are still continuous only from Rio de Janeiro to the south, with a width of some tens of kilometers, compared to the 150 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 (*Cf.* POR).

2) Diversity of species and ecosystems

Contrary to the Amazonian rain forest, the Atlantic forest 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 points out, a remarkably similar climatic regime, a long and common geological history as well as the 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 Atlantic forest 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 (*Cf.* POR).

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 Atlantic forest is considered to have the maximum number of species in Brazil (*Cf.* MARTINS). There is a predominance of the *Leguminosae*, followed by *Bignoniaceae*, *Lauraceae*, *Sapotaceae*.

There are a number of genera which are endemic to the rain forest, such as : the palms *Arecastrum* and *Bactris* ; *Baccharis* (*Composite*), *Cabralea* and *Cryptocaria* (*Lauraceae*),

Sloanea and *Schinus*, *Tibouchina*. The Atlantic and the Amazonian forests have 156 genera and 500 species in common (Cf. RIZZINI ; BIGARELLA and ANDRADE-LIMA). Species level endemism in the Atlantic forest is very high : 53.5 % (Cf. 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,...

The non-arboreous vegetation is as diversified as that of the trees : lianes, epiphytes, shrubs, arborescent ferns and bamboos, grasses and mosses and lichens. The epiphytic flora of the Atlantic forest is well known for its richness and among the main taxa are *Bromeliaceae*, *Gessneriaceae*, *Piperaceae*, *Orchidaceae*, *Araceae*, *Heliconaceae* and *Pteridophyta*.

The Serra do Mar in Southeastern Brazil is the main area of *Bromeliaceae* in Brazil, being more diversified than in Amazonia. There are many endemic genera in Southeast Brazil, such as *Dyckia*, *Cryptanthus* and *Nidularium*. BRIEGER (1969) also considers the Atlantic forest is the richest area in orchids in Brazil.

Restinga dune forest

It is a vegetal formation which grow in Holocene 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 literal 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 urbanization of the coastal area.

Mangroves and estuaries

There are innumerable lagoons and estuaries along the coast area of the Atlantic forest, and they represent essential resource units for local traditional population, in 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 Catarina 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 takes place in some areas, particularly for house construction. Traditional population also uses the resources of this ecosystem, particularly through fishing of several estuarine species, particularly fish, crabs, oyster and **mussels**. They also use mangrove trees for drying of nets, house construction, medicine,...

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 1 000 m. are covered by an exuberant and highly specific grass and bush vegetation.

Matas ciliares

These gallery forests or riverine forests are narrow forest belts along rivers, natural refugia for the more mesophilic biota, as the rivers cut 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 Atlantic forest became possible (*Cf.* POR).

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 1970's.

Rivers

Rivers of the Atlantic forest 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 sometimes, after heavy rains, cover practically the whole of the forested slopes. These streams contain many endemic genera. The black flies *Simulium pertinax (borrachudo)* are a known nuisance for the tourist and local population along the coast. There are also the "black water" rivers, where the pH is even lower than for 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 innumerable species of animals and birds.

The area is rich in *Anura*, the dominant families of frogs are the *Hylliade* and *Leptodactylide*. LYNCH analysed 183 Southeast Brazilian species of forest frogs of which 168 (nearly 92 %) are endemic to the Atlantic domain. This falls little short of the whole area of Amazonia and the Guyanas, which are housing 202 known species.

The Atlantic forest contains 150 species of reptiles, of which only 43 are shared with Amazonia and the endemism of the reptile fauna is very high. RODRIGUES (1990) listed 50 lizard species in the Atlantic Forest domain, of which around 30 species are endemic. It also harbours several species of endemic turtles, many of them living in the mountain streams.

The Atlantic forest contains 30 endemic general and 160 endemic species of birds. According to HAFFER and another calculation (*Cf.* CACRAFT, 1985), there are 214 endemic species and subspecies. 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 Atlantic forest, 2 of them being endemic. In the region, there are several endemic species of amazonian parrots : the red spectacle parrot *A. petrei (charão)* 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 mammalian, 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 mate)*, a rare species of unknown distribution is among the CITES I species (*Cf.* POR). The rodent fauna is also characterised by high endemicity.

According to KINZEY there are 6 species of Atlantic forest 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-leão)* is also an endangered species. In 1991, a band of the black faced lion tamarin was discovered in the the southern coast of São Paulo.

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

II- DEFORESTATION

As it was mentioned earlier, the original extension of the Atlantic forest was of a minimum of 1 000 000 and a maximum of 1 500 000 km.². According to the Atlas dos Remanescentes Florestais do Dominio da Mata Atlântica (SOS Mata Atlântica) which was based on satellite pictures, approximately 95000 km.² are characterised as forests of more than 90 % covered. MORI *et al.* (1981), consider that for the Brazilian states of Bahia, Espírito Sante, São Paulo and Paraná the destruction has been between 65 and 93 %. According to the Atlas, São Paulo had in 1991 the largest remnant of the forests (34 448 of closed forests). On the other hand, Espírito Santo in 1968 had 3650 km.² of dense forests and in 1991 had only 784 km.² of forest left. In the Northeast (*Cf.* MAP 3), the southern part of the State of Bahia was in 1976 still covered with 5852 km.² of forest, in 1991 the satellite picture showed only 1863 km.² of close forest. More to the north, Alagoas does not have any dense forest left and Pernambuco only 15 km.². In 1990 the Engenho Pitanga (sugar-cane mill) cut illegally 2 000 ha. of Atlantic forest in Pernambuco (*Cf.* POR).

Sos MATA ATLÂTICA, a non-governmental agency that monitors deforestation (*Cf.* TABLE 1) points out that in 1985, the total remnants of the Atlantic rain forest was 94 572 km.². It 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 the remnants in that

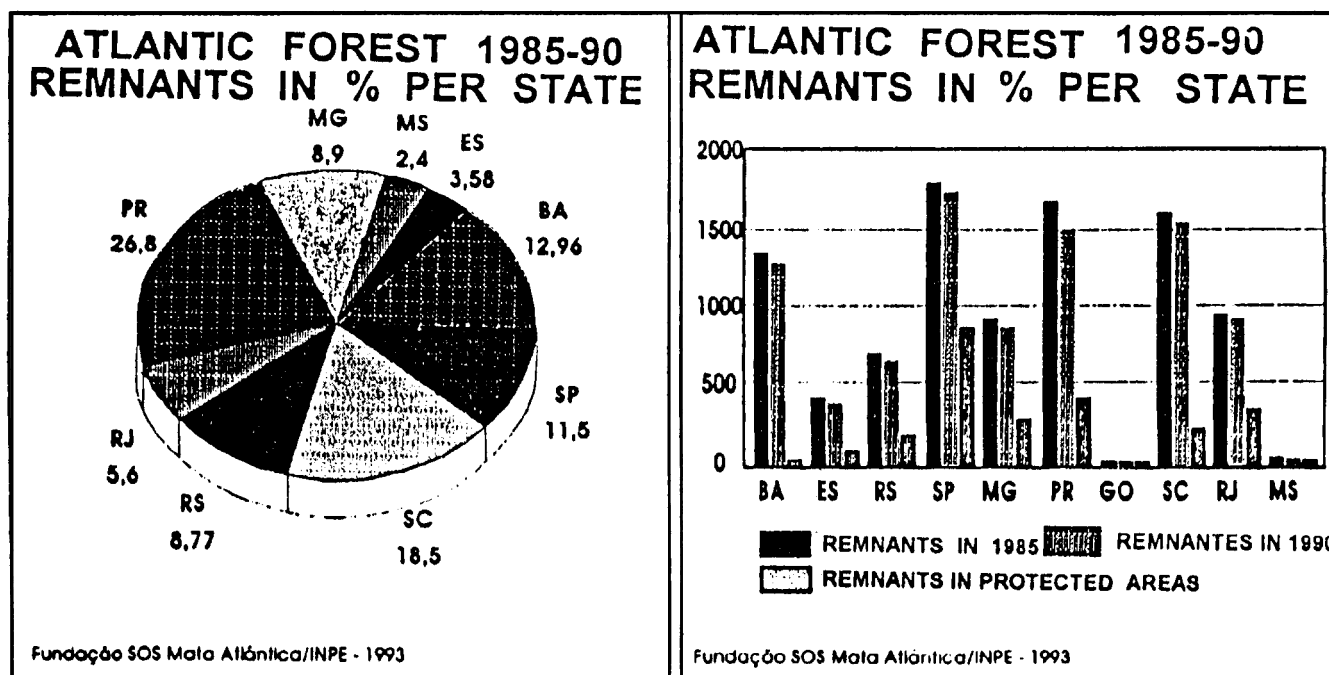
period. The highest deforestation rate was in Paraná (143 720 ha.) and in Santa Catarina (104 266 ha).

TABLE 1 : Deforestation of the Atlantic forest (1985-1990)

	Remnants (in %)	Area 1985 (in ha.)	Area 1990 (in ha.)	Deforestation (in ha.) 1985-1990
Northeast				
Ceará	4.0	-	-	-
Rio Grande do Norte	12.7	-	-	-
Paraíba	3.5	-	-	-
Pernambuco	4.6	-	-	-
Alagoas	11.4	-	-	-
Sergipe	15.3	-	-	-
Bahia	12.9	1 336 961	1 267 478	69 483
Espírito Santo	3.6	421 185	402 392	18 793
Southeast				
Rio de Janeiro	5.6	942 375	914 525	27 853
São Paulo	11.5	1 792 629	1 731 472	61 157
Minas Gerais	8.9	923 609	876 504	47 105
South				
Paraná	26.8	1 646 818	1 503 098	143 720
Santa Catarina	18.5	1 731 472	1 627 206	104 266
Rio Grande do Sul	8.8	706 023	656 717	49 306

SOURCE : SOS MATA ATLÂNTICA, 1994

GRAPH 1 : Deforestation of the Atlantic forest (1985-1990)



SOURCE : SOS MATA ATLÂNTICA, 1994

GRAPH 1 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 and Santa Catarina

III- THE FOREST PEOPLE OF THE ATLANTIC FOREST

There are very few survivors of the Indian population that inhabited the Atlantic forest. The earliest human populations which left cultural signs were the “sambaqui” people. Sambaquis are large amounts of shell mounds, 5 to 20 meters 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 before present. These Indians lived primarily on fishing and shell harvesting. Inland and along the rivers, pre-ceramic tribes existent between 8000-7000 before present. In the first millennium before present 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 were the major tribes, but old tribes such as the Guianases also subsisted. The most known tribes in the Atlantic forest were the Carijós (South of São Paulo), Tupiniquins, along the São 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 are 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-bum peasants, still depending on a variety of manioc species, on small-scale fishing, handicraft and forest harvesting. Since the 1950'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 Catarina, also along the coast there are the *açorianos* from the Açores Islands that migrated to Brazil in the XVIIth century, being peasants and fishermen. In the Northeast, from Bahia to Rio Grande do Norte 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 Atlantic forest is formed by small, medium and some large urban concentrations, such as Florianópolis (SC), Santos (SP), Rio de Janeiro (RJ), São Paulo (SP), Vitória (Es), Salvador (BA). These urban centers are in continuous expansion, being a crucial threat to the forest and adjacent ecosystems.

IV- MAIN PROBLEMS

1) Logging

According to HUECK (1972) there are 2 000 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*), cedrella (*cedro*), Balfourodendron (*pau-marfim*). Nectandra (*canela*).

Large forest tracks were cut not only for monocultivation for export (sugar-cane, coffee, cocoa), for charcoal making around the cities, but also for afforestation for paper production. Thousands of hectares of Atlantic forest were converted into "dead forests", made of eucalyptus and pinus, between the 1960's and 1980'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 2 000 the forest cover of the State of São Paulo would decrease from 8.3 % to 3.0 %, but this did not happen. As POR points out : «Between conservation and reforestation, it seems that the seemingly fateful and irresistible disappearance of the Atlantic forest has slowed down.» (p. 90).

As it was seen before, massive logging is not taking place in the Atlantic forest anymore, although it is still a matter of concern, particularly in Paraná and Santa Catarina. They are cases of clandestine sawmills operating in some areas. Palm heart (*Euterpe edulis*) is a matter of concern, from Santa Catarina to São Paulo, as this edible species is still taken from the forest. In São Paulo, most of the small-scale factories that canned *palmito* were closed. On the other side, a recent Government decree authorises the commercialization 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 its extraction is now limited.

2) Land speculation and rapid urbanization

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

In some areas, mangroves are cut to allow for house building, specially 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), São 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 urbanization in Rio de Janeiro (Marambaia, Sepetiba, etc.) and São Paulo (Ilha Comprida). Along the coast of Santa Catarina, particularly near the capital Florianópolis 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 2 000 ha. of mangrove were destroyed, affecting also the livelihood of artisanal fishermen.

3) 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 Norte, the approved plan to construct a tourist highway along the coast is a matter of concern, as it may threat ecosystems such as mangrove, beaches, *restingas* and coral reefs.

4) Industrial pollution

The combination of aerial pollution and heavy rainfall in 1985 completed to denude the slopes of Cubatão of its original rainforest. The industrial complex of Cubatão (SP) is probably the most polluted area of the world, situated only 7 kilometers 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 Atlantic forest (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) (*Cf.* MAP 2).

V- RAISING AWARENESS AND CONSERVATION

Classic preservationist groups appeared in Brazil in the 1930's. The first Brazilian Conference for Nature Protection took place in 1934 and in 1937 the first National Park was created 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 (IBDF) was created. In the 1960's, the main policy of IBDF was, however, the afforestation through fiscal incentives. In the 1970's, many tracks of the Atlantic forest 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 the Atlantic forest as well as 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, a more restrictive protected area and also the APA (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 Fishery Development). In 1989, a Ministry for the Environment was established, to which IBAMA now belongs.

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

More recently, in February 1993, a Federal Decree (n° 750) signed by the President has increased protection over ecosystems of the Atlantic forest. In its first paragraph the cutting of primary vegetation and of vegetation in advanced ecological stages of regeneration is forbidden. At the same time, for the first time, it is mentioned that traditional population can continue to use 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 Atlantic forest, 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 1970's, 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 Atlântica, established in the middle of the 1980's and a myriad of small conservation groups were also created to protect endangered species and habitats.

In 1992, a network of NGO's working in the Atlantic rainforest (Rede de ONG's Mata Atlântica) was created, joined by 30 institutions. Now 122 institutions have joined the Network, covering 16 states. The objective is to assist deforestation monitoring, to interchange 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 a state-regional level, putting together NGO's and Research Institutions dealing with some aspect of conservation and sustainable development. In the Atlantic forest 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, organization of dwellers of Juréia-Itatins Ecological Station, planning and implementation of small-projects, planning and proposal of Extractive Reserves in the coastal area of the Atlantic forest.

VI- PROTECTED AREAS

According to a recent study undertaken by NUPAUB, there are 297 restrictive protected areas (Ecological Stations, National Parks, Biological Reserves, Ecological Reserves, Forestry Reserves, Biological Stations) in the Atlantic rainforest, reaching 2 489 682 ha. (or 24 896 km.²). Taking into consideration that the remnants of the Atlantic forest occupy today 9 564 100 ha. (or 95 641 km.²), according to the Atlas de Remanescentes Florestais do Dominio da Mata Atlântica (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 ha.). 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 rainforest (147 units), covering 1 616 099 ha. (16 161 km.²) and representing 64% of the remaining forest. Within the region, the situation varies. São Paulo, for instance, has a high percentage of the Atlantic forest 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, RN) 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 rainforest. In the State of Espírito Sante, for instance, only 11 % of the remnants of the Atlantic forest are under protection (*Cf.* MAP 3).

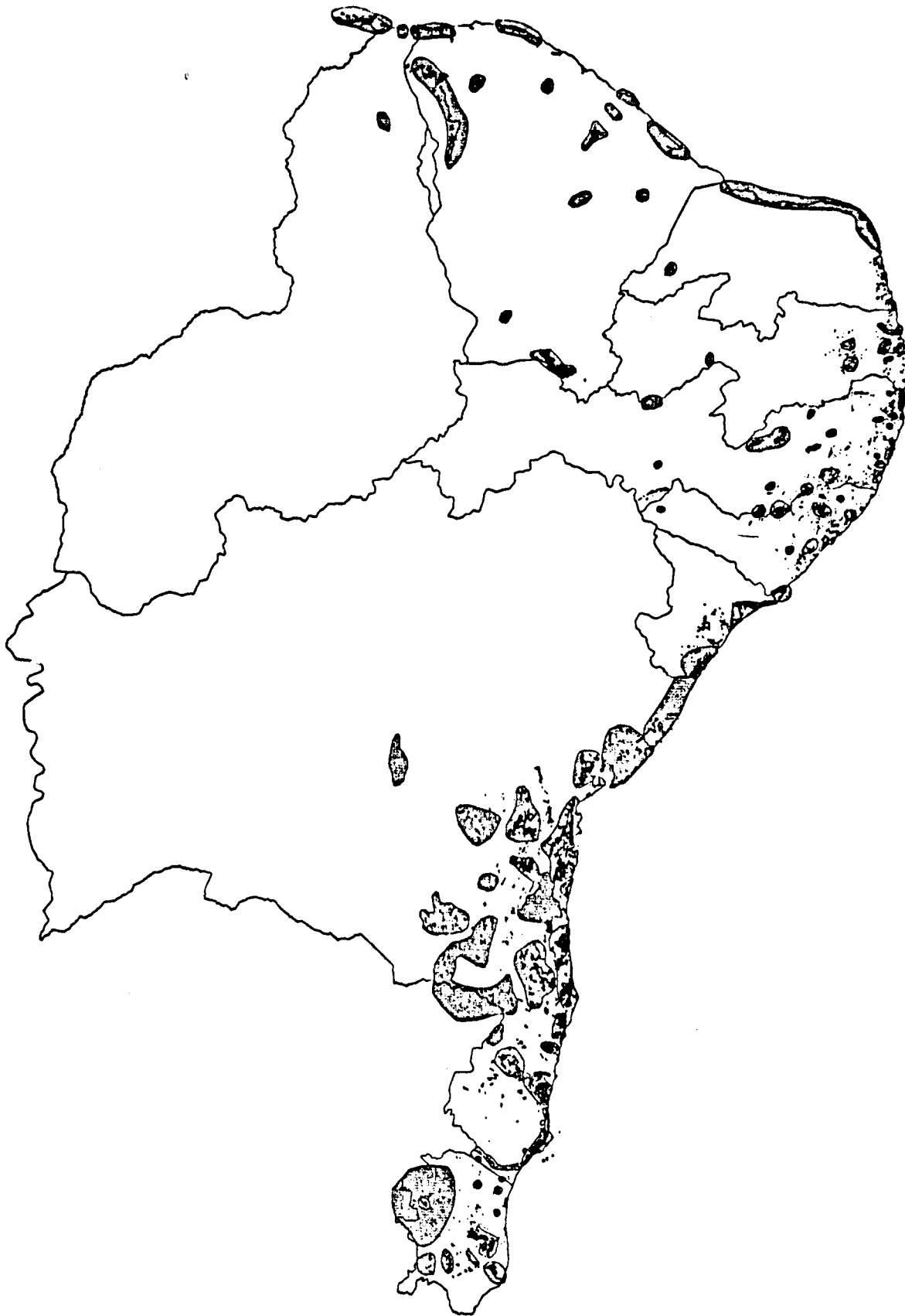
In the Southern states (RS, SC, PR), there are 70 protected areas, covering 622 416 ha., or 25 % of the remnants of the Atlantic forest.

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,... 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 farmers,... In fact, many of the rather preserved remnants of the Atlantic forest 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, these 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,... Many studies have shown the deep knowledge they have of the forest and associated ecosystems (*Cf.* Diegues ; Marques ; Mussolini). It is also true that, from the 1960's these communities, particularly those living along the coast started to be expropriated from their territories and resources by land speculators. In this sense, the establishment 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 organizations (*Cf.* Diegues, 1994).

MAP 3 : Remnants of the Atlantic forest in the Northeast



SOURCE : WORLD-WIDE FUND FOR NATURE (WWF), 1991

A recent study undertaken by the NUPAUB (Research Centre on Human Populations and Wetlands) along the various states of the Atlantic forest 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 Sante, Rio de Janeiro, São Paulo and Paraná, where most of the remnants of the Atlantic forest are 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, 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 Atlântica forest : 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.

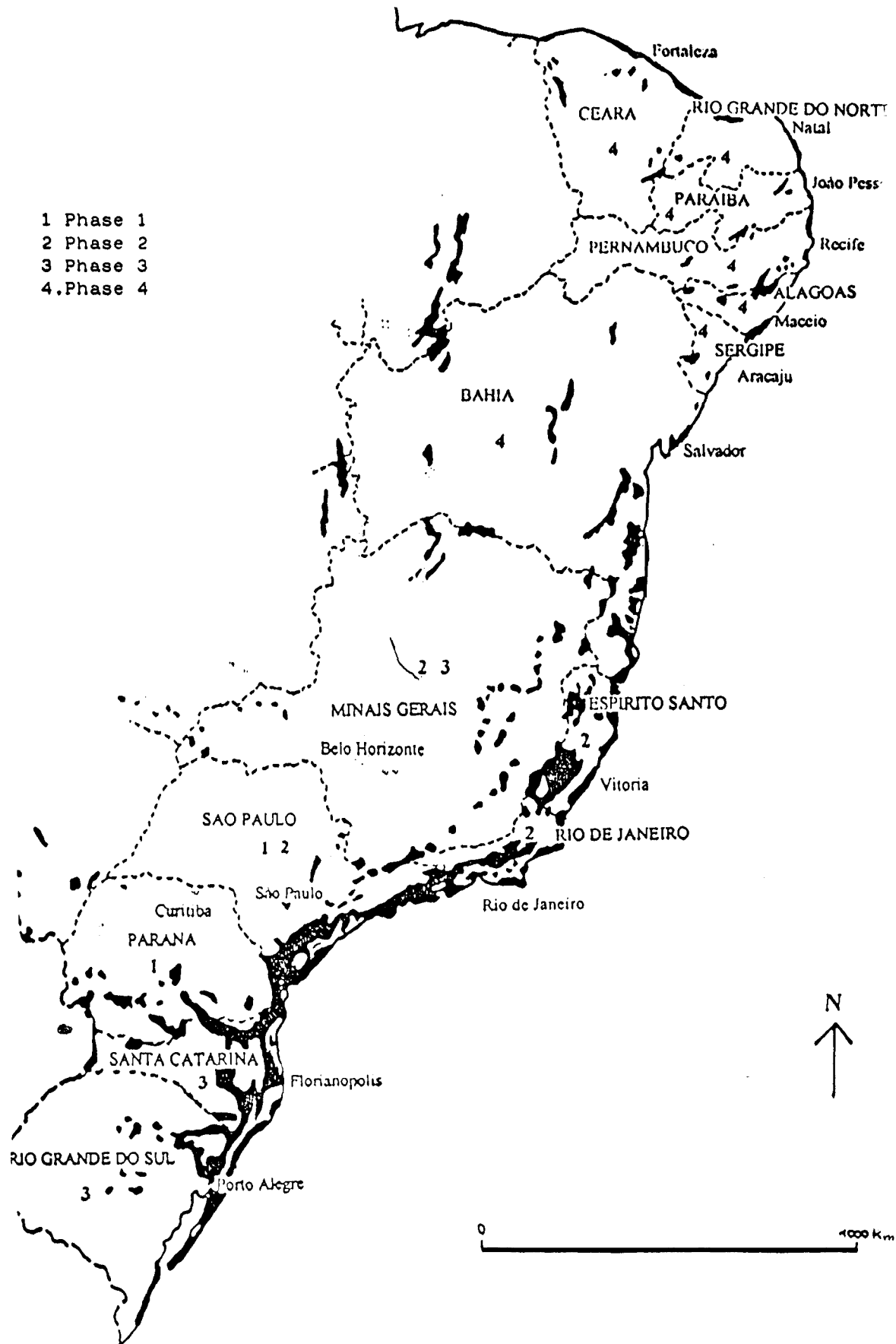
VII- THE MATA ATLÂNTICA BIOSPHERE RESERVE (RBMA)

In 1991, the Consorcio Mata Atlântica proposed the creation of the Mata Atlântica Biosphere Reserve in the most conserved and protected area of this forest : the southern coastal part of São Paulo and the north of Paraná. To the core are belonging some 730 000 ha. of already existing protected areas (*Cf.* 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 included 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 organizations.

MAP 4 : Phases of the Mata Atlântica Biosphere Reserve (RBMA)



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 the State representatives, the Federal Government and NGO's. During the various national meetings, 6 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.

VIII- 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 the Atlantic forest. The information, however only partially reaches a larger public than those already working in the field of environmental issues in the region. The Mata Atlântica Biosphere Reserve, as it was established faces several problems,

1) 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.

2) Excessive concentration on protected areas issues

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 desappropriation 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 Biosphere Reserve 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 the Atlantic forest will result in a higher degree of protection. Although it is may be true, the main asset of the Biosphere Reserve 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.

3) 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 Reserve. Although it might be politically sensitive, a few priority areas should be selected for implementation.

4) 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, information, zoning, environmental education networking) and regions (Southern Region, Iguape-Paranaguá estuary, Green Belt around São Paulo, Serra do Mar and Mantiqueira, Espírito Santo and southern Bahia, Northeast). Difficulties in setting priorities can also be assessed through the large number of projects of different types published in the 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\$ 60 051 116 (no finds yet available).

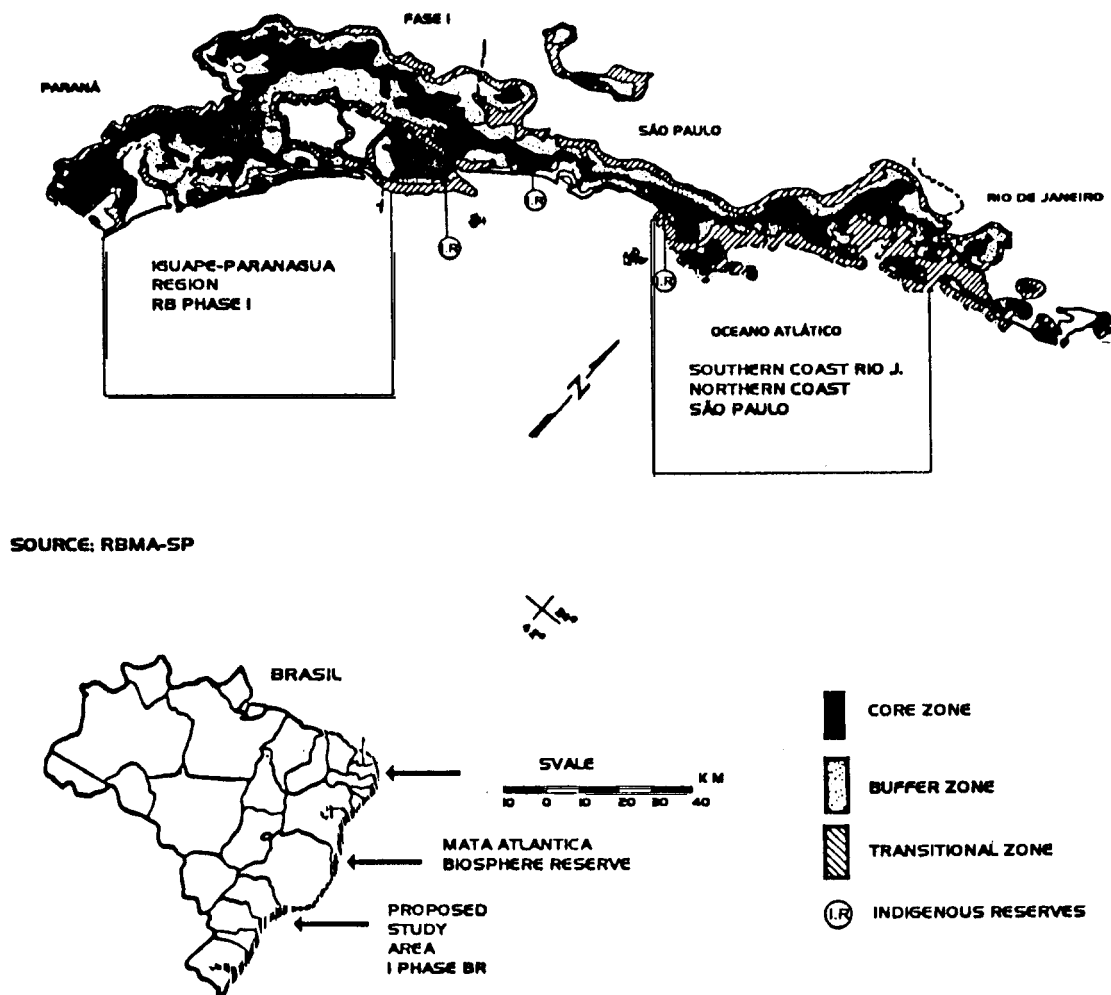
During the 4th Meeting of the Biosphere Reserve Council, in 1994, a large number of pilot project areas were selected in the States of Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, Rio de Janeiro, Minas Gerais, Espírito Sante, Sergipe, Alagoas, Pernambuco, Paraíba, Rio Grande do Norte and Ceará.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

IX- 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 (Cf. MAP 5).

MAP 5 : Proposed study area



1) Iguape-Paranaguá estuarine ecosystem, Atlantic forest and its *caiçara* population

The first area could be the Iguape-Paranaguá estuarine ecosystem, as it covers two states : Paraná and São Paulo. It constitutes roughly the first area which was declared Biosphere Reserve in 1991. 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 NGO's and Universities already working and the Biosphere 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.

a- 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, São Paulo and Rio de Janeiro, usually in small communities. This region was colonised by the Portuguese, already in the XVIth century. From that time old colonial towns such as Iguape, Cananeia, Antonina still exist. The livelihood of the *caiçaras* is based on small-scale fishing, stifling agriculture and forest harvesting.

The local population uses several ecosystems and their natural resources.

b- 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,... 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: *Crecoxia glaziovii* (*umbaua*), *Calythantes* sp. (*araçarana*), *Astrocaaryum aculeatissimum* (*brejauba*), *Aspidosperma compactinervium* (*peroba*), *Vernonia discolor* (*cambara-guaçu*) and *Ocotea* sp. (*canela*).

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

There is also an important diversity of birds and mammals in the forest (Cf. TABLE 2) many of which are hunted by the local communities.

TABLE 2 : Mammals and birds in the forest

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

Note : *Hunted by the local communities.

c- 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 diversification 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 São 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*).

d- 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 km.² of mangrove. There are several species of mangrove in the area and the more important are : *Rhizophora* 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 resource 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*),...

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

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

Mangrove areas are utilised by the traditional population primarily as a source 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-Paranaguá 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 the adjacent sea.

e- Lagoons, estuaries and natural resources

There are many estuaries and lagoons in the low coastal plains of the south of São Paulo, Paraná and Rio de Janeiro. The main one is the large Iguape-Cananeia-Paranaguá 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.

f- Coastal and ocean ecosystems

The *caiçaras* also exploit the open sea, close to estuaries and beaches. In the rocky northern coast of São 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.

g- The traditional livelihood of the local *caiçaras* in the areas

Until the 1960's, 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 *mutirão*.

Fishing, as well as agriculture was divided in two main seasons : summer, from November to April, and winter, from June to September. The mullet fishing played a particularly important role in the *caiçara* society until the 1960's, 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 it. The fishes were caught by the use of beach seine and bamboo screen traps (*cercos*), were dried and salted 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,... 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 1950's and 1960's. 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 São Paulo.

In the 1960's 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 1960's tourism and land speculation have also exerted strong pressure over local communities, particularly in Ubatuba, Paraty 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 1960's, the region was the only well conserved Atlantic forest region in the State of São 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 São Paulo, the Biological Station and the APA of Guaraquecaba, the National Park of Superagui) and today over 70 % 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 São Paulo and Guaraquecaba in Paraná). If one includes Paranaguá, an important export harbour in Paraná, 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 a need to harmonise development and environmental protection on an area basis and in this sense, the Mata Atlântica Biosphere Reserve can play a crucial role, creating income alternatives based on sustainable uses of renewable resources.

In this action, priority should be given to the *caiçara* 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 for the urban population, particularly through strategies based on tourism and services.

h- Government and Ngo institutions in the region

In São Paulo

The Research Centre on Human Population and Wetlands, of the University of São Paulo (NUPAUB/USP) is an interdisciplinary research centre which is working on the following projects :

i) Extractive Reserve in the Atlantic forest : a feasibility study has been recently completed in Mandira village, Cananeia in co-operation with 20 *caíçara* families and with the Centre for Traditional Population (COPT) of IBMAMA, responsible for the implementation of the Extractive Reserve. The first reserve for 20 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 50 artisanal fishermen families.

ii) 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 Sos Mata Atlântica, a project for *caixeta* management. This project is working closely with the local Association of *caixeta* harvesters. As result, the first small-scale saw-mill has been reopened, using logs from the project area. This project has been funded by the Ford Foundation and FINNIDA/FANC.

iii) Support to *caíçara* population living inside protected area. This project aims at supporting local communities organization, such as the Association of Dwellers of Jureia-Itatins Ecological Station. In June 1994 the first meeting of dwellers of protected areas in São Paulo and Rio de Janeiro was organised, in co-operation with REBRAAF (Rede Brasileira de Florestas), PROTER and NGO's 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 authorizations for the sustainable use of natural resources in small areas where this population lives.

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

Other projects :

* Sos Mata Atlântica : this NGO has facilities in Iguape and is operating mainly in environmental education projects.

* REBRAAF : 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 REBRAAF and the Association of Dwellers of Jureia-Itatins Ecological Station where around 300

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

* AAO (Organic Agriculture Association) : it 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 São Paulo, the Fisheries Institute and the Forestry Institute (from the Secretariat of Agriculture and the Secretariat of Environment) 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 is involved in surveillance and management projects for *manjuba* (anchovieta) management also in Iguape.

In Paraná

In the estuarine area situated in Paraná some projects have also started :

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

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

iii) The graduate course of Society and Environment, of the Federal University of Paraná 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.

2) São Paulo northern and Rio de Janeiro southern coastal region

In this second sub-region, the Atlantic forest is also very important, although tourism has increased dramatically in the last few years, particularly in Ubatuba, Ilha Bela, Caraguatuba, São Sebastião 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 1970's, along the coast, has changed the landscape of this area, allowing for the dramatic expansion of urban areas over mangroves and beaches. The local *caiçara* population has the same social and cultural features as described for the southern part of São Paulo but social changes were more rapid there than in the first analysed region. Small communities, however, still exist in more remote areas of Ubatuba, São Sebastião and Ilha Bela, where a State Park exists. *Caiçara* communities also live in isolated islands, as Montão de Trigo, Vitória 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 São Sebastião there is a huge harbour for oil transportation and often oil spills occur, polluting neighboring beaches.

NGO's and Government institutions in the region

State institutions :

* The São Paulo Secretariat for Environment (SMA/SP) : it 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. The SMA/SP has also build-up a center in Picinguaba (Ubatuba) for environmental education and research.

* The CETESB : State company dealing with environmental control, has projects for assessing pollution levels in the region.

* The Instituto Oceanográfico (USP), Biociencias (USP) and Instituto de Pesca have research basis in Ubatuba and São Sebastião.

* The Rio de Janeiro Forestry Institute (IEF/RJ) : it is responsible for the establishment and surveillance of protected areas in the southern coast of Rio de Janeiro.

NGO's institutions :

* São Sebastião Tern Alma, located in São Sebastião 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 Vitória, Buzios and Montão de Trigo. It has also, in co-operation with NUPAUB, organised several meetings to discuss and propose solutions for **caiçara** problems (Encontro **Caiçara**, Encontro das Ilhas). In December 1994, a Symposium called Internation Meeting of the Sea and Mata Atlântica 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 television station that presents programme 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 (*Cf.* Diegues & Nogara).

X- 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 :

i) **Better understanding on the knowledge of 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, subsistence cropping, fishing,...) according to the 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 commercialized.

ii) **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,... An inventory of these practices are essential to retrieve and use traditional management schemes in different projects.

iii) **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*), aquiculture (oysterculture, mussel cultivation,...). Some of these studies have already been studied in different areas of the Atlantic forest, but have to be tested in community areas.

iv) **Creating “new commons” : Extractive Reserves in the Atlantic forest.** As it was mentioned, many of the *caiçaras* communities are under threat, particularly from land speculation. In some cases, Extractive 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 the Atlantic forest represents a legal recognition of

communal territories informally used by local communities (for example, mangrove). As community organization, establishment of committees of commoners are a condition for Extractive Reserves, communal participation is an 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, palm heart (*palmito*) planting, medicinal herbs production,...

An additional advantage of the Extractive Reserve is that applied research can be a continuous process, linked with production/commercialization and extension activities.

v) **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.

BIBLIOGRAPHY

BIGARELLA J., ANDRADE-LIMA D. : *Paleoenvironmental changes in Brazil*
in : **PRANCE G. T. (cd.) :** *Biological diversification in the Tropics, 1982.*

CONSORCIO MATA ATLÂNTICA :

Reserva da Biosfera da Mata Atlântica -Anais do Seminário Nacional
UNICAMP, Campinas (SP, Brasil), dezembro de 1991.

Reserva da Biosfera da Mata Atlântica -Plano de Ação
UNICAMP (Projetos, vol. 12), Campinas (SP, Brasil), 1992.

Rede de ONG's -2ª Reunião Nacional
São Paulo (SP, Brasil), 1994.

DIEGUES A. :

Pescadores, camponeses e trabalhadores do mar
Ática, São Paulo (SP, Brasil), 1983.

Biological diversity and traditional cultures in coastal wetlands of Brazil
NUPAUB-UICN, São Paulo (SP, Brazil), 1988.

O mito moderno da natureza intocada
NUPAUB/USP, São Paulo (SP, Brasil), 1994.

DIEGUES A., NOGARA P. : *O nosso lugar virou parque : estudo sócio-ambiental do saco de Mamangá-Parati-Rio de Janeiro*
NUPAUB/USP, São Paulo (SP, Brasil), 1994.

HAFFER J. : *Avian speciation in South America*
Nuttal Orn. Club Publication n° 14, Cambridge (Mass., USA), 1974

KINZEY W. G. : *Distribution of primates and forest refugia* (pp. 445-482)
in : **PRANCE G. T. (cd.) :** *Biological diversification in the Tropics, 1982.*

LYNCH J. D. : *The amphibians of the lowland tropical forests* (pp. 189-215)
in : **DUELMANN W. E. (cd.) :** *The South American Herpetofauna : its origin, evolution and dispersal*,
Kansas University Press (Historical Museum Monograph n° 7).

MARTINS U. R. : *Monografia da tribo Ibidionini*
VI Distribuição Geográfica, Arq. Zool., (SP, Brasil), vol. 27, n° 3-3 (pp. 165-370).

MARQUES J. G. :

Aspectos ecológicos da etnoictiologia dos pescadores do complexo estuarino-lagunar Mundaú-Manguaba (Alagoas)
UNICAMP (Tese de Doutorado), Campinas (SP, Brasil), 1991.

Ecologia humana/etnoecologia na várzea da Marituba : cognição e conexões em um ecossistema de área úmida do baixo São Francisco alagoano
NUPAUB/USP, São Paulo (SP, Brasil), 1994.

MUSSOLINI G. : *Ensaio de antropologia indigena e caiçara*

Paz e Terra, Rio de Janeiro (RJ, Brasil), 1980.

NUPAUB: *Conflitos entre populações humanas e unidades de conservação na Mata Atlântica*

NUPAUB/USP, São Paulo (SP, Brasil), 1994.

PORF. D. : *Sooretama : the Atlantic rainforest of Brazil*

SPB Academic Publisher b.v., The Hague (The Netherlands), 1992.

RIZZINI C. T. : *Tratado de fitogeografia do Brasil*

Huicitec - USP, São Paulo (SP, Brasil), 1979.

RODRIGUES M. T. : *Os lagartos da floresta Atlântica brasileira -Distribuição atual e preterita e suas implicações para estudos futuros* (vol. 2, pp. 404-409)

II° Simpósio Ecos. da Costa Sul e Sudeste Brasileira, 1982.

SOS MATA ATLÂNTICA : *Rede de ONG's Mata Atlântica*

Especial, São Paulo (SP, Brasil), 1994.

Antonio Carlos DIEGUES

The Mata Atlântica Biosphere Reserve (Brazil) : an overview

Working Paper N° 1, 1995 (36 pp.)

UNESCO (South-South Cooperation Programme), Paris (France)

ABSTRACT

The author describes the present situation of the Brazilian Atlantic forest : variety of ecosystems, environmental damages, diversity of population and conservation policies. The use and knowledge of the natural resources by the traditional population (the *caiçaras*) are stressed, as are the conditions of their rapid socio-cultural transformations exposed. A description is made of the first phase of the creation of the Mata Atlântica Biosphere Reserve. Its main problems are, for the author, the lack of local participation, the excessive concentration on core zone issues compared to the higher priority of buffer zone management issues, the large size of the area with numerous State Administrations which makes it difficult to implement a coherent management policy, as it is with an excessive number of priorities considered. Therefore, a more restricted area is proposed and studied where a limited number of projects on the sustainable use of natural resources could be carried on, with a large participation of local communities, Government and Non-governmental institutions.

RÉSUMÉ

L'auteur décrit la situation actuelle de la forêt atlantique brésilienne : variété des ecosystems, dégâts portés à l'environnement, diversité des populations et des politiques de conservation. L'utilisation et les connaissances des ressources naturelles, par les populations traditionnelles (les *caiçaras*), sont mises en relief, comme sont exposées les conditions de leurs rapides transformations socio-culturelles. Une description de la première phase de la création de la Réserve de la biosphère Mata Atlântica est effectuée. Ses principaux problèmes sont, pour l'auteur, le manque de participation locale, la concentration excessive sur des thèmes concernant la zone centrale en comparaison de la priorité des thèmes de gestion de la zone tampon, la grande étendue du territoire avec de nombreuses Administrations étatiques rendant difficile l'implantation d'une politique de gestion cohérente, comme cela l'est aussi avec un nombre excessif de priorités considérées. Par conséquent, une région plus restreinte est proposée et étudiée où un nombre limité de projets sur l'utilisation pérenne des ressources naturelles pourrait être mis en œuvre, avec une large participation des communautés locales, des institutions gouvernementales et non-gouvernementales.

Professor Antonio Carlos DIEGUES is Scientific Director of the NUPAUB (Research Centre on Human Population and Wetlands) of the University of São Paulo (Brazil).

Working Papers

- N° 1 (1995) : *The Mata Atlântica Biosphere Reserve (Brazil): An Overview*
Antonio Carlos DIEGUES
- N°2 (1995) : *The Xishuangbanna Biosphere Reserve (China) : A Tropical Land of Natural and Cultural Diversity*
WU Zhaolu, OU Xiaokun
- N°3 (1995) : *The Mae Sa-Kog Ma Biosphere Reserve (Thailand)*
Benjavan RERKASEM, Kanok RERKASEM
- N°4 (1995) : *La Réserve de la biosphère de Dimonika (Congo)*
Jean DIAMOUANGANA
- N° 5 (1995) : *Le Parc national de Tai (Côte d'Ivoire) : un maillon essentiel du programme de conservation de la nature*
Yaya SANGARÉ
- N°6 (1995) : *La Réserve de la biosphère de Mananara-Nord (Madagascar) 1988-1994: bilan et perspectives*
Noëline RAONDRY, Victor SOLO, Martha KLEIN
- N°7 (1995) : *A Study on the Homegarden Ecosystem in the Mekong River Delta and the Hochiminh City (Viet Nam)*
Nguyen Thi Ngoc AN
- N° 8 (1 1995) : *The Manu Biosphere Reserve (Peru)*
Gustavo SUAREZ DE FREITAS
- N° 9 (1 1995) : *The Beni Biosphere Reserve (Bolivia)*
Carmen MIRANDA L.
- N° 10 (1995) : *La Reserva de la biosfera Sierra del Rosario (Cuba)*
Maria Herrera ALVAREZ
- N° 11 (1995) : *The Omo Biosphere Reserve (Nigeria)*
Augustine O. Isichei
- N° 12 (1995) : *Environnement naturel et socio-économique de la forêt classée de la Lama (Bénin)*
Marcel A. BAGLO, P. COUBEOU, B. GUEDEGBE, B. SINSIN
- N° 13 (1995) : *The Calakmul Biosphere Reserve (Mexico)*
Eckart BOEGE SCHIMDT

ANNOUNCEMENT

The Programme is publishing its Newsletter South-South Perspectives, which can be received free of charge on request.

In the Newsletter, its editors would be glad to write short notes about books received and other kind of publications on *environment conservation, biodiversity, sustainable management of renewable resources* and **South-South cooperation**. We would also reflect information on present South-South cooperation activities in these fields.

All comments are welcome.

All correspondence should be addressed to :

Miguel CLUSENER-GODT
UNESCO
Division of Ecological Sciences
South-South Cooperation Programme
1 rue Miollis
76 732 PARIS Cedex 18
FRANCE

E-mail : scmcl@unesco.org
Telefax : 33 - (1) 46.65.98.97

