March7, 2008

MARINE PROTECTED AREAS AND ARTISANAL FISHERIES IN BRAZIL

ICSF

Antonio Carlos Diegues, anthropologist,
NUPAUB[1]/University of São Paulo –Brazil
September 2007

SUMMARY

[1] Research Assistant: Fabio Henrique de Souza, Nupaub

Introduction

In Brazil the establishment of Marine/Coastal Protected Areas,in particular national parks has raised many conflicts between artisanal fishermen and protected areas authorities. Most of these conflicts refer to restriction of artisanal fishing activities in areas traditionally used by these artisanal fishermen In many cases these conflicts appeared as result of the fact that these protected areas were created without fisheries communities information and participation. One example of this top-down approach is Peixe Lagoon National Park, in southern coast of Brazil described as case study.

In 2000, when a new National System of Protected Areas was created, new categories were established, particularly Marine Extractive Reserves (MER) and Reserves for Sustainable development,(RSD) where sustainable uses are means to achieve biodiversity conservation and amelioration in the living standards of fishermen. In recent years the demand for the establishment of the sustainable use reserves by fishermen communities has greatly increased It should be mentioned that no-take zones within these reserves are forseen in the legislation and some communities are asking for their creation.

In view of the importance of MPAs and growing conflictive situations it is important for ICSF to build up a common position in order to protect the livelihood of artisanal fishermen communities that are the most affected by the expanding no-take parks and at the same type promote conservation and sustainable use of natural resources

The objectives of this paper are:

a) to better understand the impact of no-take marine protected areas on coastal communities livelihood, conflicts and potential solutions

b) to analyse existing experiences on biodiversity conservation and sustainable use that benefit coastal communities. In the case of Brazil, priority will be given to analyse a new strategy to protect biodiversity and promote sustainable use of marine/coastal resources: **the Marine Extractive Reserve** (category 5 in IUCN tipology).

c) to promote the sharing of experience with other Southern Countries that have similar problems.

Organization of the paper

In the first part, the paper analyses

a) the situation of the no-take marine protected areas and their impact on artisanal fishermen´s livelihood and
b) in the second part a new protected area category of sustainable use is described : the Marine Protected Areas (MER)
c) In the third parte three case studies of Marine/Coastal Protected are analysed :1 Coastal National Park and two Marine Extractive Reserves.

PART 1

1. The Brazilian Legislation on Marine Protected Areas

In Brazil, the IBAMA (Brazilian Institute for the Environment), an institution which is part of the Ministry for the Environment- MMA) is responsible for the establishment and management of protected áreas . The more recent legislation on these areas is the National System for Protected Area,(SNUC) which was established by a Congress Law in 2000. The SNUC distinguishes two basic types of protected areas **:areas of total protection** (no take) in which no human population is allowed to stay and **areas of sustainable use**

The local names and corresponding IUCN typology of no-take marine protected areas are :

1. Marine National/State Parks (IUCN category II)
2. Marine Biological Reserve (IUCN category I)
3. Marine/Costal Ecological Station (IUCN category IV)

The Marine Biological Reserve and Ecological Stations are the most restrictive categories as far as the presence of people is concerned : only research and environmental education are allowed. In the Marine National Parks tourist visitation is allowed.

The local names and corresponding IUCN typology of sustainable use categories of marine protected areas are :

4. Areas of Environmental Protection (IUCN category V)
5. Marine Extractive Reserves (IUCN category category V)
6. Marine Reserve for Sustainable Use (IUCN category V)

Marine Extractive Reserves (MER) and Reserves for Sustainable Development, allow for the sustainable use of resources, although the last one may also include areas for total protection. They can be considered as « new commons » in the sense that they have defined boundaries, collective actions represented by fisheries co-management activities undertaken by Government and the User´s Association, laws and regulations established by the User´s Association, penalties for those who disobey them.

The Marine Extractive Reserves(MER) established officially in 1990 will be the main issue of this paper ;

The Marine Protected areas follow the regulations of the continental protected areas. In this paper marine as well coastal protected areas are considered, as many continental protect areas have coastal line in which fishing activities are restricted.

2. A Brief History of Protected Areas in Brazil.

The SNUC law was approved after more than 10 years of discussions among different groups of conservationists and the core of the conflicts was the role and presence of « traditional people » inside the areas of total protection. By that time it was estimated that over 70% of the no-take areas had people living, many of the traditional people . Since the establishment of the first National Park in 1937 (Itatiaia) the Government had the policy of transfering these dwellers, but this policy started in fact to be implemented only in the 80 ´s with the creation of the National Secretariat for the Environment (SEMA) which is 1989 was replaced by IBAMA. By then, the establishment of protected areas became the most important strategy for nature conservation and the department responsible for the creation and implementation of these areas was the more important one inside IBAMA. The decade of the 70/80, during the Military Regime was crucial for the Amazonian area, as many development programmes (roads, dams, mining, agro-industries,

cattle ranching) were implemented and funded by the World Bank and other international funding institutions. Many no-take areas, recommended by the World Bank were established in that region as a lip-service for the forest destruction promoted by those large projects. .It should also be mentioned that in that period many Enviromental NGOs were established in Brazil and had the creation of no-take protected as their main strategy. In the 80´s international Ngos oppened their branches in Brazil, such as WWF, Conservation Internation (CI) and TNC, fueling international money on the the management of many protected areas created earlier (considered paper parks) and pushing the government to created new ones.

Until the 80´s only no-use received priority (funds, personnel) from IBAMA And preservationist NGOs which exerted great influence on government environment institutions. When the rubber-tappers started resisting deforestation of the rubber trees at the end of the 70´s, they were able, through the National Council of Rubber Tappers to propose the first Extractive Reserves. This political pressure was supported by internation groups and social mobilization at national level. As result the first extractive reserves were legally incorporated as protected areas for sustainable use. At the end of the 80´s, a small unit was created inside IBAMA – the National Council for Traditional Population (CNPT) to be responsible for the establishment and implementation of extractive reserves although it lacked funds and personnel.

The national legislation also makes a clear distinction between Indian Peoples (Povos Indigenas), summing some 160 different cultures and languages (some 700.000 individuals) who have their own territories protected by law and traditional populations/ communities that were historically formed by the mixing of the Indian, European and Black slaves.

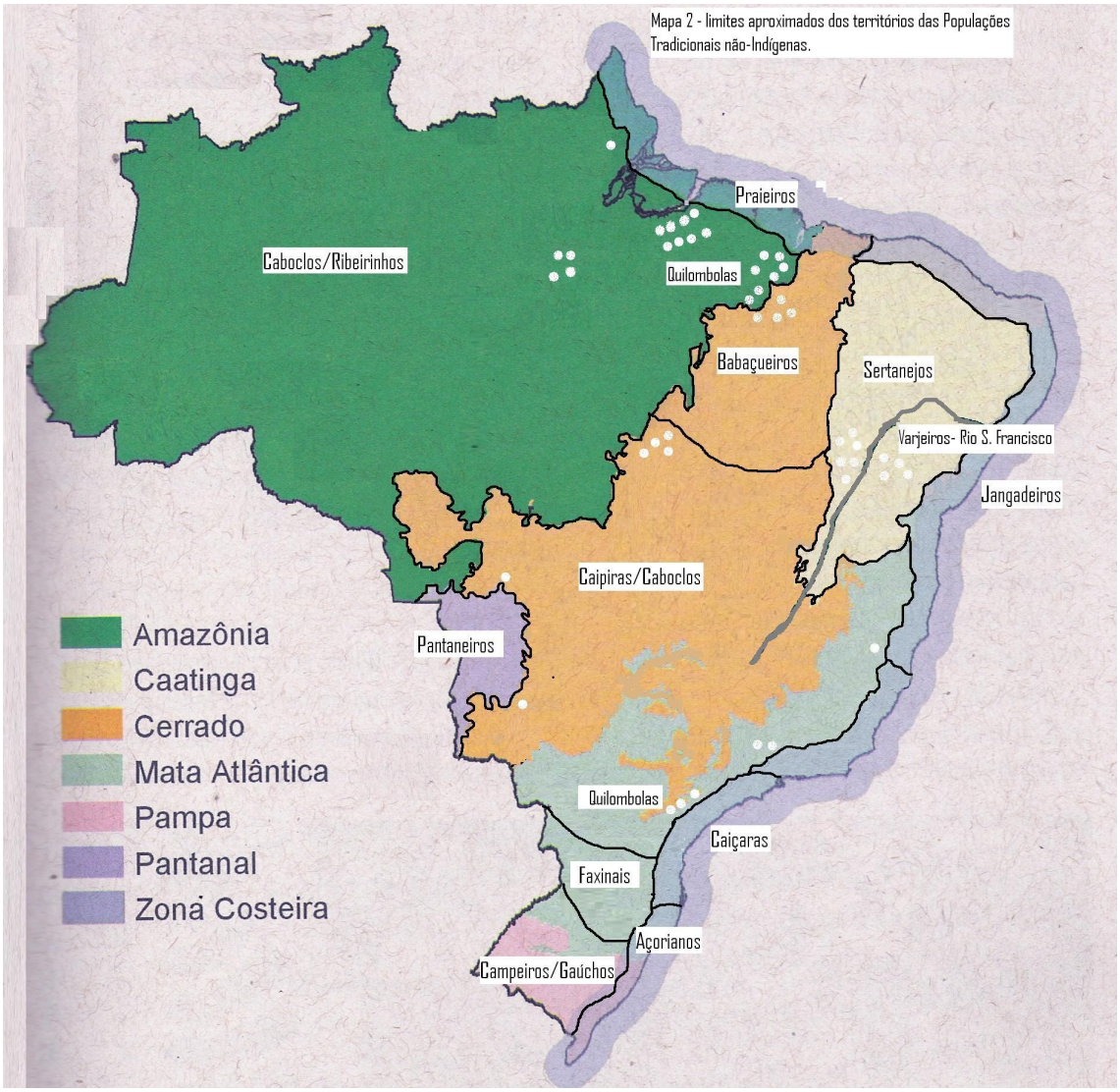
Among these Non-Indian traditional populations/ communties are the Amazonian riverine/rubber tappers, the caiçaras (peasant/fishermen living in the Southeast coast and Atlantic Forest), « the sertanejos », small-scale cattle raisers from the Northeast, the « Azorians », fishermen from the southern coast.

Artisanal fishermen belong to different sub-cultures .Thus, in the southern coast of the country, there are artisanal fishermen, who are descendants of the Azorian migrants who developed techniques and systems suited to a jagged coastline, with many islands, bays and lagoons. In the southeastern region are the "*caiçaras"*, descendants of the Portuguese colonisers, natives and blacks who combine small-scale fishing with

small-scale agriculture. In the northeast live the raft fishermen (jangadeiros) who use a specialised raft adapted to beaches without piers, known as the "jangada". In the Amazonian coast are the "praieiros" fishers who developed a large variety of boats suited especially to a coast with fluctuating tide conditions.(see map 1)

MAP 1 **Location of various non-Indian traditional peoples in Brazil**

Source:Diegues,2001



In 2005 the Environment Ministry launched a courageous policy to take into account the needs of the traditional communities, both Indians and Non-Indians (although most of them have strong Indian cultural influence). This policy is being developed by the Government and representatives of these traditional communities through a National Sustainable Commission for Traditional Communities. The creation and support for Extractive Reserves and Reserves of Sustainable Development are one of the main request of these traditional coastal communities. From the 14 different representatives of these communities in the Nation Commission, five belong to different coastal/fishing cultures.

3.A short history of Coastal Marine Protected Areas in Brazil:

The establishment of protected areas is one of the main Government policies concerning coastal ecosystem conservation and can be considered a reaction against the rapid degradation of Brazilian coastal habitats.The first no-take marine protected areas were create since the 80´s to protect oceanic islands and archipelagos.(such as Fernando de Noronha, Abrolhos National Parks).

The creation of protected area is under the responsibility of the newly created Instituto Chico Mendes,~ICB-(2007) that replaced IBAMA (Brazilian Institute for the Environment) on the responsibility of the establishment and management of protected areas.The ICB is still in the process of organization, and will be operational in some months time. MPAs can also be created by States and Municipalities. There are 24 (409.100 ha) of no-take protected areas under Federal jurisdiction , 14 under Provincial jurisdiction (8.800), totalling 38 MPAs, covering 417.900 ha. There are also 28 federal (1.057.200 ha) and 25 Provincial sustainable use Pas (375.800 ha), covering 1.433.000 ha..In total there are 53 marine protected areas covering 1.433.000 ha. It should be noted that the 535 terrestrial Pas under Federal and Provincial jurisdiction cover 97.999.600 hectares and the are of MPAs represent only 1.46% of the total surface of terrestrial Pas. (ICM. 2008)

MPAs spread over several coastal and marine ecosystems such as coastal and oceanic islands/archipelagos, dunes, mangroves, lagoons and salt marsh habitats. A recent study on coastal/marine-protected areas has shown that there is a low level of management due to lack of management plans, of legislation enforcement, technical and financial means and research.

A major reason for the low conservation achievement however lies in the way these protected areas are established, without previous consultation with users groups, and traditional populations in particular. These groups, according to existing legislation must be transferred from the places where these protected areas are established. It is known, however, that these traditional communities have used these habitats with a low level of impact on flora and fauna and should be considered as important allies in the conservation process. As these areas are created mainly by federal and state agencies, local municipalities are excluded from the decision and therefore give little support to these important conservation areas.Given the fact that in some communities fishermen also practice small-scale agriculture in order to avoid this activity government environmental agencies tend to more lenient with fishing activities, to induce local communities to be associated with tourism particularly in the coastal national/state parks. The support and incentives to tourist services is also a strategy of BINGO´s (Big International NGO´s) to take fishermen communities from the traditional use of natural resources, However, due to urban/tourist expansion many artisanal fishermen have lost their house and shacks (to keep their boats) and moved to areas far from their beaches.

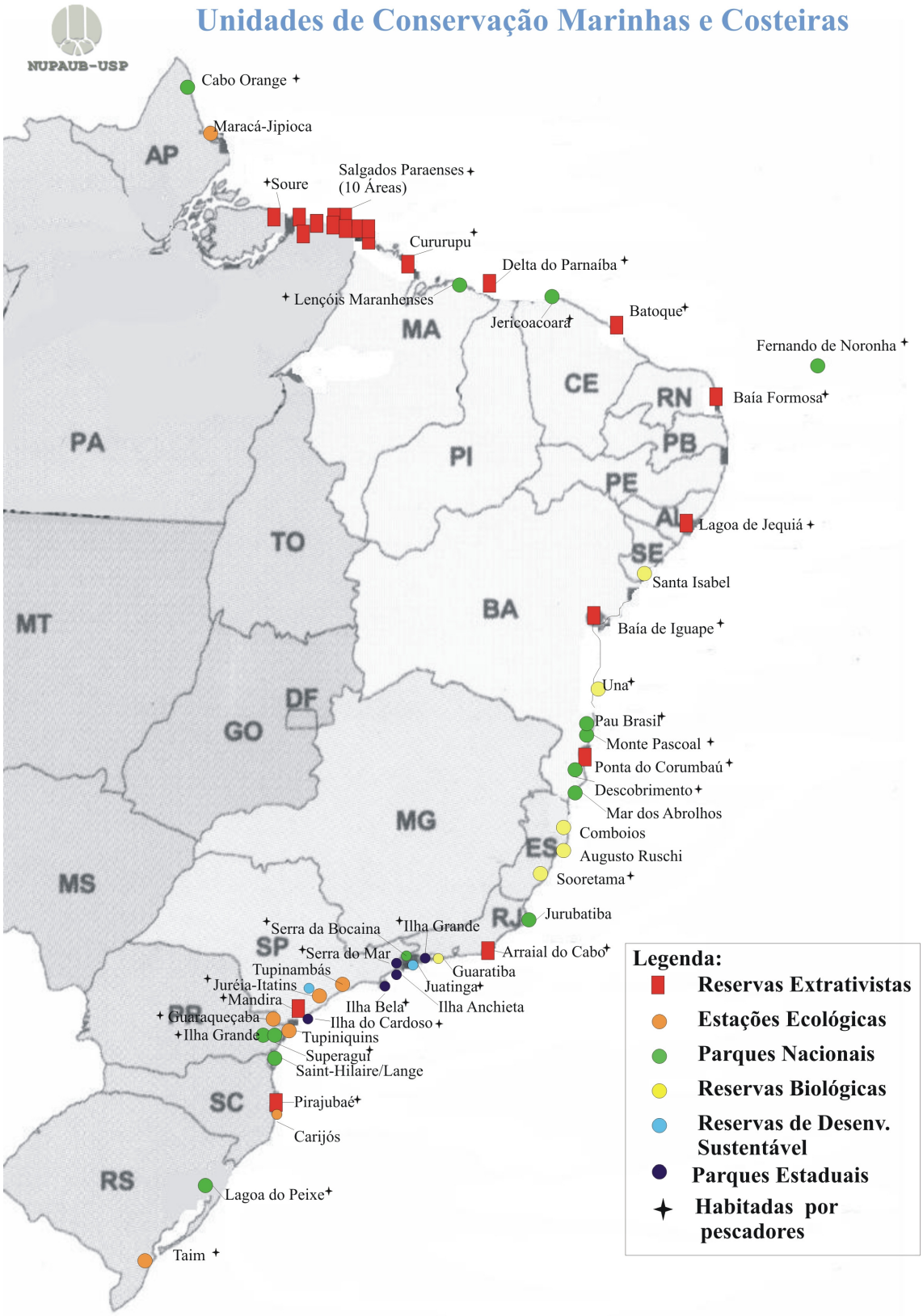
4. No take marine protected areas and their impact of fishers livelihood

In the **map n.2** marine/coastal protected areas of no-take and of sustainable use are indicated. With exception of biological reserve that generally are small, the almost totality of no-take categories have population, particularly, particularly fishermen living inside.

Table 1. Coastal/marine to take protected areas and population living inside

Cat.Non-use	Number	With inhabitants	% with inhabit.
National Parks	12	11	91.5
State Parks	5	5	100,0
Ecological Stations	5	5	100,0
Biological Reserve	5	2	40,0

Source : IBAMA 2000



MAP 2 Different categories and location of Marine/coastal protected areas

As the legislation concerning strictly protected areas are severe, fishermen and other extractivists face great difficulties for carrying on their traditional fishing and their way of life. In many of these parks conflicts still continue and often result in the abandon of their houses and plots and in the migration for urban areas in coastal towns where they face under-employment and poor living conditions.

Reported conflicts involving fishermen and park administration occur in coastal State Parks of Ilhabela and Ilha do Cardoso in Sao Paulo State. In the first one, created in 1977 coastal communities suffer severe limitations on their traditional way of life that combines small-scale agriculture (now forbidden) and fishing (with several constraints)(Angelo, Sueli, 2000). In the second was established in 1962 when over 700 peasants / fishermen were living and now only around 350 still remain. Most of them were forced to move to surrounding coastal towns and those who remain are authorized to live from tourism (touristic guides, small hotels) but not from the traditional use of natural resources.In both cases there are severe limitations in the use of wood to rebuild their old houses and particularly their large dug-out canoes using for fishing, limited access to health and education facitilies.(Parada, 2000,Furquim,2000, Diegues, 2004). Similar situation also exists in the coastal area of the Ecological Station of Jureia, in Sao Paulo, established in 1987, from where two thirds of traditional population were forced to leave the reserve as most of their traditional activities were fiercely forbbiden. (Oliveira, Rita, 1993, Prado, Dauro, 2004).In the National Park of Superagui, (Paraná State) created in 1989 fishermen are also restricted in their fishing and small-scale agriculture and are moving to the outskirts of coastal towns. (Cunha, L.H. 1989) . In the southern coast of Brazil, the coastal National PArk of Lagoa do Peixe (Fish lagoon) the local fishermen are forced to leave fishing and to engage in the only allowued activity : ecotourism, a change they fiercely oppose(Adamoli, 2002)

In the Northeast, in the coastal National Park of Lençois Maranhenses, established in 1981 there are reported cases of limitations imposed by the park authorities over fishermen and their traditional way of life, and at the same time, priority is given to ecotourism.(D, Antona, Alvaro, 2000)

In the coastal area of the Amazon the same process has ocurred in the Ecological Station of Anavilhanas from where dozens of fishers families were removed or constraint to leave from 1981

There are several other reported cases of severe limitations on the traditional way of life of coastal (and inland) fishermen but as Government enviromental agencies

are not interested in disseminating this kind of information for obvious political reasons, the only sources are papers, reports, thesis of graduate students and some few NGOs.

5.Artisanal Fisheries in Brazil

Brazil has around 8.000 kilometers of coastal line, covering a diversity of ecological systems such as estuaries, lagoons, coral reefs, mangroves, rocky and sandy beaches.

Artisanal fishing is undertaken by some 600.000 fishermen, not including many of them that live in the Amazonian rivers and are dependent on fish as their main source of protein. It is estimated that some 2.000.000 individuals depend directly of fishing activities (including processing, commercialization)

Table 2 Distribution of coastal artisanal fishermen by main regions in 2003

Coastal Regions	Registered artisanal fishermen	Percentage
North(Amaz.coast)	49.991	18.5
Northeast	114.205	42.3
Southeast	52.956	19.9
South	52.396	19.4
Total	269.548	100.0%

Source: IBAMA 2003

Note: only registered fishermen in the fishermen guilds are considered.The number of artisanal fishermen in the North region is underestimated

In the Northeast are concentrated over 40% of all artisanal fishermen in Brazil.

Artisanal fishing is practiced in a variety of ecosystems that greatly influence the way fishing activities are organised. Sea currents, winds, tides, waves, coastal vegetation, fauna and flora and particularly ecological cycles are important elements that are taken into consideration by artisanal fishermen in order to organise their fishing activities. They have a deep traditional knowledge of these ecosystems and have developed different management practices.

In Brazil, as in many other tropical countries, artisanal fisheries are typically embedded in mixed land and sea-based economies, having both commercial, semi-commercial, and subsistence components. In some cases, very little of the catch from artisanal production passes through the marketplace at all; however, this does not mean it is any less critical to the livelihood of impoverished populations. To the contrary, it is often the backbone for marginal communities in terms of food supply and income, where there are few other alternatives.(Cordell, 2007)

A second feature distinguishing artisanal production is its extreme variability and versatility. Artisanal fisheries are multi-species, multi-purpose, and multi-dimensional. They utilize remarkably varied technologies in terms of equipment and fishing craft, which run the gamut from traditional to high-tech. A diversity of habitats and coastal micro-environments are used for fishing. These fisheries are also characterized by a division of labor across households, communities, and task groups.

A third characteristic is that artisanal fishing tends to be strongly associated with specific community-based, inshore territories, which are held under a wide range of traditional tenure arrangements, fishing and resource use-rights customs and principles involving systems of traditional resource management knowledge . These traditional elements have been shown to have pronounced resource impacts, though they are often hard to interpret and quantify.(WB, 2006)

The pattern of decline in Brazil´s marine capture fisheries follows the trajectory for fishing for the world as a whole, showing production increases from 1960 through middle 80´s, due particularly to the establishment of industrial fishing activities followed by a stabilization around 450.000 ton. Only fish cultivation showed a continuous increase in the last years, representing over 20% of total fish production .

Brazilian marine biodiversity is concentrated along the coastal and estuarine areas, in a variety of habitats such as the high mangrove in the Amazon Basin, the sandy beaches and coral reefs of the Northeast region, the lagoons, estuaries, islands and salt marshes in the Southeastern. Even before the arrival of the European colonizers in the XVth century, Indians were occupying these coastal areas harvesting shells and oysters, using dug-outs canoes and bamboo traps for fishing. Until the 60´s, most of the fisheries in the country was done by artisanal fishers and represented more than 80% of the total catches. In the 60´s the Government decided to build a fish industry based on export, generous fiscal incentives(seldom paid back) and many large boats and factories were built. As little control on fishing efforts were implemented and industries

had to export at any costs, in less than 15 years most of the commercial fish stocks were depleted by overfishing, particularly shrimp and lobster. As result most of the industries were closed and the large boats rusted in the piers. Artisanal fisheries, even without government assistance were able to subsist, providing most of the fish to internal markets, jobs and income particularly in the North and Northeastern region.(Diegues, 2004;Cordell 2007)

Also from the 60´s onwards, industrial centers and harbours were built in the larger estuaries which combined with expanding urbanization caused high coastal degradation and pollution. The consequences of situating almost all heavy-polluting industries and industrial centers (chemical, petrochemical, fertilizer, sand and clay heavy-metal mining) in fragile coastal areas, estuaries, and bays have spelled disaster for the environment and especially for artisanal fishers.

Other factors contributing to increasing degradation of the coastal zone are urbanization and urban sprawl fueled by dramatic increases in migration to cities in the Northeast; expansion of the transportation system linking capital cities along the coast; oil exploration and drilling; and especially state-sponsored tourism and recreation projects, notably PRODETUR. Lucrative tax incentives to develop industrial fisheries and large-scale shrimp farming are generating short-term profits for investors, but also intensifying competition for limited coastal space and resources and contributing to extensive mangrove deforestation.

The people and aquatic habitats taking the hardest hits—from pollution of land-sea transition zones by off-site, upstream agricultural, forest, mining, chemical industries and energy producers—are those, like traditional fishers, that can least afford to bear the impacts and costs.

From the late 80´s, large scale shrimp farms were established mainly in the Northeast, resulting in high rates of mangrove destruction and social disorganization of fisheries communities. In our days, the most grave, immediate threat to coastal biodiversity, artisanal fisheries, and to livelihoods of coastal residents in Brazil is the unregulated, highly speculative, environmentally destructive, expansion of large-scale shrimp farming , especially in the Brazilian Northeast (Diegues, 2004). Brazilian shrimp farming exports jumped from $14 million in 1999 to $244.5 million in 2003 but at high costs to fragile coastal habitats and fishers communities.

Artisanal systems are highly vulnerable to a variety of pressures, including uncontrolled development in other industries operating at the land-sea interface;

population pressure in the coastal zone; and expansion of other, more modernized inshore fisheries, as well as industrial fleets operating offshore. Yet small-scale inshore fishing traditions continue to expand, and remain the economic backbone for Brazil's coastal poor (an estimated 2 million or more fishers and their families depend on the artisanal fishing economy.)

After the collapse of the industrial fishing, from the end of the 80´s artisanal fishers re-occupied some coastal waters in a process that can be described as " re-artisanalisation" of fishing activities and resulted in a higher proportion of 54% of the total catches .

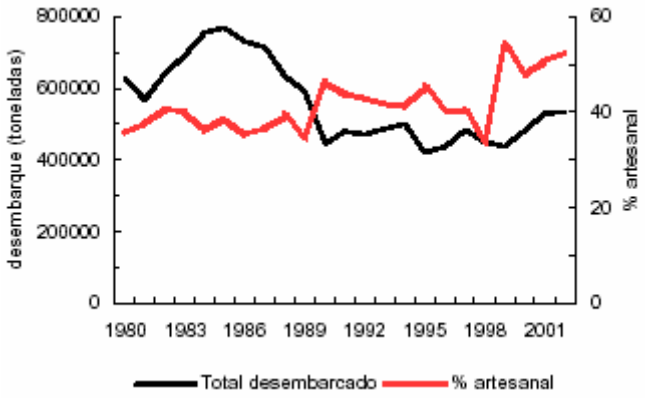


Figure 1. Total landings: percent artisanal and industrial fishing *Source*: IBAMA; IBGE

6 Destruction of traditional management and open access

Until the 60´s when industrial fleet started their large scale operation, open access was limited by existing traditional way of appropriation of sea resources. These practices of artisanal fishers´communities have contributed to limiting access to fishing grounds were unofficial, informal ones: local sea tenure systems based on artisanal fishers' vernacular environmental knowledge, kinship and social networks, contracts, and alliances and collective sense of "use rights." (Cordell, 1989, Diegues, 2004).

In many places, coastal areas and estuaries were used as " commons, used by nearby fishers communities.

These local tenure arrangements which control access to fishing grounds can have management impacts which are similar to the quota and limited entry provisions and restrictions employed in contemporary fisheries management frameworks.

Traditional appropriation of marine resources in some cases ends up having noticeable effects on fishing pressure and production by establishing normative procedures to control fishery access and activities within socially demarcated sea space. Such cultural practices are basically designed to allow fishing communities to intervene in nature and in the life cycles and processes of marine species. In recent years anthropologists have found this to be an enlightening way to understand and explain why tenure systems develop and how they work in many tropical coastal areas which in the past have been perceived by governments, fishery entrepreneurs and by regulatory agencies alike as open-access areas. The prevailing wisdom behind imposition of most recent fishery management regimes and legislation stems from what is turning out to be a naive and erroneous assumption about ownership status of inshore fisheries and coastal sea space, much of which has long been held and sustainably managed under pre-existing traditional tenure arrangements.(Cordell, 2006). The anthropological and social science literature is now replete with examples of local fishing traditions that intentionally or un-intentionally regulate access to resources and sea territory, create fishing rights and with corresponding social obligations and that regulate the use and distribution of fishing gears in order to reduce social conflicts and in certain cases to control fishing pressure itself. Also as Cordell (1989) points out, sea tenure traditions may include not only subsistence strategies buy reflect basic cultural values, social identity and a sense of place.

The industrial fleet needed *freedom* to fish anywhere along the coast,- an *open access*- encroaching with existing traditional management and largely contributed to disorganize most of them. In addition to that, anyone who is professionally registered and licensed as a member of a fishing guild (*colonia*) can still fish (by law) commercially anywhere in Brazil. Aside from this registration, which formerly was the only way most impoverished artisanal fishers could claim a miniscule pension. Limits on fishing pressure are not mandated, and could not be enforceable in any event under the present chaotic conditions of resource competition.

The main concern therefore is how to limit the open access created de facto by the expansion of the industrial fishing and the invasion of the legal artisanal fisheries area of 1.5 km large along the coast. The second problem is how to control the

access to artisanal fishing areas (mangrove, estuaries) by a larger number of urban poor that seek fishing activity as their last chance of survival.

While Governmental coastal management planning and implementation has, in general, remained a technocratic exercise without a major impact, in some areas coastal communities are doing their own coastal management. In Ceará, for instance, local communities are suffering from the invasion of their beaches by land speculation, tourism and from overfishing of lobster, mainly by the industrial fleet and by divers coming from a neighbouring state. Assisted by local NGO's and research institutions, they have proposed a Coastal Forum, where the various problems are discussed by representatives of local communities, tourism sector, the industrial fisheries sector and the federal, state and municipal governments. Within this forum they have proposed a management plan for lobster fishing, also in coordination with the industrial fisheries sector. When IBAMA (National Institute for the Environment)announced that no funds and boats were available for surveillance of lobster fishing, they equipped one of their boats in order to ensure the compliance with the rules that regulate that fishery. The fishermen that disobey the regulations are first reprimanded and when they violate the agreed legislation again, they are taken to a court.

In some beaches, the selling of a plot of land to tourists must be approved by the community council

In some other coastal communities, sustainable use reserves reserves are being built in order to ensure access to fisheries resources for the members, and limit the access to outsiders, mainly to sport fishermen. In most of their initiatives, there is a strong resource conservation component, and as result they frequently succeed in getting the support of government and non-government environmental organisations.(Diegues, 2004)

.

7. The role of MPAs on fisheries management.

The establishment of Marine protected areas (MPAs) is becoming a main management tool for conserving biodiversity and for other purposes in most developing countries particularly from the Eighties onwards. They are usually created in response

to growing threats to the marine environments, from habitat destruction, overuse of resources, pollution runoff, large scale aquaculture, oil exploration, high impact tourism to conflicting interests over resource use.(Cordell 2007)

Tropical countries, especially those with extensive coral reefs, are being strongly encouraged to expand and improve management of their MPAs. At present, there are some 1.500 marine protected areas of different categories that represent 0.5% of the world´s oceans and coastal areas. The International Union for Conservation of Nature (IUCN) recommends that by 2012 a system of representative networks of marine and coastal protected areas should be established, with roughly 20-30 % of the territory in each exemplary network demarcated as 'no-take' zones.

IUCN provides the most widely accepted definition of what an MPA is: "any area of interidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical or cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment" In practice, various terms are used to describe specific types of MPAs (marine parks, marine reserves, fisheries reserves, marine management areas, national marine parks, marine wilderness areas , marine extractive reserves, among others). However, this terminology can be broken down into what are essentially two main categories: *no take zones* and *sustainable/multiple use areas.* In the former, no human activity is permitted, while in the latter sustainable uses are allowed.

According to UNEP-United Nations Environmental Programme, 1995), the main objectives of a MPA are: to conserve marine biodiversity, to maintain productivity and to contribute to economic and social welfare. MPAs are being used to support other conventional forms of marine resource management where these methods have proved ineffective.. MPAs are also used to hedge against management uncertainty and changing conditions of marine ecosystems, providing a buffer against management mistakes or unforeseen declines in environmental quality and marine production.

There are few studies on social and cultural issues related to the set-aside of Marine Protected Areas, particularly in Third-World Countries where the vast majority of professionals and scientists dealing with these areas have a biological background. The lack of interdisciplinary approach, however, has been pointed out also in developed countries as it is mentioned in the NOOA- National Marine Protected Center study entitled: *Social Science Research Strategy for Marine Protected Areas (2003):*

NOAA ´s paper indicate six priority themes for a social science strategy: Governance, institutions and processes; use patterns, attitudes, perceptions and beliefs; economics, communities , cultural heritage and resources. It insists that the inputs of social sciences(including Anthropology/Sociology, Economics, Geography, History, Archeology, Psychology, Law and Ethics) should be used in planning, monitoring, implementation and evaluation of MPAs.

If this gap of information exists in countries like the USA, it is even greater in Tropical countries, where in addition of an important marine biological diversity of species and habitats, there is a greater cultural diversity. In this connection, a core problem has to do with lack of knowledge or attention to cultural differences, community cultural property interests, resources and claims in coastal waters. Without provisions to more effectively integrate cultural and biological components in protected areas, prospects for mobilizing long-term community support are reduced, and the risks of social opposition, conflict, and eventual project failure increase.

PART 2

8. **The development of Marine Extractive Reserves in Brazil**

From the late 80´s onwards, a new type of protected areas was created: the sustainable use reserves, combining sustainable use and nature resources conservation. They are defined as '.protected areas areas aimed at sustainable use and conservation of natural renewable resources, by traditional extractive populations. They can also be defined as areas ecological and social interest having characteristics which enable their sustainable use without jeopardizing the conservation of the natural resources.

Contrary to the no-take reserves, created by the Government and supported mainly by Ngos, sustainable use reserves were established through the pressure of traditional communities, such as the rubber-tappers in the Amazon to avoid forest destruction..

The Marine Extractive Reserve is essentially an effort to modify and extend the concept of 'extractive reserves' – a conservation and sustainable development framework successfully instituted in western Amazonian forest (primarily rubber-tapper) economies—to coastal aquatic and marine domains of traditional fishing communities.. By taking into account how environment and society both stand to benefit from helping the coastal poor secure continuing access to their traditional sea territories, and livelihood resources, Brazil's Marine Extractive Reserve is a radical departure from conventional approaches to setting up and managing no-take Marine Protected Areas (MPAs). In the past most MPAs were established opportunistically, or, more recently, almost solely on the basis of biodiversity criteria. MER require biological as well social and cultural criteria for its establishment. The Marine Reserve for Sustainable Development (MRSD) is used when fishing is not the only economic activity and where local communities are involved in tourist, handicraft, agriculture, forest extractive activities. In MER fishing or aquaculture are the main and often the only economic activities.

MER is a community-based, site-specific, multi-use, land and sea resource management approach based on claims of culturally distinct groups with longstanding livelihood ties to "artisan-scale" production territories.(Cordell, 2006)

Marine Extractive Reserves can also be considered as " new commons" that are being built by coastal communities, particular by fishing communities in order to protect their fishing territory from encroachment of other economic activities such as tourism expansion, industrial fleet and now, particularly from the expansion of commercial shrimp farm that have a negative impact on mangrove and the livelihoods of local people.

9. Principles and Steps for the creation of MER

Basic Principles guiding the Marine Extractive Reserves

a) *Social and Ecological Sustainability*: The basic assumption is that the area of the reserve and their natural resources should be able to maintain the livelihood

of fishermen and other members of the reserve (small scale aquaculturalists, extractivists, local tourist guides etc). Special attention should be given to the reproduction of living resources through participatory management.(CNPT 2004)

b)*Precautionary principle*: in the absence of reliable information and given the risks of over-use of natural resources, the reserve users´association set targets for the adequate rate of reproduction of living resources.

c) *Adaptative management*: this principle is linked to the previous one. In view of lacking of reliable information on the main characteristics of the natural resources and also of the market the management plan should be flexible in order to take into consideration, in the short run, changes in the environment as well as on social group living in the reserve.

d) *Participatory approach*. As the MER can only be creation upon request of local communities, their participation is essential both at setting targets, monitoring socioeconomic activities

e) Use of *traditional knowledge* and *management* as well as of modern science to plan and to monitor sustainable fishing activities

f) Multi-use approach: almost all existing MErs are based on artisanal fishing. There are also reserves that combine fishing, small-scale agriculture and tourism. The reserve should encompass all activities existing in the area, trying to solve eventual conflicts existing among them

Employing a framework that restricts access to, and economic uses of coastal sea space offers Brazil a way to begin to control the highly destructive, still basically unmanaged, development of its extensive coastal zone (harbouring a wide range of habitats of high conservation value, not only coral reefs), while at the same time reinforcing the resource-use rights and territorial claims of local communities to the micro-environments of small-scale fishing.(Cordell 2006)

Phases of the Process of establishing and functioning of the MER

A) **Preparation Phase**:

Contrary to no-take reserves created without local people consultation , in the case of Marine Reserves for Sustainable Use there is a need for a formal demand by local community (es), fishermen cooperatives and associations to create a

MER,addressed to the CNPT(National Center for Traditional Populations/IBAMA(Federal Environmental Agency) responsible for the establishment of the protected area. The document should also indicate approximately the area traditionally used by local fishermen that may vary from some hundreds to thousand hectares of marine habitat.

The CNPT , through Research Institutes and NGOs organizes an interdisciplinary assessment study on biological and socio-economic potential and constraints.(fish stocks, aquaculture potential, fish migration patterns, types of uses of natural resources, sustainable yields, fishing technology, social organization, marketing etc). This assessment has the participation of local communities that are at the center of the process of the reserve establishment, particularly on the indication of boundaries

The biological assessment is essential to identify the fish resources, their abundance and location and to indicate which level of use is optimal in order to guarantee their renewal. The socio-economic assessment will concentrate on existing economic and social basis, fishing technology, existing and potential markets, level of social organization , among other issues. Potential conflicts with other communities are also taken into consideration. Traditional knowledge and management are also analysed to be taken into consideration in the management plan.

The marine boundaries of the reserves usually coincide broadly with the marine/coastal are traditionally used by the communities. The coastal/marine area has to be declared state (public) land and given as concessions to the users´association

Finally, the marine protected has to be officially created by law of the Federal/State Governments. The official document has to be signed by the President of Brazil.

Phase II - Implementation

Once a project is approved and the presidential decree published in the federal public registry, a number of steps need to be taken in order to begin the implementation process of the reserve. First, IBAMA/CNPT appoints a director of MER who has a crucial role in mobilize financial and technical resources. One of Government main responsibility is to deal with the land tenure situation which needs to be legalized and private land has to become state land. In the case of marine reserves, beaches and aquatic areas in Brazil are already state owned. In general, only the aquatic

environment is used to establish a MER, but there are studies under way to make public domain the areas where fishermen live. (Pinto da Silva, 2002)

One of the requirements at the implementation stage is that the members of the reserve be organised in a legal institution that will act as the intermediary between the State (IBAMA) and resource users. In most cases, these associations do not already exist and must be created. Once an officially registered association has been established, a contract is signed between IBAMA and the Association giving usufruct rights as concessions for a long period of time (from 50-60 years.) in order to give security to people participating in the MER . Although the State maintains ownership of the physical area, usufruct rights is given to the association and its member through an official document which formalizes this relationship. Rights to access of reserve resources may not be traded or sold between living people and can only be passed on through inheritance. This measure could also provide increased incentive for sustainable resource use. If individual´s activities deviate from the Utilisation Plan in a way that causes environmental degradation, and therefore unsustainable use, the contract can be cancelled .

The Utilization plan for the reserve has to be established and implemented by Association of the Users of the Reserve and officially approved by IBAMA in a co-management process.. It establishes the activities and techniques that can be used in which areas. It also defines penalties for those who do not obey the rules. The co-management plan is the next step, replacing the temporary utilization plan and has to be completed in the first five years of the reserve. It defines the type of use (restricted access- non-use of certain areas, multiple use for other areas, including fishing, aquaculture, tourism, etc). Authorized fishing techniques and penalties as well as the role of each institution participating in the deliberative council are also defined. Monitoring and surveillance measures are also agreed upon and local fishermen are called to participate in these activities.

Decisions over what the rules should be are defined by the resource users themselves in a public forum where they have the right to vote on decisions made. It is essential that resources users participate in this stage since the adherence to rules depends to a large degree on their wide spread understanding and prior approval.

One important element of this process is the establishment of the Reserve Deliberative Council which was created in 2002 for all extractive reserves, even for those established before that date.. This council is the highest decision-making level of

the Reserve and the most crucial as it is not formed only by fisher´s association our coastal communities association. Half of the seats is occupied by local fisher´s associations , Ongs, tourism associations and half is occupied by government institutions (federal, state, municipal). The main role of the Deliberative Council is to solve conflicts among different users of the sea space and their associations.

The operational aspects of the reserve are taken care by the Reserve User´s Association,. As it was mentioned before the Deliberative council has to approve the management plan and the sustainable development plan.

Sustainable development plan: one of the main aims of marine extractive reserve, in addition to resources conservation is the amelioration of living conditions of the participants of the reserve. When fishing is the main activity, efforts have been made to improve commercialization of the products (often through cooperatives), quality of the seafood, involvement of women on small-scale fish processing , etc….Auxiliary activities such as handcraft making, involvement on local tourism, etc…Priority is also given to education and health particularly when coastal villages are situated far from the cities.

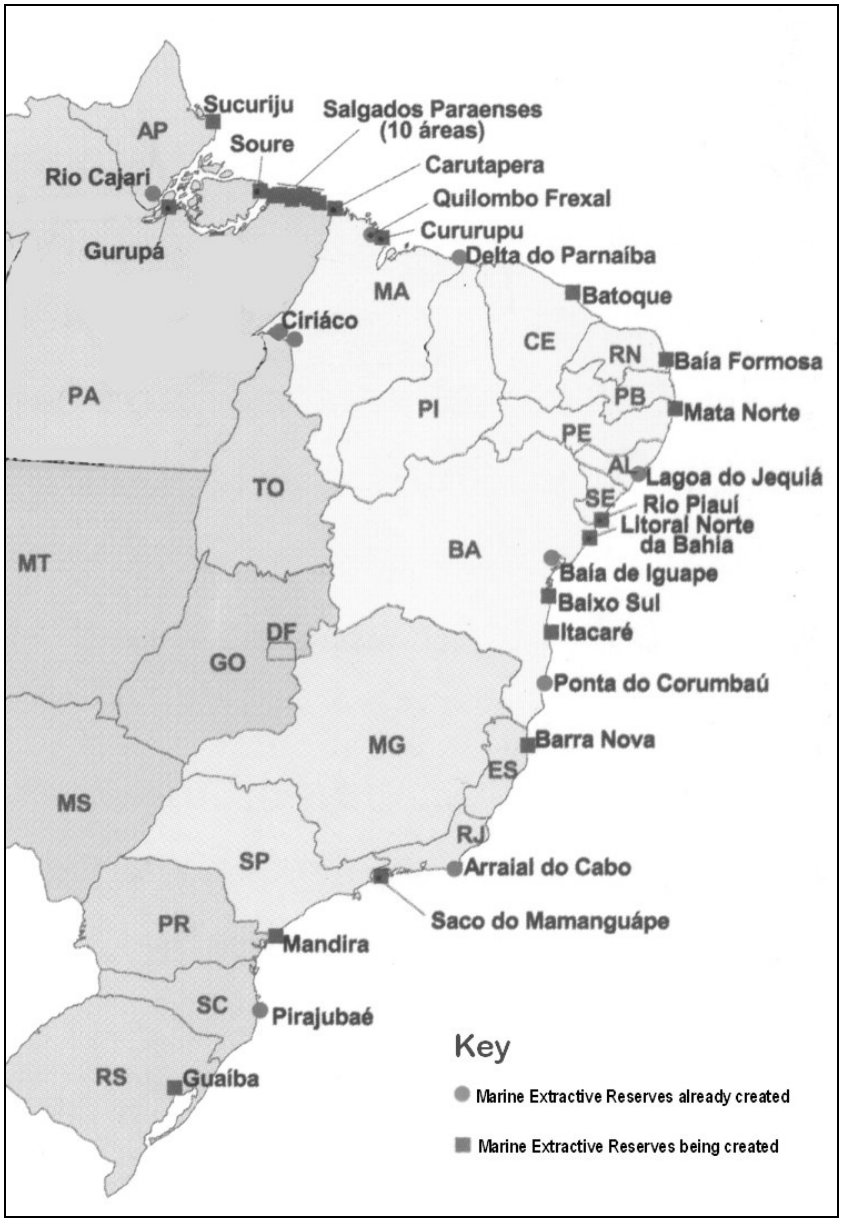
III Consolidation phase.

The consolidation phase occurs when the MER is partially or totally dependent on the financial resources generated by its members or cooperatives. Main social services (health, education) should be functioning properly. The two main institutions : The Users´Association and the Deliberative Council should also be performing their duties and users and members of the council should be fully participating in the decisions.

At present, very few of these marine extractive reserves have achieved self-sufficiency and full participation of their members.

The most important source of funding is still the Federal Government through the National Council of Traditional Population (CNPT) that usually has a small budget for each reserve, ensuring the functioning of its own offices within the reserves and of the two decision-making bodies above mentioned. Some associations have some income from the contributions of the associated members, from a percentage of the fish traded by the users (when there is no cooperative), from fees received from industrial

fishing boats that cross the space of the reserve, from operations of commercial harbours that exist inside the reserve, etc.



Map 3. Location of marine extractive reserves

Source, CNPT/IBAMA

10. **The present situation of MER in Brazil**

Several marine extractive reserves have been officially established by the National Council of Traditional Populations (CNPT- IBAMA) and several others are in the process of being created, particularly in the North and Northeast regions.

As shown in Map 3 and table 3 there are 17 reserves in nine Brazilian states, stretching from Para to Santa Catarina and encompassing 1.659.690 hectares of sea space. Existing MER communities contain approximately 28.248 artisanal fishers. An additional 68 MER proposals are under consideration by the Brazilian Environment Agency (IBAMA) for strategic sites in 15 of Brazil's 17 coastal states.

Table:3 **List of approved MER, area, number of families benefited and year of creation**

Number of Marine Extractives Reserves-MER

MER	Municipalities/ST	Area/hect	N.of families	year of creation
RESEX Pirajubaé	Florianópolis/SC	1.444	200	20/5/1992
RESEX Arraial do Cabo	Arraial do Cabo/RJ	56.769	3.000	3/1/1997
RESEX Baia do Iguape	Maragojipe e Cachoeira/BA	8.117	1.150	11/8/2000
RESEX Corumbau	Porto Seguro e Prado/BA	89.500	500	21/9/2000
RESEX Delta do Parnaíba	Ilha Grande de Sta Isabel/PI, Araióses/MA e Água Doce/MA	27.021	2.500	16/11/2000
RESEX Lagoa do Jequiá	Jequiá da Paraia/AL	10.203	3.046	27/9/2001
RESEX Soure	Soure/PA	27.463	400	22/11/2001
RESEX Mandira	Cananéia/SP	1.175	22	13/12/2002
RESEX Maracanã	Maracanã/PA	30.018	1.500	13/12/2002
RESEX Mãe Grande de Curuçá	Curuçá/PA	37.062	2.000	13/12/2002
RESEX Batoque	Aquiraz/CE	601	230	

				5/6/2003
RESEX Cururupu	Cururupu e Serrano do Maranhão/MA	185.046	2.600	2/6/2004
RESEX Araí - Peroba	Augusto Correa/PA	11.479	900	20/5/2005
RESEX Caeté-Taperaçu	Bragança/PA	42.068	3.000	20/5/2005
RESEX Gurupi-Piriá	Viseu/PA	74.081	4.500	20/5/2005
RESEX Tracuateua	Tracuateua/PA	127.153	1.400	20/5/2005
RESEX Canavieiras	Una, Canavieiras, e Belmonte/BA	100.645 829.845	1.300	5/6/2006
Total		1.659.690	28.248	

Source:Disam:Relatorio de Avaliação da Gestão 2003-2006,Brasilia, jan.2007

From the 17 already created MER, some (41.1%) are located in the North Coast (Amazonian Coast), 41.1% in the Northeastern coast, totaling 82.2% of all the MER on the Brazilian Coast. It coincides with the two regions with largest number of Brazilian artisanal fishermen .Only 18% of them are located in the Southeast coast and 6% in the southern coast.

The majority of the MER of the Amazonian coastal area are located on mangrove, estuaries and river delta and the main activity is small scale fishing and mollusk (mainly crab) harvesting.The area covered by MER in this coastal region is 355.319 ha of sea/coastal waters or 21.4% of the total MER in Brazil. The largest MER area is located in the Northeast (1.153361 ha or 69,5% of the total area of Mer). The smallest area is located in the southern coast (1.444 ha) and in the Southeast coast (57.943 ha or 3.5% of the total area).

As far as the number of users around 28.248 people are living in MERs. The largest number of fishermen participating in MER are living in the North/Amazonian coast (13.700 fishermen)or 48.5% of the total users and in the Northeast coast(11.697 fishermen) or 41.4% of the total users. As the total number of artisanal fishermen in the North/Amazonian coast is 49.991 , some 27.5% of total fishermen of that coastal area live already in MER. Around 10.2 % of the total number of fishermen in the Northeast (114.205) live already in marine extractive reserves.

As far as for the period of creation of MER, around 60.0% of them were established after 2002 and therefore, were recently created, making difficult an evaluation of their performance.

11. Issues and challenges to implement MER

In this session, some specific and crucial issues concerning the implementation and management of the MER are analysed.

a) **Diversity of ecological and social settings**

As it was mentioned before, Marine Extractive Reserves occupy a variety of coastal landscapes (estuaries, mangrove, coastal waters) by fishers having different cultural backgrounds and livelihoods. In the Northeast, for instance, most of the coastal fishermen do not have agricultural or forest extractive activities and depend almost exclusively on fishing. At present, many of them combine fishing with tourism and handicraft making. In the Amazon and Southeast coastal are, many artisanal fishermen combine different economic activities to make their living. In some areas, as the North and Northeast artisanal fishermen are more organized institutionally, in some cases with the support of the Catholic Church. The issue of social and political organization is essential as the pressure over the fishing territory by investors (beaches, coastal areas) is increasing dramatically.

Due to this pressure and to the lack of funds to expropriate landowners in order to make the land available as long term concessions to fishermen villages, the Government, in most of the case, is declaring the MER on coastal waters, estuaries and mangroves that are already of public domain. One of the main problem is that coastal land, particularly on the beach has a very high price particularly in the Northeast and Southeast coast. There is a risk of although having control of the coastal waters, fishermen communities might loose their houses and plots on the land.

The size also varies from one reserve to another. The Mandira Extractive reserve established on mangrove area for oyster management is only 1.200 hectares large comprising around 22 families. The coastal waters reserve surface in Corumbau almost 90.0000 hectares, comprising five communities, including semi-urbanized ones. The control of outsiders is naturally easier in Mandira than in Corumbau.

The pressure from outsiders depends on the un-employment rate in the surrounding areas, as it was mentioned fishing is the last hope to survive when no other opportunities are available.

b) **Multi-use management**

Although the Marine Extractive Reserves are planned basically for fishing, many coastal communities are today engaged on tourism services, support to recreational fishing, small-scale aquaculture etc and these complex activities have to be taken into consideration in the planning and management of the reserve. In the management plan areas are reserved for these different activities in order to avoid conflicts and foster cooperation among the dwellers. In addition to that, representatives of all relevant economic sectors have representatives in the Deliberative Council and conflicts among those sectors (tourism, aquaculture, fishing) have to sold out through the co-management process.

c) The challenge to include Traditional Management in the overall Management plan

Traditional appropriation of marine environment occurs within a broader framework of territoriality through which artisanal fishers on the Brazilian coast have marked areas of the sea that "belong" to them by virtue of their occupation and use. They have, in fact created common property regimes in an overall situation of open access existing in the Brazilian sea. A major challenge for social scientists concerns how to develop better working relationships with management agencies that can assist local communities in articulating and representing their traditions, continue transmitting culturally-based environmental knowledge, and pursue visions for the future and discover new uses for local knowledge to strengthen modern-day management of MPAs and fisheries. (MALDONADO, 2000; CORDELL, 2007)

In some areas traditional **management systems** have remained in spite of changes in fishing techniques. One question is how to integrate these traditional techniques in the co-management process that includes also other types of modern management techniques. Traditional management by artisanal fisheries is closely linked to coastal (lagoons, estuaries, mangrove, etc.) and sea tenures. Sea tenure regulates the access of fishermen to coastal/sea spaces. Traditional management is a set of customary regulations that regulates fishing itself, i.e. the amount and type of fish to be caught, with the goal of maintaining the reproduction of natural resources and the fishermen's

communities. It is based on a deep knowledge of the physical and biological characteristics of habitats and living resources. There are no written laws but orally transmitted regulations passed from generation to generation. Very often they are loaded with myths and social symbols. The transgression of these regulations is met with social disapproval and loss of respect.

Among these tenure systems that exist in some MER some can mentioned:

Brush Park

This is a brush-park built with mangrove poles making a circle or a rectangle. Inside it the artisanal fishermen lay branches, similar to the *akadjás* of West Africa It is not yet known whether this technique was brought from West Africa by the African slaves or developed locally. Brush parks are mainly used by the fishermen of Mundaú-Manguaba lagoons in the state of Alagoas. They are settled in shallow places with weak water currents. Fishermen have a profound knowledge of the fish species that are caught in the brush-parks.

The "marcação"Fishing of the Northeast

Caminho e assento or " marcação" is a fishing system in which the fishing ground is discovered and pinpointed in the ocean through a complex method of mentally constructed reference points. The fishermen use no compass but still through crossing imaginary lines (*caminho*), taking for reference geographical landmarks such as the top of mountains in the continent, they are able to locate small fishing grounds made of rocky bottoms (*cabeços*) several miles away from the continent. These fishing grounds are "owned" by the boat captain or skipper who discovered them. Other fishermen do not know where these grounds are located. Some boats might follow the lucky owner of the fishing ground but when the skipper becomes aware of this, he changes the route. After some years, some of these productive fishing grounds might be made public but keep the name of the skipper who discovered them. The secrecy of the cabeços are transferred from the father to his children

Sequential casting of nets : In the Extractive Reserve of Arraial do Cabo (Rio de Janeiro) fishermen use encircling net launched from large canoes. If all the fishing groups worked on the same day, the result for each of them would be meagre.They developed an information organization by which only two fishing groups work a day.

Rotation of fishing grounds : Some areas of some beaches are considered to be more productive than others, according to the moon, specially those close to cliffs. In order to avoid conflicts, fishermen develop a complex system of turn by which each fishermen group that has its turn in the more productive as well as in the less productive part of the beach**.**

It is becoming clear that fishers communities, their territorial rights and claims and culture heritage interests need to be strengthened so local initiatives and longstanding resource management practices and environmental knowledge systems don't get lost and have a chance to adapt to expanding scales of fisheries management and governance and to the globalizing MPA agendas of applied biodiversity science.(CORDELL, 2007). As the world's last tropical sea frontiers vanish, once remote indigenous, and traditional fishing societies are being increasingly marginalized or disappearing altogether, along with many highly productive, potentially sustainable small-scale fisheries. Yet conservation impacts on biologically significant scales cannot be achieved by reinventing social marginality within single-issue, exclusively biodiversity-driven, coral reef action plans, for example. Alternative culture' sea management concepts, property rights, and discourses merit much great appreciation and careful consideration than has so far been the case in establishing MPAs. (CORDELL, 2007; DIEGUES,2001).

The *main challenge is how to integrate* this kind of traditional management techniques in the overall management of the reserve. In many cases they are not used by all local fishermen. It will depend basically on the organization of the fishermen groups that depend on these practices. The respect to these practices by outsiders would be difficult today outside the MER, but can be incorporate in the fishing management of the marine reserves, as it happens in the Marine Extractive Reserve of Cabo Frio, where the sequential casting of nets is being incorporate in the management plan.

d) The challenge to integrate modern science and traditional knowledge

Another challenge is how to incorporate traditional knowledge in the assessment, planning and implementation of MER. Very little information on artisanal catches exist in Brazil that could be the basis for an adequate fisheries planning and management particularly in small and sometimes distant areas where the reserves are

located.. Some Extractive Reserves, such as Corumbau and Mandira, are organizing their own data collection employing young people, usually assisted by local NGos. The information collection is not easy as the points of fish disembarkment are disperse.

The MER organizations are complementing the quantitative information with the information provided by the fishermen and this is rather new in Brazil. Until now only " scientific information" was considered adequate for fisheries management. This combination between scientific and traditional knowledge has become an official policy of the IBAMA policy makers in charge of the MER

Spheres of local knowledge also include references to classification of aquatic species, fish behaviour, taxonomy, patterns of reproduction and migration of fishes, feeding interrelation among species, to physical and geographic characteristics of the aquatic habitat, climate (cloud formation, winds, storms, weather change), principles of navigation and functioning of diverse fishing techniques in a range of micro-environments. Traditional knowledge may also reflect people's association and connections with the spiritual world, for example, demarcation of sacred sites in the sea, creation myths and story places.

In Brazil, since the 80´s there is an increasing number of fisheries biologists working with ethno-science and some of these studies cover MER areas. There is , however, lack of expertise in transforming this traditional knowledge into management tools.

e) The challenge of Interdisciplinarity

The planning of the no-take reserves has been done in Brazil basically by natural scientists and in the case of marine areas by oceanographers, marine biologists, etc. Very little attention was given to the existence of fishermen living in the area or using it during certain periods of the year. Only in recent years young natural scientists have shown interest in disciplines related to ethno-science.

Interdisciplinarity, including traditional knowledge has been officially recognized to be fundamental for the success of these reserves. This is an important step because for the in other sector of IBAMA responsible for national fisheries management this is not the case, as only fishery biologists (and sometimes fisheries economists) have a say. At national basis, data collection and fisheries monitoring is usually done only on few commercial species that usually are exported.

It is becoming clearer that appropriate management is closely related to conflicts between types of fishing (commercial/industrial); between artisanal fishing and large scale aquaculture; between different fishers groups using different types of gears, etc. Fisheries biologists are, usually not trained in social conflicts solving and other disciplines, particularly social sciences are required.

- Through detailed ethno-conservation and ethnographic documentation, inter-disciplinary, social science research can do much to ensure that protected area frameworks are created which build on and reflect the full range and complex of mixed economies and corresponding habitat dependencies (agriculture, forestry, foraging, fishing) of tropical coastal populations which characterically span the land-sea interface.

f) The challenge of making Co-Management work

- In Brazil there are experiences of co-management since the 80´s in the Amazonian lakes between IBAMA and local fishing communities in inland fisheries . Co-management approaches have been introduced also as a principal strategy for successful design and implementation of marine protected areas and developing sustainable fisheries. At the same time, in many countries, national environmental agencies are very centralized and reluctant to share power with local institutions. How can these local organizations be empowered to have more of a voice in co-management processes and how can more de-centralized power-sharing arrangements can be negotiated and implemented?
- In the case of MER co-management has been introduced as an important strategy for the success of these protected areas for sustainable development in cases where small-scale fishing and aquaculture is the main activity co-management work more easily than in the cases other activities such as tourism or recreational fishing exist. In the first situation the main roles are played by the IBAMA officer in charge of the reserve and the fishers association. Zoning and the use of fishing techniques are decided among these two actors. The situation is more complex in MER such as Corumbau and Arraial do Cabo when other activities and actors are involved. The instance where management measures is decided is the Reserve Deliberative council where not only fishers association have a seat, but also representatives of the tourism, aquaculture and recreational fishing associations are represented.

- Very often the fishers associations represented in the Council are the less powerful. There is an urgent need to increase the bargaining position of fisher´s association in many of the already created Marine Extractive Reserve.
- A recent study (Seixas, 2004) shows that in spite of the fact that co-management experiences in the Amazonian lakes, much less was done in coastal waters. In coastal/marine waters Seixas (2004) identified several barriers in the different phases of co-management : data gathering/analysis, planning and decision making, implementation , monitoring, enforcement and evaluation. One of the main barriers is the historical marginalization of smalll-scale fishermen in decision making process and the prejudice against their traditional knowlege. From the Government side, there is a lack of continuous support do participatory managment or lack of recognition of co-management institutions, lack of training of fisheries officers to cope with conflict solving process mainly due to their natural sciences background. Very often Government is inefficient in organizing law enforcement due to lack of means of transportation in the sea.

12. MER Potential and Constraints.

If the MER initiative is successful, Brazil will come closer perhaps than many other tropical country in establishing a socially-responsive, economically realistic, and environmentally sound multi-use MPA framework which could serve as model for other countries whose coastal waters, where it is still essential to protect longshore coastal biodiversity distributed across many different coastal habitats.

A) Potential

Marine sustainable development reserves (MER and MRSD) offer opportunity of

a) Conserving marine biodiversity through sustainable use. Allowing for areas of non-use, controlled by the communities they offer to the reserve members the opportunity to be involved directly in biodiversity conservation.

b) Breaking " de fato" the open access regime in the sea, creating a " new commons" of responsibility of the coastal communities

c) Improving the fisher´s communities socio-economic well being and their culture, based on their traditional way of living.

d) fully participating in decisions concerning the sustainable use of natural resources, monitoring and surveillance.

e) Introducing innovative approaches to marine conservation that fit better to the ecological and socio-economic conditions of developing countries. Innovative activities such as family based aquaculture are being introduced in areas where fishing are the main source of labour and income.

f) Finding new sources of income for women (part time aquaculture, craftwork) and power as in many places they are participating in the deliberative councils

g) Being part of larger conservation efforts, creating a barrier against threats of unsustainable use of resources, represented in Brazil by the increasing number of large shrimp-cultivation farms, urban/tourist expansion that destroy the habitats in which artisanal fishers work and from which they take their subsistence such as mangrove, coastal forests, etc.These reserves can also hinder " free-riders" of unsustainably using natural resources Allowing for the establishment of participatory fisheries/aquaculture co- management plans.

h) Being associated with more strict protected areas such as marine parks, creating a mosaic of protected areas of different categories, fostering biodiversity conservation and sustainable uses of natural resources.

i) integrating a network of marine protected areas (both no-take and sustainable development) in the existing coastal management plans (GERCO).

B) **Constraints**

a) Resistance from more intensive and destructive users of the marine environment such as shrimp cultivation enterprises, industrial fishing boats, urban/tourism developers, fish traders that create strong lobbies in the Congress to hinder the expansion of MER along the highly valued coastal line for touristic purposes.

b) insufficient managerial capabilities in the government enviromental institutions that until recently were trained for the management of no-take reserves.

What is perhaps the most critical issue for MER at this stage, however, is that CNPT / IBAMA (*Centro Nacional de Desenvolvimento Sustentado das Populacoes Tradicionais*), the lead, coordinating, unit for extractive reserves within Brazil's environment agency, IBAMA, is far from having the technical capacity and experience working with MPAs to implement and manage a full-fledged national MER network. However, in these last few years the present government has up-grade the CNPT agency within IBAMA, increasing the number of their personal particularly at local levels.

c) Suspicion of large multinacional Conservation NGOs and part of the local strong preservationist movement who believe that biodiversity conservation can be achieved only through no-take protected areas. Some of these NGOs favours the " large scale conservation/ global measures that benefit more their donors(multinacional corporations) criteria than conservation at local level.

d)insufficient funds to support sustainable use of resources, as most of these international funds are directly almost exclusively to strict protected areas.

e) lack of administrative experience of local communities in managing more complex economic undertakings directed to the market, through marketing associations and cooperatives. Training and administrative support are therefore essential for the success of the marine sustainable use protected areas.

f) lack of power of fishing communities as the formal associations (guilds/colônias de pescadores) lack sufficient authority and often are controlled by no-fishers.Lack of a strong national movement of fishers compared to the National Movement of rubber-tappers that was able to make viable the Amazonian extractive reserves.

g)lack of experience of community management of natural resources, particularly in the reserves where some migratory species are relevant for the local economy. Adaptative management is probably the only option where biological and social data are scarce.

h) possibility of integrating scientific and traditional knowledge and management. It is also important to highlight the extent of cultural documentation and social sciences inputs required to develop these reserves, from original proposal submission to monitoring and evaluation, and both internal and external conflict resolution. Also, in Brazil, anthropologists with longstanding ties to communities tend

to help legitimize and create a credible image for reserves, and exercise a critical "gatekeeping" and brokering role in relationships with regulatory agencies to affirm and reinforce the power of community decision making—as provided under Brazil's extractive reserve (SNUC) legislation in proposing reserve sites and preparing, approving, and implementing site specific management plans.(W.B. 2006)

Conclusions

Artisanal fishers and their communities have been suffering from the extension of no-take areas which are established without participation and approval, generating serious problems that often make jeopardize their traditional way of life. These conflicts are described in the case study of Peixe Lagoon National Park.

To cope with this situation, a new pattern of marine protected areas has emerged in BraZil: the sustainable use protected areas both at forested areas as well as at coastal/marine habitats that can be combined to existing no-take protected areas which until recently was the only priority for biodiversity conservation. This new pattern can be explained by the emphasis given by the present government on the role of traditional peoples in biodiversity conservation as result of grassroots movements actions (rubber-tappers, fishers, extractivists,) The new policy on traditional peoples (indigenous and non-indigenous) was made public this month (April 2007) and may created new opportunities and challenges for community-base biodiversity conservation. This policies were established after nationwide conferences which for the first time put together Indians and more than 15 representatives of different non-Indian traditional peoples (riverine/caboclos from the Amazon, artisanal fishers, caiçaras from the southeast coast, communities living the savannahs (cerrado) , many of them fishfolk.

The sustainable development protected areas are now considered by sectors of the Government as having the same importance for biodiversity conservation as no-take areas. In coastal/marine environments, these reserves are functioning as " new commons" reducing the " open-access regime" in territorial waters, considered one of the main factors for overfishing and poverty of coastal communities. They open a legal framework for coastal communities participation in the establishment and implementation of these reserves through co-management. They also require a new scientific approach that take into consideration not only biological sciences (as it is

usual for no-take reserves) but also social sciences and traditional knowledge. It is becoming clear that in developing countries such as Brazil, no-take zones are not enough to ensure biodiversity /conservation, as they as socially and politically costly arrangements. A mosaic of different conservation areas, including no-take and sustainable development areas may be more efficient to protect biodiversity and cultural diversity. The challenges are enormous requiring peoples mobilization, conflict-solving strategies, training , innovations and an interdisciplinary approach.

These initiatives are exceptionally promising; they have the potential to unify and reconcile elements that all too often are seen as incompatible: traditional culture heritage and cultural resource preservation needs, sustainable local fisheries, and conservation of marine biological diversity.

Map - Location of The Three Case Studies

PART 3. Lessons from existing Marine Reserves

Three case studies are selected : Peixe Lagoon National Park, MER Mandira,(Sao Paulo), Corumbau (BAhia).

THE DILEMMA OF THE PEIXE LAGOON NATIONAL PARK, SOUTHERN BRAZIL

Tiago Almudi and Daniela Coswig Kalikoski
Federal University of Rio Grande (FURG), Brazil.

Case-study: The Peixe Lagoon National Park

The Peixe Lagoon National Park, established in 1986 is situated in the central portion of the southern Brazilian coastal zone, in the narrow sandy strip between the Patos Lagoon and the Atlantic Ocean. Due to difficulties of access to this region, the urban development in this region is little prominent. Only two small cities (Tavares and Mostardas), which together have around eighteen thousands inhabitants, are found in the surroundings of the Peixe Lagoon..

Since the first Portuguese immigrants had occupied the region, in the middle of the eighteen century, they have developed agriculture, raised cattle and fished in the Lagoon and adjacent ocean (Tagliani et al., 1992). Nowadays, people that inhabit the area of the Peixe Lagoon National Park (PLNP) continue to be fishermen and farmers.

During the past decades some fishing villages have been built on the edges of the Lagoon, few kilometres away from the urban areas. There are three fishing villages with around fifty families located inside the National Park and two villages located outside of the Park where forty families live. All these villages are located a few meters from the beach and only the villages in the inside of the Park are located on the edges of the Lagoon.

The Lagoon periodically connects to the sea and serves as a nursery and feeding place for diverse species of mollusks, crustaceans and fishes, among other typical estuarine species (Knak, 2004). For this reason the Peixe Lagoon also presents a great abundance of endemic and migratory birds that periodically visit this region migrating

from the south (Argentina) and from the northern hemisphere Due to the abundance and richness of birds, this region attracted the interest of local and international researchers from North American institutes during the 80's (Resende, 1988). Based on the recognition of the importance of this Lagoon for the migratory birds, the former Brazilian Institute for Forest Development (IBDF), decided to transform this area into a National Park. The area of the Park corresponds to 34000 ha and involves not only the Peixe Lagoon ecosystem but also the local surrounding ecosystems such as spit forest, dunes, beaches and small fresh water lakes.

According to the Law 9985/00 (National Systems of Conservation Units - SNUC) and the Decree n° 4340/02, the people who inhabit a National Park have to be removed and relocated, and the exploitation of natural resources must be forbidden. The category of National Parks given by SNUC is a restrictive type of conservation unit and does not allow any type of extractive activities nor does it allow people to live inside the park's borders. This has generated a serious conflict between the responsible environmental agency (IBAMA-*Instituto Chico Mendes de Conservação da Biodiversidade* - ICM)[2] and the local peoples because of the legal requirements of removal of the local population in spite of their historical dependence on fisheries for survival and use of rudimentary tools for fishing.

ICM has not yet removed the fishermen from the National Park as required by SNUC due to the lack of structure, staff, and financial resources. A hundred and sixty six (166) fishers have an exceptional and temporary work license inside the protected area. Some of them are also allowed to live in this area. Despite such formal agreement, National Park officials have historically made informal pressures to cause people's withdrawal from their residences within the protected area. Uncomfortable with this situation, fishermen have moved for villages outside the National Park or to the nearby cities. This has been done without any assistance from the government despite the legal obligations to support people relocation.

The lack of participatory mechanisms for the implementation of the PLNP strengthens the arguments of local peoples that highly oppose to this category of conservation unit. The local peoples question the legitimacy of the Park on the basis

[2] The mandate of the Chico Mendes Institute for the Conservation of the Biodiversity created in 2007, is to propose, implement, manage, enforce and monitor the federal Conservation Units. Before the creation of this Institute this responsibility was under the mandate of the Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA) which will be responsible to execute projects related to environmental licences, their authorization and enforcement.

that it was imposed without popular consultation, disrespecting their traditional rights of living in the Lagoon surroundings and managing its resources.

Methods of investigation involved primary and secondary data. Primary data were collected using semi-structured in-depth interviews with local fishermen and government officials. A total of forty (40) interviews were made with fishermen and a total of eleven (11) government officials were interviewed. This data were complemented by document analysis, including the Peixe Lagoon National Park Management Plan and a local newspaper.

Fishers´ livelihoods in the Peixe Lagoon National Park

The Peixe Lagoon fishermen works not only in the Lagoon but also in the adjacent coastal waters. In the sea, they use three-mesh gillnets locally called 'feiticeira' to capture mainly southern kingfish (*Menticirrhus littoralis*, *Menticirrhus americanus*), mullet (Mugil spp), silverside (*Austroatherina incisa*, *Odontesthes argentinensis*, *Xenimelaniris brasiliensis*) and weakfish (*Macrodon ancylodon*). Bagnets are used to capture Argentine stiletto shrimp (*Artemesia longinaris*). The fisheries are carried out without boats but old trucks are used to pull the nets to the land, in a similar way formerly done by human traction.

Fishing resources captured in the sea are widely used for fishermen's own subsistence, constituting important element for their food security. Shellfish (*Mesodema mactroides)* is also collected, being mostly used as a means of subsistence. Fishermen collect shellfishes with their own hands or using shovels. In the Lagoon, the fishermen use small open boats made of wood, locally called 'caíco' (Borsato, 1992). These boats are approximately twenty feet long and are not motorized. The main aimed species is the pink-shrimp (*Farfantepenaus paulensis*, *Farfantepenaeus brasiliensis*) which is caught with stownets. Gas lamps are used in order to attract the shrimps to the nets. Mullet, blueside and flatfish (*Paralichthys orbignyana*) are also fished in the Lagoon. For that, the fishermen use one-mesh gillnets with less height than those used in the sea.

The fisheries can be divided in two distinct seasons: the summer season, when there are higher expectations to obtain good profits, and the winter season, when the captures are usually enough only for fishermen's subsistence. In the winter time fishermen live with the money earned during the summer. In the summer time (from January to May), the efforts are concentrated in the pink-shrimp, which is the species with higher commercial value representing the main source of income. In the end of the

summer, mullets are captured in the sea, especially in years when the pink-shrimp is scarce.

The majority of the families depend exclusively on the fisheries for survival, and the art of fishing is taught and learned in the familiar sphere. Children and women use to directly or indirectly participate in the fishing activities. While many women do fish, others only participate in the post-harvesting activities, such as cleaning fish and shrimp, catching shellfish, and washing the boats and nets. Differently from the industrial fisheries, the artisanal fishermen give part of the production for people from the community such as widows, children, neighbors and relatives. This production system is similar to other small-scale fisheries systems in Brazil, constituting a social and economic dynamics different from the mainstream society represented by the industrial fisheries (Diegues, 1996).

The accumulation of wealth by the Peixe Lagoon fishermen is generally reduced. Their modest housing, which inside the National Park area lacks electricity and running water, is an example of their simple life style. Few fishermen have means of transportation, and the transport of the production is made with horses or old pick-up trucks.

The conservation role of traditional ecological knowledge

The knowledge involved in the day-to-day activities of the fishermen is closely related to the Peixe Lagoon and adjacent ecosystems as they depend directly upon these environments for survival. The routine of the local population is shaped by and largely adapted to local environmental conditions such as wind and rain regimes. Fishermen's knowledge is especially rich in what relates to the weather, species life cycles and their relationships with other living beings and the local ecosystems.

Such knowledge creates ways of managing resources in a responsible way, adapting to local natural conditions for the maintenance of the ecological resilience . An example of traditional ecological knowledge is the fishermen voluntary closure of pink-shrimp fisheries when there are small shrimps in the Lagoon, until they reach a better size for commercialization. Another example of management system is the annual opening of the Lagoon's mouth. As the Peixe Lagoon naturally closes its link with the sea at the end of the summer, local people has annually done the opening of the Lagoon's mouth at least since 1820 (Saint-Hillaire, 1887) allowing algae, nutrients and larvae to enter in the Lagoon from the sea. This process results in biological enrichment and maintains the food web, becoming part of the local ecological system.

Peixe Lagoon fishermen established informal institutions based on the respect for traditional practices and agreed rules. For example, there are fishing spots 'owned' by fishermen both in the Lagoon and beach. This ownership is respected by all and sanctions are virtually unnecessary, despite the fact that there is no official document that characterizes such arrangements.

Their culture includes a distinguished way of speaking, designating ecosystems and natural phenomena, creating local artifacts and specific religious beliefs. Peixe Lagoon fishermen have developed their levels of TEK in an intricate and complex knowledge-practice-believe system related to the local environment. We argue that such TEK can provide the basis for a resilient management system of the natural resources and ecosystems, which fits the protected area conservation purposes.

Nature conservation and traditional population: social conflicts

Fishermen of Peixe Lagoon constitutes a traditional population and should have their ways of life and culture valued and protected, according to the SNUC. However, reality has being quite different so far. The National Park administration still threatens fishers within the removal of fishermen from their residences and the ban of the fishing activities that are the basis for their livelihoods and culture. At the present, although they continue fishing and living in the protected area, the National Park administration imposes innumerable prohibitions such as the restriction on social services such as schooling, provision of electricity and running water.

Conflicts are generated once the National Park officials have, according to the perception of the fishermen, tried hardly to restrict as much as possible the activities of the local population inside the protected area. In many occasions, fishermen complained that officials act in hostile ways and do not respect basic civil rights. Park officers use to spy them in their day-to-day activities, entering in their houses without permission, and setting fire in their fishing boats, cars and tents. Sometimes fishers have react to these actions, resulting in fights and physical violence against the park officers.

Due to such pressures, constraints and conflicts, fishermen are moving out the protected area without consultation, previous consent and fair compensation, which violates their civil rights, although the law guarantees appropriate compensation in case of removal.

The history of the PLNP is marked by chronic conflicts. In 2003, around 3000 people (more than half of the Tavares city population) participated in a parade to demonstrate their dissatisfaction with the National Park administration and to demand the rights of local peoples. It is argued argues that the establishment of protected areas that disregard the aspirations and necessities of the local people can create insoluble social problems that threaten the viability of the parks in the long run.

The question that should be critically addressed is why the traditional fishermen of the Peixe Lagoon have to be removed from the protected area? According to the current SNUC objectives and guidelines, removing and relocating traditional populations from their homes have no sense. According to SNUC, the participation of local population in the creation and establishment of conservation units should be assured, and traditional population's culture and ecological knowledge should be respected and valued. These statements are in accordance with international instruments such as Agenda 21 and the Conventions 107 and 169 of the International Labour Organization (ILO).

In addition, no study was done to prove that the local fishing activities in the Peixe Lagoon impact negatively the environment. The only research project conducted prior to the period of the creation of the Park indicates the following: (1) during the whole annual period of field observations carried out by the project, no negative impact was observed coming from fishermen, and (2) conservation of that area could be more effective if the population was not excluded, but rather partner of the monitoring of the Park by assisting governmental officials with rule enforcement in the area (Resende and Leeuwenberg, 1987).

The case of the Peixe Lagoon National Park demonstrates an example of government and conservationist practices based on wilderness ideologies and inadequate top-down conservation management models. Little importance has been given to discussions about an eventual adequacy to a more appropriate category of conservation unit that would put forward a more efficient system of environmental protection respecting the cultural identity and social security of the traditional local fishers. Co-management in this case could provide a mechanism towards the reconciliation of conservation policies with social justice. Similar participatory initiatives are happening in other lagoon complex in southern Brazil such as the Patos

Lagoon (Kalikoski and Satterfield, 2004) and the Ibiraquera Lagoon (Seixas and Berkes, 2003).

Summary of the characteristics of Peixe Lagoon National Park

1. The PLNP was established without consultation with local fishers who until now are threatened with eviction and as consequence fishers´ rights were not respected
2. Restrictions on the use of fishing gears and of fishing grounds were imposed without consultation with local people. These restrictions led to " voluntary migration" of several fishers´families to towns outside their Traditional fishing territories.
3. In addition to these restrictions, park authorities did not improve social facilities mainly schooling for the children, contributing to further deterioration of the quality of life.
4. Continuous conflicts led to street manifestations and even violence against the park administration.
5. The top down management plan did not use traditional knowledge and caused social marginalization and further impoverishment of local fishers.

Map: Boundaries of the Peixe National Park

Source:Veja,2007

Acknowledgements

The authors thank the Brazilian National Council for Scientific and Technological Development (CNPq Process Nº 109984/2004-8; Institutional process Nº 800730/1990-9) for supporting this research. The help of the fishing communities of the Peixe Lagoon and IBAMA's officials were also fundamental for the accomplishment of this work.

Mandira Extractive Reserve, S.E. Brazil

.

a) *A brief history of Mandira Extractive Reserve: southern coast of Sao Paulo*

It is a very small reserve of 600 hectares of estuarine area, mainly mangrove, in southern São Paulo coast,created in 2002 by the Federal Government benefiting some 25 families of traditional fishers and oysters collectors.(see map 4). The Mandira extended family has been established in the area since the 18th century, first engaging in agriculture but gradually shifting to seafood harvesting—due to changing economic conditions, pressures for land, and environmental restrictions. Mandira is a *quilombola*, a community made up of slave-descendants who have proven resident and can trace their ancestry over generations (through Catholic Church records and oral histories). Mandira, like other "quilombolas", have collective rights over the land protected under Brazilian legislation.

Before the project, the market chain for oysters was dominated by traders, who paid little regard to legislation or to hygiene and health standards for shellfish processing. There was overexploitation of some oyster stocks. Outside shellfishers (interlopers often from distant states) tended to "invade" the region with little regard to local traditions.

Preparation Phase

The project started in 1993 by Nupaub-the Research Center on Weltands Conservation of the University of São Paulo and a local Ngo-Gaia in the process of selection of the most suitable community from several existing in the area for a sustainable use project. Mandira village was selected for because of strong families ties, clear traditional leadership and dependence on the issue of sea resources.

The main effort for almost two years was directed to community organization and the building of a local association, an approach that proved successful in the long run..

In 1996 there was an official request for the creation of the MER, sent to IBAMA/CNPT, signed by all the user´s of mangrove reserve area (22 families). In that period the biological and participatory socioeconomic assessment was done by Nupaub, emphasizing local knowledge about the mangrove.The local income was low, less than the regional minimum wage Most of the families lived out of extraction of adult oyster from the mangrove, by cutting the mangrove roots where oysters and sold the product at very low price to local traders. Once they agreed on establishing a Mer, they adopted a new technology of raising oysters without cutting the mangrove.Assisted by the Ngo Gaia and by the Fisheries Institute, they made experiments using oyster rearing frames (bamboo frames covered with a plastic net to avoid predation by different animal and bird species). These frames were laid in the estuary and surprisingly young oysters reached de adult phase much quicker than the natural oyster, allowing for three harvest a year.

The implementation phase

In 1997, even before the formal approval, with funds from the Federal Government and other sources, a Cooperative was formed, benefiting 40 families of oyster cultivators living in 5 different communities, from which 17 families were from the MER-Mandira.

With funds from the Federal Government the Cooperative headquarters was build , a depuration system was established, an commercialization started with the use of a small insulated truck used for commercialization of oyster. A cooperative was also created selling oyster with high quality standard, increasing substantially their income.This cooperative, situated in the town of Cananeia, head of the Municipality accepted members from different villages even when they were not members of the MER. These new member had to accept the same rules of environmental protection and product quality that are required from the members of Mer. By that time, the Cooperative and the Reserve were supported by a variety of donors including Margaret Mee Botanical Foundation, Shell Brazil, World Vision, the Brazilian Fund for Biodiversity (Funbio), the Forest Foundation of São Paulo (Fundação Florestal). They

also got an international reward from the Tropical Initiative in Johannesbourg Conference in 2002. (Medeiros, Dean, 2004)

The MER Mandira is one of the few where the utilization plan is working in a participatory way in the sense that rules are built by the reserve assembly of users and it is monitored b y its member and by IBAMA in a co-management process. Although there natural and social scientists involved in the process, the main approach is adaptative management (learning by doing).

- "There are various examples of adaptive management, for instance initially bamboo structures were used to construct oyster rearing beds but now concrete is used, when affordable, since it is more durable. In response to high oyster mortality from solar heat stress, Cooperative members started to cover oyster beds with palm fronds in the summer to protect the oysters from intense sunlight (local adaptation). The fisheries researchers (outsiders) suggested mediating the heat stress by elevating the top mesh like a tent to prevent the mesh, which gets very warm when exposed to the sun, from touching the oysters directly. Now both the local and outsider mediation mechanisms are used.
- Monitoring of the oyster stocks by the Extractive Reserve and Cooperative members and fisheries researchers is also ensuring that the oysters being harvested in the region are not being depleted. If oyster stocks were progressively being depleted then appropriate actions would be taken to limit the harvest (i.e. stronger enforcement of regulations with increased vigilance; more severe penalties for infringements; extended temporal (quantity harvested) and spatial restrictions (extension of extractive reserve). Again this is not drafted in a formal management plan, but both fisheries researchers and Cooperative members understand that actions would be taken to secure the valuable oyster stock. The Cooperative members would require assistance (monitoring to prevent others from harvesting and income alternatives during stricter regulations) from governmental agencies to help secure their resource. "(Medeiros 2204: p.20)

Also according to Medeiros (2004) "the effect of oyster rearing beds on mangrove biota has not been studied, but is likely negligible. Unlike large-scale aquaculture operations, mangrove forest does not need to be cleared to provide rearing space, since the oyster rearing beds are placed in shallow lagoons and water ways. Only a small number of lagoons and waterways within the entire estuary contain rearing beds. The rearing beds also only occupy a small portion of the lagoon or waterway and thus

do not completely disrupt tidal flow or the movement of mangrove organisms. Consequently, the impact of the oyster rearing beds on the mangrove ecosystem is likely to be minimal. The oyster rearing beds may actually enhance the biodiversity and productivity of the mangrove by increasing the surface area for algae and other sedentary macrofauna to grow on, thereby serving as an artificial reef. Various species of fish and crustaceans were observed on and around the rearing beds." (p.29)

The consolidation phase.

Finally, in December 2002 the Mandira was officially declared by the the Federal Government as a protected area: the Extractive Reserve of Mandira.

The creation of Mandira Extractive Reserve on December 13, 2002 was the first step to prevent open access conditions since now only the inhabitants of the reserve, the Mandira's, would have access to the oysters. However, efficient and consistent enforcement is still being built up to prevent outsiders from illegally harvesting within the reserve. IBAMA is providing some financial support for the placement of signs to mark boundaries and for policing of the reserve.

In 2004 the Deliberative Council was organized and approved by IBAMA with the participation of the MER association, IBAMA, local Ngos, research institutes.The success of the cooperative is fundamental for the increase in the income of the Mandira community and of the members of the Cooperative. Surrounding communities are requesting to be transformed in MER, as they have seen the success of Mer-Mandira. However, as all the members of the Cooperative have to follow the rules of sustainable cultivation of oyster and have the same rights as the MER Mandira participants, the pressure to implement a new Marine Extractive Reserve is lower than in the past.

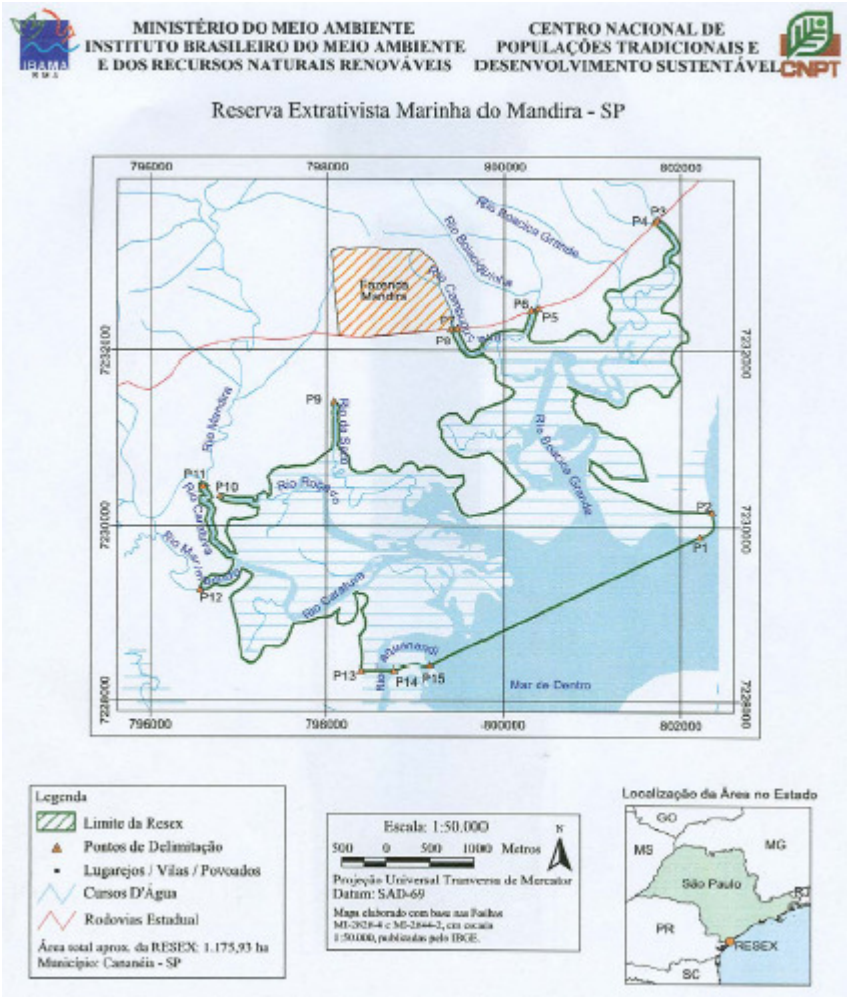
The Cooperative and MER members receive twice as much per dozen of oyster from selling to the Cooperative than they do from selling to middlemen. (Cooperative pays on average R$1.80/dozen and average black market price is R$1.00/dozen). However, being part of the Cooperative also requires additional time to participate in various, lengthy meetings. Furthermore, due to insufficient sales, the Cooperative cannot buy as many oysters that all the Cooperative members can supply. Consequently, some Cooperative members still continue to sell to black market middlemen for half the

price obtained from the Cooperative to supplement their income. These black market middlemen then undercut the Cooperative's own market, making it difficult for the Cooperative to charge more for its oysters along the Sao Paulo Coast.(Medeiros, 2004)

Most social and infra-strcuture improvements have been at an individual/family level. Communal benefits include the construction of the headquarters for the Inhabitants of Bairro Mandira Reserve and a Community Center. Other than facilitating the organization of the Cooperative (i.e. a place to have meetings), the headquarters is also used for social events and other community activities.(Medeiros, 2004)

Women also participate in the Community Association and there are several initiatives organized by them, such as a series of training courses and workshops on handicraft making, sewing, etc.

The Mer Association is also looking for alternative source of income, reducing their dependence only from one product. They are planning to resume their rice planting, and to explore opportunities from eco-tourism, handicraft,etc



Map 5. The limits of the estuarine Extractive Reserve

In the case of Mandira, project results include tangible benefits to the regional economy and the restoration of cultural values and environmental quality. Local communities that had been socially and economically downtrodden have found pride through their fishing activities and working to enhance the quality (and prices) for their products. At the same time, consumers in urban markets have access to a higher quality, safer, more sustainable product based on harvesting and processing activities that are environmentally sensitive.

There have also been noticeable conservation and cultural benefits. This has not only permitted the maintenance and enhanced appreciation of artisan-scale production, but good, locally available seafood encourages tourism and is starting to create conditions for future generations to make their own economic choices. In many ways, the experience of Mandira restores extractive activities to their proper place—where

knowledge and management practices of local communities are adapting to modernity, while retaining elements of traditional knowledge and livelihoods.

Summary of the Main characteristics of Mandira Reserve

1. Small size in surface and user´s compared to Corumbau Extractive Reserve
2. One single, more homogeneous and organized community living out of urban area, with a clear leadership. All members belong to the same religion (Catholic) and have a strong cultural identity.
3. The ecologic and socioeconomic assessment was done jointly by the village members, men and women and NUPAUB/USP Research Institute. Local knowledge was intensively used. Change from an ecological unsound way of collecting oyster, cutting the mangrove roots to a new technique- oyster rearing beds-
4. Community organization and discussion on extractive reserve took more than one and half year and was a decisive strategy for a solid building of the reserve..
5. Strong commitment of the Mer reserve in protecting the boundaries against free riders, and in ameliorating the quality of sold oyster
6. Build up of a cooperative where the Mer members represent the core group and occupy the key posts.
7. Strong support of different State, Federal, local Ngos and research institutes
8. The MER was able to raise funds from different public and private sources for its establishment.
9. Co-management is working, with special emphasis on the monitoring of the activities and rules established by the Deliberative Council

10 Several training workshops on different aspects of community organization , oyster rearing, bookkeeping ,etc

11. The MER leaders are often being called by other fishing communities to teach how to rear oysters along the São Paulo and Rio de Janeiro (where a new experience started).

2. Corumbau Marine Extractive reserve in Bahia:

The Marine Extractive Reserve (RESEX) of Corumbau was established in 2000 through a Presidential Decree. The Corumbau MER encompasses a total area of 98,174 hectares, spanning municipalities of Porto Seguro and Prado in the south coast of the state of Bahia .Corumbau is a federal conservation unit/entity, so IBAMA is responsible for its management. Corumbau is intended to protect marine biodiversity and improve livelihoods in five small fishing communities (Caraiba, Corumau, Embassuaba, Cumuruxatiba and one village of the Indigenous *Pataxós* group. All five villages are dependent on reef and soft bottom fishes captured with hand-lines, spears and nets; trawled shrimp (recently introduced); and small-scale tourism.Some villages have already a strong tourism season (from December to February)Tourism is becoming a crucial economic activity in Caraíba, where high standard hotels have been built.
Some communities also depend on small-scale agriculture, in which the role of women is important.

Corumbau was the first MER specifically designed to protect coral reefs. Considering fishers and their families officially registered as members of the RESEX, roughly 1,750 people are directly dependent on the extractive activities in this area.

The Bahia coastline harbors some of the most extensive remaining areas of Brazil's Atlantic Forest, the most important portions of which fall within a range of land and sea protected areas. The MER at Corumbau, for example, borders on Monte Pascoal National Park, which includes both non-indigenous traditional populations and indigenous peoples' reserves.

Although it is a new conservation unit, the RESEX Corumbau is already organizing its Deliberative Council and is drafting a management plan that embodies a strong participatory approach with provisions for ongoing participatory monitoring, and decisions about zoning.

RESEX Corumbau occupies a much larger open sea surface than RESEX Mandira which is an inshore protected area. It also harbours a greater number of fishers, belonging to different villages which do not have necessarily the same demands and perspectives in the Deliberative Council. Given these features, social participation is more complex in Corumbau than in Mandira and the threats from industrial boats coming to fish in the area are also higher. The positive aspect is that a broader marine area is protected and it is a part of a regional protected network that includes the

important Marine Archipelago of Abrolhos. It is also considered an important defense line against the large shrimp farms that are threatening the whole Bahia coast. Fisheries management is also more complex as there are many migratory fishes that require specific management measures.

Some problems affect the Resex Corumbau: the physical distance among the 5 different villages and insufficient means of transportation to take people to meetings. Each of these five villages have a user´s association, but they function unevenly, pending of the type of leadership they got and the conflicts they have to solve . Conflicts with tourism occupation seem to be higher in the fishing village that is part of the main city but it exist also in other more distant villages, as the whole area is attracting a larger numbers of visitors.

One of the main conflicts, however, involves the shrimp cultivation farms that are expanding in its last frontier: the southern coast of Bahia where Resex Corumbau is located. In fact, close to the reserve there is a plan to build the largest shrimp farm of Brazil, covering 5.000 hectares that may affect the Resex and the Abrolhos National Park. The MER association, IBAMA and NGOs are fiercely opposing the establishment of this new shrimp farm, whose owners are important politicians and investors of the Province and have developed a strong lobby in the State Parliament to get the project approved. In the place where the shrimp farm would be located, there is also a project to build a new Marine Extractive Reserve.

One relevant issue is that only the coastal/marine are was declared protected area, but not the land where fishers live which is governed by commercial and private property laws. Some of them are selling their plots to tourists where they build their secondary house.If this trend continue some fishermen will be forced to live far from their beaches. Some communities are already requesting IBM to extend the protected area to the land but this proposal is already facing opposition from some hotel owners.

A recent study (Di Ciommo, 2004) has shown the fragility of the social institutions related to the MER. According to this study, the villages are organized in three users´ association, but only a small percentage of the commoners re aware of the norms that regulate the MER and their participation (14% in Cumuruxatiba, 25% in Corumbau and 45% in Caraiva). " Long distances, meeting schedules which are incompatible with women´s daily activities and lack of information on the creation and management process were pointed out as obstacles to the participatory process."(Di Ciommo, 2004:57).Concerning women´s participation in the meetings of the users´s

association, the author mentions that motherhood and cultural traditions are the main factors that preclude their participation. The author also points out that men and women have different views of the problems of MER: while men are worried with the weakness of their associations, the lack of roads to sell their products, women are more concerned with the lack of piped potable water, of health and education services and day care centers for children up to 6 years old and lack of alternative employment. They pointed out that job opportunities exist during tourist season and were asking to training courses on tourist activities where they could have their own income. Men also " expressed their wish to have better working conditions starting with the purchasing of a boat nd the possibility of collective transportation which would make it easier for the family to travel to other places.The scarce roads are not properly maintained and during the rainy season the situation becomes worse. In addition to that " the construction of roads is another issue that needs to be discussed, giving rise to conflicts between local people and conservation organizations. This is due to the potential threat it represents by encouraging tourism which, as discussed could result in environmental and cultural damage."(Di Ciommo, 2004: 64)

Apart from these conflicts, very little funding from outside sources was found to ameliorate the fish landing areas, the commercialization system, the functioning of the schools and health services. For the moment, the only advantage of the MER is keeping the trawlers out of its boundary and the consequence increase in fish available for artisanal fishermen of the reserve.

Finally, the presence of IBAMA/ CNPT, as co-managers with the users´s associations is weak as just one officer is responsible for this large MER. The Reserve, although supported by local Ngos did not yet get enough funds for its functioning and does not have boats to make the surveillance of the large open sea surface. Fish marketing is still in the hands of the traditional fish traders, resulting in a low income for the fishermen. Some of them are also engaged in small scale agriculture in order to supplement their income.

Summary of the characteristics of the Corumbau Reserve

1.large open-sea area and a greater number of disperse villages, including one in urban area.

2;Diversity of fishing techniques

3.Diversity of ecosystems including beaches, mangroves, coral reefs and islands.

4. Great distances between villages, problems of communication.

5. Limited participation of women in the users´s associations

6. The villages where fishers live are not part of the protected area, and as some villagers are selling their houses on the beaches to tourists ,the whole MER might be in danger.

7. Increasing importance of tourism in several villages

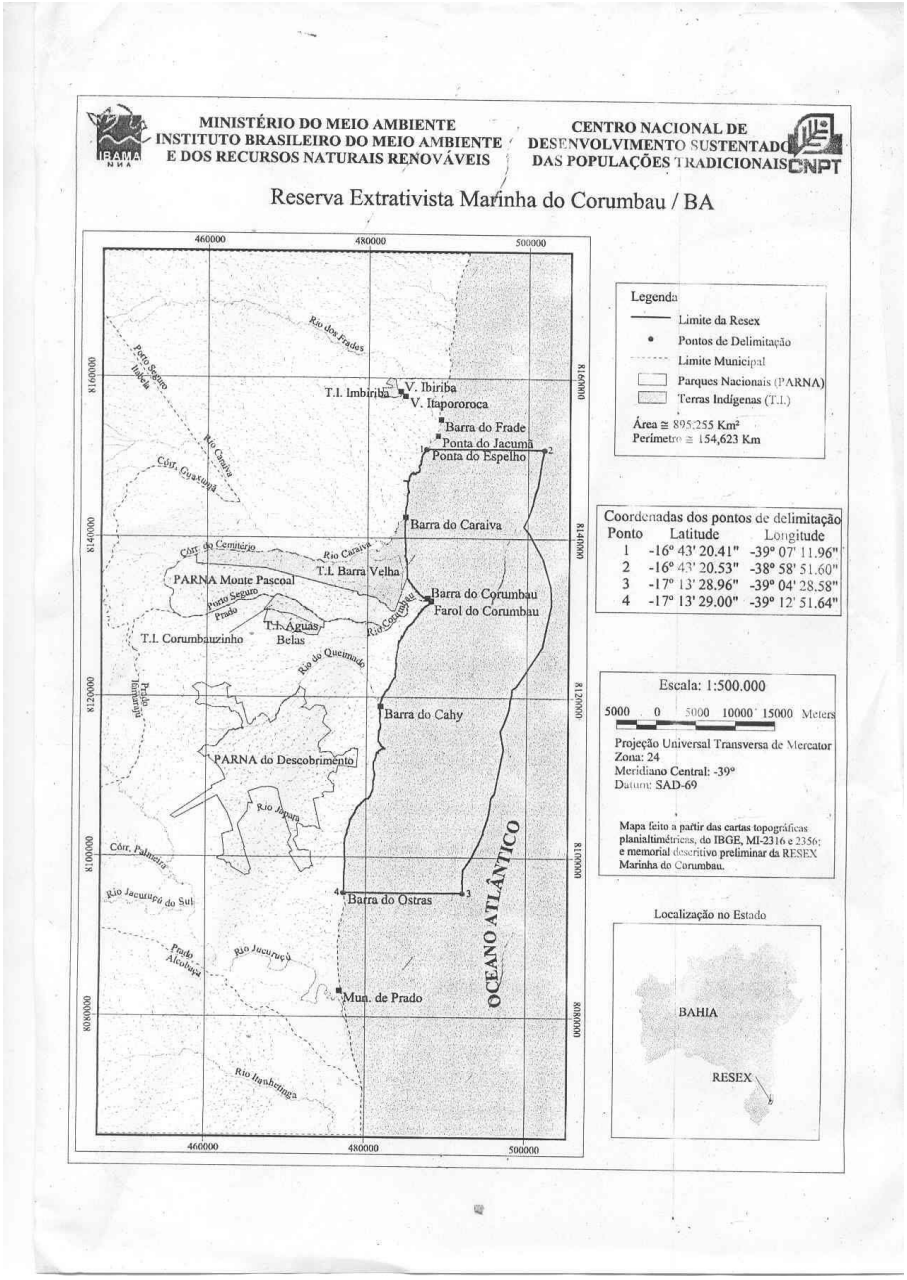
8. Co-management is still on its initial phase, although the utilization plan was already approved.

9 .Difficulties in controlling boundaries because of lack of appropriated boats. Surveillance is often done with the infrastructure of the nearby Abrolhos National Park.

10. In southern part of Bahia is seriously threatened by the expansion of shrimp cultivation farms. The Corumbau Reserve has been helping the fishermen of the area to resist to the expansion of these farms, creating additional MER in the region.

7. Weakness of users´s associations and insufficient staff from Government Institutions (IBAMA/CNPT)

8. Limited and badly maintained physical and social infra-structure (roads, health and education)



Map 6. Limits of MER Corumbau

Lessons learned from the case studies

1. The establishment of marine national parks in Brazil has been done without consultation with the artisanal fishers. Their traditional fishing rights have not been respected. In most cases, severe restrictions on the use of sea resources have caused migration to urban areas outside their traditional sea territories. The changes introduced by the Brazilian National System of Protected Areas, SNUC, under the law 9985/00 that includes the need for the creation of a consultative committee, the obligation by the State of promoting sustainable development for the fishers communities are seldom promoted.
2. These restrictions and threatens of eviction, as it is the case of the Peixe Lagoon National Park are the main causes of conflicts between fishers and park administration. Under these conflictive situations fish resources and traditional fishers are the main loosers.
3. Fisheries management plans, usually done by natural scientists do not incorporate traditional knowledge and management, increasing social marginalization, serious problems with law enforcement , loss of cultural identity and impoverishment.
4. Recent creation of Marine/coastal Extractivist Areas and Coastal/Marine Sustainable Use Reserves opens new possibilities for the involvement of fishers communities from the planning to the implementation phases.
5. Marine/Coastal Extractivist Protected Areas require a formal demand of the fishers for their establishment as well as the need for interdisciplinary studies that incorporate also traditional knowledge and management.
6. Assessment of the social and cultural organization, internal social conflicts, economic basis, leadership, marketing structures as well as biological potential are crucial elements for a viable reserve.
7. The definition of boundaries is also a crucial elements that usually involve discussions with neighbouring communities. Although only the fishers belonging to the reserve association are allowed to fish with these boundaries, consideration is given to the rights of fishers of surrounding communities that traditionally also fish in the area, provided that they respect the agreed management plan.
8. Fishers associations are encourage to establish no-take zones inside the Extractive Reserves for the protection of natural resources.

9. Co-management involving local fishers and the reserve government authorities is crucial for the success of the project. Until now, however, due to a series of difficulties described in the case studies, co-management faces constraints in their implementation. Law enforcement and penalties for those who disobey the management plan directives are more effective in smaller and less complex reserves.
10. Smaller reserves with more homogeneous communities such as Mandira Extractive Reserve prove to be more sustainable than larger ones, with several communities inside their boundaries, particularly when these last ones involve urban fishers and growing tourist activities.
11. More successful reserves are those that, in addition to the sustainable use of biological reserves were able to improve the income of the fishers and the establishment of adequate social services, particularly schooling and health services.
12. Women´s participation in the Reserve Association greatly contribute for the success of the extractive reserves.

BIBLIOGRAPHY

ADAMILLI, GIANPAOLO 2002 Trabalho, meio ambiente e conflito: um estudo antropológico sobre a construção da identidade social dos pescadores do Parque Nacional da Lagoa do Peixe, RS Dissertação de Mestrado em Antropologia Social UFRGS

ALMUDI, T (2005) Adequação do modelo de unidade de conservação: populações humanas, convivências e conflitos nos arredores da Lagoa do Peixe (RS). Honour thesis. Fundação Universidade Federal do Rio Grande (FURG), Brazil, 188pp.

BORSATO LJ (1992) Plano de Manejo do Parque Nacional da Lagoa do Peixe. Relatório Final. Rio Grande: FURG/IBAMA.

ANGELO, SUELI 2000 Lugar e cidadania: implicações socioambientais das políticas de conservação ambiental: Parque Estadual da Ilhabela Tese de Doutoramento, Depto de Geografia, USP, SP

CNPT/IBAMA 2004 Roteiros Metodologicos: plano de manejo e uso multiplo das reservas extrativistas federais: Rodrigues, E, de Paula, A.e Araújo, C., (ed) IBAMA/MMA

CORDELL, JOHN, 2007 A sea of dreams: valuing culture in marine conservation, The Ethnographic Institute, Berkeley

CORDELL, JOHN 2003 Brazil´s coastal Marine Extractive Reserves (MER) Initiative:protected area management: capacity building, social policy and Technical Assistance. Consultancy report. The Ford Foundation (Rio Office/Ibama/CNPT

CORDELL, JOHN, 2002 Remapping the waters: the significance of sea tenure-based protected areas: keynote address: IIII Conference on property rights, economics and the Environment. Centre d´Analyse Economique de l´Unicversité d´Aix-Marseille

CORDELL, JOHN 1989 The sea of small boats, Cultural Survival, Cambridge Mass.

CUNHA, LUCIA HELENA Comunidades litorâneas e unidades de proteção ambiental: conflitos e convivência. O caso de Guaraqueçaba, Nupaub-USP 1989

DANTONA, ALVARO 2000 Tempos e lugares nos Lençóis Maranhenses: considrações sobre o modo de vida de comunidades residentes junto a um Parque Nacional, in Diegues, (org) *A imagem das Águas*, Hucitec, 2000

DIEGUES, ANTONIO, 2001 Traditional fisheries knowledge and social appropriation of marine resources in Brazil. Paper presented at Mare Conference, People and the Sea Amsterdam,August/September

DIEGUES, ANTONIO 2004 A pesca construindo sociedades: leituras em antropologia marítima e pesqueira, Nupaub-USP 2004

DIEGUES, ANTONIO E ARRUDA, RINALDO: 2001 Saberes Tradicionais e Biodiversidade no Brasil, MMA, Brasília

DIEGUES, ANTONIO 2006 Artisanal Fisheries in Brazil, Samudra Monograph, ICSF

DI CIOMMO, REGINA 2007, Gender, tourism and participatory appraisals at the Corumbau Marine Extractive Reserve, Brazil, Human Ecology Review, vol. 14,n. 1

FURQUIM, ANA 2000 A ilha do Cardoso: O parque Estadual e os Moradores. Dissertação de Mestrado em Ciências Florestais, Esalq.

KALIKOSKI, DC, VASCONCELLOS M and LAVKULICH LM (2002) Fitting institutions and ecosystems: the case of artisanal fisheries management in the Patos lagoon. Marine Policy 26 (03): 179-196.

KALIKOSKI i DC and SATTERFIELD T (2004) On Crafting a Fisheries Co-management Arrangement in the Estuary of Patos Lagoon (Brazil): Opportunities and Challenges Faced through Implementation. Marine Policy 28:503-522.

KNAK, RB (2004) (Org.) Plano de manejo do Parque Nacional da Lagoa do Peixe. IBAMA/FNMA/FURG/NEMA/UFPel. Brasília: Portaria 012, 2004.

KALIKOSKI, DANIELA 2004 Análise da gestão compartilhada: avaliação preliminar comparativa do Fórum da Lagoa dos Patos (S) e RESEX do Arraial do Cabo, Consultoria SEAP-Pesca, Projeto BRA/03/035

MALDONADO, SIMONE Caminho das Pedras: Percepção e Utilização do Espaço na pesca simples, in A.Diegues (ed) Imagem das Águas. Hucitec/Nupaub, São Paulo

OLIVEIRA, RITA, 1993 Populações Humanas na Estação Ecológica de Jureia-Itatins, Nupaub-USP

MEDEIROS, DEAN, 2004 Lessons from the Equator Initiative: Cananéia Oyster Producers´ s cooperative, Brazil. IDRC/UNDP/ Centre for Community-based resource management, Univ.of Manitoba, Canada

PINTO DA SILVA, PATRICIA 2002 Common Property to co-management: social change and participation in Brazil´s first Marine Extractive Reserve, PHD Thesis, London School of Economics

PRADO, DAURO 2004 Os caiçaras em areas protegidas, in Diegues, Antonio Enciclopedia Caiçara, vol4 Hucitec/Nupaub-USP

PARADA, ISADORA: 2002 Mudanças socio-ambientais de duas comunidades caiçaras do P.E.da Ilha do Cardoso, Monografia em Ecologia, Inst.Biociências, Rio Claro, SP

RESENDE, S (1988) Nobreeding strategies of migratory birds of Lagoa do Peixe, Rio Grande do Sul, Brazil. Masters Thesis. Ithaca, New york: Cornell University, 150 pp.

RESENDE, S and LEEUWEMBERG, F (1987) Ecological studies of Lagoa do Peixe. Report of project 'Lagoa do Peixe' to World Wildlife Fund, 52pp.

SAINT-HILAIRE AD (1887) Voyage a Rio Grande do Sul. Orleans: H. Herlison, 644pp.

SEIXAS,CS AND BAERKES,F and Berkes F (2003) Dynamics of social-ecological changes in a lagoon fishery in southern Brazil. pp. 271-298 In: Berkes F, Colding J, Folke C (Ed.) Navigating socio-ecological systems. Cambridge: Cambridge University Press.

SEIXAS, CRISTIANA 2004 Barriers to local-level participatory ecosystem assessment and management in Brazil. In Millenium ecosystem assessment conference: Bridging scales and epistemologies: linking local knowledge and global science in multi-scale assessment, Alexandria, March 17-20

TAGLIANI, CR et alli (1992) Geologia e geomorfologia da Porção Sul do Parque Nacional da Lagoa do Peixe, RS, Brasil. In: Congresso Brasileiro de Geologia, 37, SBG / SP, São Paulo. Boletim de Resumos Expandidos 2:292-293.

TAGLIANI, PRA (1995) Estratégia de planificação ambiental para o sistema ecológico da Restinga da Lagoa dos Patos-Planície Costeira do Rio Grande do Sul. Ph. D. Thesis. São Carlos: Universidade de São Carlos.

WORLD BANK 2006 Scaling up Marine Management: the role of Marine Protected Areas. Report n. 36635.Environment Department and Sustainable Development Network, Washington DC