

SAMUDRA Monograph

Marine Protected Areas and Artisanal Fisheries in Brazil



Antonio Carlos Diegues



International Collective in Support of Fishworkers
www.icsf.net

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Mapping of the limits of the Corumbau
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Contents

Acronyms and Abbreviations.....	v
Preface	vii
Introduction	1
Section I: Brazilian Legislation on Marine Protected Areas	3
Section II: The Development of Marine Extractive Reserves in Brazil	17
Section III: Lessons from Existing Marine Extractive Reserves	33
Peixe Lagoon National Park, Southern Brazil	34
Mandira MER, São Paulo	39
Corumbau MER, Bahia	45
Endnotes	51
References	52
Figure: Total landings: Catches (in percentage) by the artisanal and the industrial fishing sectors	13

List of Tables

Table 1: Coastal/marine no-take protected areas with populations living inside.....	7
Table 2: Distribution of coastal artisanal fishermen by main regions in 2003	10
Table 3: List of approved MERs, area, number of families who benefit and year of creation	23

List of Maps

Map 1: Location of various non-Indian traditional people in Brazil	5
Map 2: Different categories of MPAs and their location	8
Map 3: Location of MERs.....	22
Map 4: Location of the three MPAs chosen for case studies.....	33
Map 5: Boundaries of the Peixe National Park	39
Map 6: The limits of the estuarine Mandira Extractive Reserve	43
Map 7: Limits of Corumbau MER	48

Acronyms and Abbreviations

CBD	Convention on Biological Diversity
CI	Conservation International
CNPT	Centro Nacional de Desenvolvimento Sustentado das Populações Tradicionais (National Council for Traditional Populations)
COP7	Seventh Meeting of the Conference of Parties (of the CBD)
ft	feet
FURG	Federal University of Rio Grande
ha	hectares
GOMBR	Gulf of Mannar Biosphere Reserve
GOMNP	Gulf of Mannar National Park
IBAMA	Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (Brazilian Institute for the Environment)
IBDF	Instituto Brasileiro de Desenvolvimento Florestal (Brazilian Institute for Forest Development)
ICSF	International Collective in Support of Fishworkers
ICMBio	Instituto Chico Mendes de Conservação da Biodiversidade (Chico Mendes Institute for Conservation of Biodiversity)
ILO	International Labour Organization
IUCN	International Union for Conservation of Nature
MER	marine extractive reserve
MIMP	Mafia Island Marine Park
MMA	Ministério do Meio Ambiente, dos Recursos Hídricos e Amazônia Legal (Ministry of Environment, Water Resources and the Legal Amazon)
mn	million
MPA	marine protected area
MRSD	marine reserve for sustainable development
NGO	non-governmental organization
NOAA	National Oceanic and Atmospheric Administration (of the US)
NUPAUB	Núcleo de Apoio à Pesquisa sobre Populações, Humanas e Áreas Úmidas (Centre for Research on Human Population and Wetlands in Brazil)
PA	protected area
PA PoW	Protected Areas Programme of Work (of the CBD)

PoW PA	Programme of Work on Protected Areas (of the CBD)
RSD	reserve for sustainable development
SEMA	Secretaria Especial do Meio Ambiente (National Secretariat for the Environment)
SNUC	Sistema Nacional de Unidades de Conservação (National System of Conservation Units)
TNC	The Nature Conservancy
UNEP	United Nations Environmental Programme
US	United States
WSSD	World Summit on Sustainable Development(
WWF	World Wide Fund for Nature

PREFACE

As the conservation of marine resources becomes a growing global priority, the concept of marine protected areas (MPAs) is being widely propagated. Since most MPAs are located in coastal areas of great biodiversity, their development has direct relevance and concern to the livelihoods, culture and survival of small-scale and traditional fishing and coastal communities.

An MPA is considered to be any coastal or marine area in which certain uses are regulated to conserve natural resources, biodiversity, and historical and cultural features. The Convention on Biological Diversity (CBD) defines an MPA as “any defined area within or adjacent to the marine environment, together with its overlying waters and associated flora, fauna, and historical and cultural features, which has been reserved by legislation or other effective means, including custom, with the effect that its marine and/or coastal biodiversity enjoys a higher level of protection than its surroundings”.

As an area-based management tool, MPAs are considered useful in implementing both the ‘ecosystem approach’ and the ‘precautionary approach’, since their design involves managing pressures from human uses by adopting a degree of protection, which can range from strict protection, where all use activities are barred, to less stringent measures like sanctioning areas where multiple uses are allowed and regulated.

In 2004, the Seventh Meeting of the Conference of Parties (COP7) to the CBD agreed that marine and coastal protected areas, implemented as part of a wider marine and coastal management framework, are one of the essential tools for the conservation and sustainable use of marine and coastal biodiversity. The meeting noted that marine and coastal protected areas have been proven to contribute to (a) protecting biodiversity; (b) sustainable use of components of biodiversity; and (c) managing conflict, enhancing economic well-being and improving the quality of life. Following on this, Parties to the CBD subsequently agreed to bring at least 10 per cent of the world’s marine and coastal ecological regions under protection by 2012. In 2006, only an estimated 0.6 per cent of the world’s oceans were under protection.

Protected areas (PAs) need to be seen not just as sites copious in biodiversity but also as regions historically rich in social and cultural interactions, which often have great importance for local livelihoods. In practice, however, MPAs

have increasingly become tools that limit, forbid and control use-patterns and human activity through a structure of rights and rules. While numerous studies have examined the ecological and biological impacts of MPAs, few have focused on their social implications for communities and other stakeholders in the area who depend on fisheries resources for a livelihood. A particular MPA may be both a “biological success” and a “social failure”, devoid of broad participation in management, sharing of economic benefits, and conflict-resolution mechanisms. Clearly, for MPAs to be effectively managed, it is essential to consider the social components needed for the long-term benefits of coastal communities.

It is in this context that the International Collective in Support of Fishworkers (ICSF) commissioned studies in six countries to understand the social dimensions of implementing MPAs, with the following specific objectives:

- to provide an overview of the legal framework for, and design and implementation of, MPAs;
- to document and analyze the experiences and views of local communities, particularly fishing communities, with respect to various aspects of MPA design and implementation; and
- to suggest ways in which livelihood concerns can be integrated into the MPA Programme of Work, identifying, in particular, how local communities, particularly fishing communities, could engage as equal partners in the MPA process.

The studies were undertaken in Brazil, India, Mexico, South Africa, Tanzania and Thailand. Besides the Mexico study, the rest were based on primary data collected from selected MPA locations within each country, as listed in the table opposite.

The studies were undertaken in the context of Programme Element 2 on governance, participation, equity and benefit sharing in CBD’s Programme of Work on Protected Areas (PoW PA, also referred to as PA PoW), which emphasizes the full and effective participation of local and indigenous communities in protected area management. Taken together, the studies provide important insights into the MPA implementation process from a fishing-community perspective, particularly on issues of participation.

It is clear from the studies that the most positive examples of livelihood-sensitive conservation come from Brazil, where communities are in the forefront of demanding, and setting up, sustainable-use marine extractive reserves (MERs). Communities there are using PAs to safeguard their livelihoods, against, for example, shrimp farms and tourism projects. The Brazil study also highlights the many challenges faced in the process, which are related, among other things, to the

need for capacity building of government functionaries and communities; funding; strong community/fishworker organizations; an interdisciplinary approach; and integration of scientific and traditional knowledge.

Country	Case Study Locations
Brazil	<ul style="list-style-type: none"> • Peixe Lagoon National Park, Rio Grande do Sul • Marine Extractive Reserve (MER) Mandira, São Paulo • Marine Extractive Reserve (MER) Corumbau, Bahia
India	<ul style="list-style-type: none"> • Gulf of Mannar National Park (GOMNP) and Gulf of Mannar Biosphere Reserve (GOMBR), Tamil Nadu • Malvan (Marine) Wildlife Sanctuary, Maharashtra
South Africa	<p>Five MPAs in three of the country's four coastal provinces, namely:</p> <ul style="list-style-type: none"> • Langebaan Lagoon MPA • Maputaland MPA • St Lucia MPA • Tsitsikamma MPA • Mkambati MPA
Tanzania	<ul style="list-style-type: none"> • Mafia Island Marine Park (MIMP)
Thailand	<ul style="list-style-type: none"> • Had Chao Mai Marine National Park, Trang Province, Andaman Coast • Ra Island, Prathong Island, Prathong Sub-district, Kuraburi District, Phang Nga Province, Andaman Coast

On the other hand, the studies from India, Mexico, South Africa Tanzania and Thailand indicate that communities do not consider themselves equal partners in the MPA process. While, in all cases, there have been recent efforts to enhance community participation, in general, participation tends to be instrumental—communities are expected to participate in implementation, but are not part of the process of designing and implementing management initiatives. The studies also document clear costs to communities in terms of livelihood options lost, expulsion from traditional fishing grounds and living spaces, and violation of human/community rights. The affected communities regard alternative livelihood options as providing limited, if any, support, and, in several cases, as in South Africa, Tanzania and Thailand, they do not perceive substantial benefits from tourism initiatives associated with the PAs. There tends to be a resistance to MPAs among local communities, a mistrust of government and non-governmental organizations (NGOs) that lead such processes, and violations of rules and regulations, undermining the effectiveness of the MPA itself.

The studies in this series of *SAMUDRA Monographs* stress that there is a strong case for putting in place, or strengthening, a legal framework for supporting community rights to manage resources, building the capacity of both governments and communities, strengthening local organizations, and enhancing institutional co-ordination. They also highlight the need for more, independent studies on MPA processes from the community perspective, given that the few existing studies on social dimensions of MPA implementation have mainly been undertaken by MPA proponents themselves. Where clear examples of violations of community rights, and unjust costs on communities are identified, easily accessible redressal mechanisms need to be put in place, nationally and internationally.

Empowering indigenous and local fishing communities to progressively share the responsibility of managing coastal and fisheries resources, in keeping with the CBD's PA PoW, would undoubtedly meet the goals of both conservation and poverty reduction. This is the challenge before us. The future of both effective conservation and millions of livelihoods is at stake.

Chandrika Sharma
Executive Secretary, ICSF

Marine Protected Areas and Artisanal Fisheries in Brazil

INTRODUCTION

The establishment of marine and coastal protected areas in Brazil, particularly national parks, has led to many conflicts between artisanal fishers and those governing the protected areas. Most of these conflicts have been born of restrictions imposed on fishing activities in areas that were traditionally used by artisanal fishers. In many cases, they are also a fallout of having created protected areas without consulting the fishing communities in the area or encouraging their participation. A typical example of this top-down approach can be seen in the Peixe Lagoon National Park on the southern coast of Brazil, which has been described in a case study that follows.

In 2000, when the National System of Conservation Units (SNUC) legislation came into force in Brazil, it included new categories of protected areas such as marine extractive reserves (MERS) and reserves for sustainable development (RSDs), where a sustainable use of resources will help conserve biodiversity and improve the living standards of those within them. In recent years, more and more fishing communities have been demanding such reserves. It should also be mentioned that no-take zones within these reserves are provided for in the law, and some communities have been asking that they be set up.

In view of the importance of marine protected areas (MPAs), as well as an increase in the many levels of conflict they engender, it is important for communities and their organizations to evolve a common position that protects the livelihoods of artisanal fishing communities, the section most affected by the expansion in

the number of no-take parks, without compromising on the aims of promoting conservation and the sustainable use of natural resources.

The objectives of this paper are:

- to better understand the impact of no-take MPAs on the livelihoods of coastal communities, the conflicts associated with their establishment and potential solutions;
- to analyze existing experiences in biodiversity conservation and sustainable use of marine/coastal resources and their benefits to coastal communities, particularly in the context of Brazil's MERs; and
- to promote sharing of experiences with other developing countries that have similar problems.

This paper is organized as follows¹:

- a) The condition of no-take MPAs and their impact on the livelihoods of artisanal fishing communities is discussed.
- b) The new category of protected area to promote sustainable use, the MER, is studied.
- a) Three case studies on—one coastal national park and two MERs—follow.

SECTION I

BRAZILIAN LEGISLATION ON MARINE PROTECTED AREAS

The Brazilian Institute for the Environment (IBAMA), an institution that was part of the Ministry of Environment (MMA), was responsible for the establishment and management of protected areas in Brazil until 2007. It was then restructured to form the Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio, the Chico Mendes Institute for Conservation of Biodiversity), which is now in charge of all protected areas under the federal government. The latest legislation on protected areas is the SNUC, which entered the law books in 2000. The SNUC differentiates between two types of protected areas: areas that are totally protected (no-take areas), where human habitation is not allowed, and areas for sustainable use.

The local names and International Union for Conservation of Nature (IUCN) typology of no-take MPAs are:

1. Marine National/State Parks (IUCN category II)
2. Marine Biological Reserves (IUCN category I)
3. Marine/Coastal Ecological Stations (IUCN category IV)

The Marine Biological Reserves and Ecological Stations are the most restrictive categories in terms of permitting the entry of people: only those taking part in research or environmental education are allowed in them. Marine National Parks allow visits by tourists.

The local names and IUCN typology of sustainable-use MPAs are:

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

MERs and RSDs allow the sustainable use of resources, though the latter may also include areas that are totally protected. They can be considered a “new commons” in the sense that they have defined boundaries and the fisheries are co-managed by the government and users’ associations. Rules and regulations are framed by the users’ associations, which can impose penalties on those who disobey them.

MERs, which were established officially in 1990 and encompass marine as well as coastal areas, will be the main concern of this paper.

A BRIEF HISTORY OF PROTECTED AREAS IN BRAZIL

The SNUC was approved after more than 10 years of discussion among different groups of conservationists. The main bone of contention was the role and presence of “traditional people” in the areas of total protection. At the time, it was estimated that over 70 per cent of the no-take areas had people living in them, many of them traditional people. Ever since the establishment of the first National Park in 1937 (Itatiaia), the government’s policy has been to transfer these dwellers elsewhere. This policy, however, began to be implemented in earnest only in the 1980s with the creation of Secretaria Especial do Meio Ambiente (SEMA, the National Secretariat for the Environment), which, in 1989, was replaced by IBAMA. By then, the establishment of protected areas had become the most important strategy for nature conservation and the IBAMA department responsible for this had become an important one.

The 1970s and 1980s were crucial for the Amazonian region. During the military regime, many development programmes (for roads and dams, mining, agro-industries and cattle ranching) got under way, funded by the World Bank and other international financial institutions. Several no-take areas, recommended by the World Bank, were established in the region, often to compensate for the destruction of forests by large projects. The period also witnessed the entry of many non-governmental organizations (NGOs) into Brazil, all of which gave great importance to the creation of no-take areas. They included the World Wide Fund for Nature (WWF), Conservation International (CI) and The Nature Conservancy (TNC).

Until the 1980s, only no-use protected areas were accorded priority, in terms of funds and personnel, by IBAMA and the environmental NGOs, who exerted great influence on the government. It was the Amazon’s rubber tappers who, through the National Council of Rubber Tappers, first proposed that extractive reserves be set up. This proposal received the backing of international groups and social organizations within the country, building up political pressure for their creation. Soon, the first extractive reserves were legally incorporated as protected areas for sustainable use. At the end of the 1980s, a small unit was created within IBAMA, the Centro Nacional de Desenvolvimento Sustentado das Populacoes Tradicionais (CNPT, the National Council for Traditional Populations), which is responsible for the establishment and functioning of extractive reserves. But the unit lacked funds and personnel to accomplish what it was supposed to do.

The country’s laws make a clear distinction between Indian peoples (*Povos Indigenas*)—around 700,000 people with 160 different cultures and languages,

who have their own territories protected by law--and the traditional communities that have emerged from the commingling of Indians, Europeans and Africans. Among the non-Indians are the Amazonian rubber tappers, the *caiçaras* (peasants/fishermen living along the southeast coast and in the Atlantic Forest), the *sertanejos* (small-scale cattle raisers from the northeast), and the Azorians (fishermen on the southern coast).

Artisanal fishers belong to different sub-cultures. The southern coast has fishers who are descendants of Azorian migrants and they have 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 colonizers, natives and blacks, who combine small-scale fishing with small-scale agriculture. In the northeast live the raft fishers (*jangadeiros*) who use a special kind of raft known as the *jangada*. Along the Amazonian coast are the *praieiros* fishers, who have developed a variety of craft to suit the coast that has fluctuating tide conditions (see Map 1).

Map 1: Location of various non-Indian traditional people in Brazil



Source: Antonio Diegues, 2001

In 2005, the MMA launched a policy aimed at paying attention to the needs of all communities, Indians and non-Indians (many of whom have strong Indian cultural influences). This policy is being implemented by the government and representatives of traditional communities, through the CNPT. Of the 14 representatives in the council, five are from different coastal or fishing communities. Among the main demands of traditional coastal communities is the creation of MERs and RSDs, and support for them.

A SHORT HISTORY OF COASTAL MPAs IN BRAZIL

Establishing protected areas is one of the important measures the government takes to conserve coastal ecosystems, no doubt in response to the rapid degradation of Brazil's coastal habitats. The first no-take MPAs were created in the 1980s to protect oceanic islands and archipelagos (such as Fernando de Noronha and Abrolhos National Park).

The responsibility of establishing and managing MPAs under the jurisdiction of the federal government has, since 2007, passed on to ICMBio, which was created by restructuring IBAMA. ICMBio is still in the process of being organized and is expected to be fully operational in a few months. MPAs can also be created by States and municipalities. There are 24 no-take MPAs under federal jurisdiction (409,100 ha) and 14 under provincial jurisdiction (8,800 ha), totalling 38 no-take MPAs covering 417,900 ha. There are also 28 federal sustainable-use MPAs (1,057,200 ha) and 25 provincial ones (375,800 ha), covering 1,433,000 ha, making a total of 53. It should be noted that terrestrial protected areas under federal and provincial jurisdiction number 535 and cover an area of 97,999,600 ha. MPAs represent only 1.46 per cent of this area (ICMBio, 2007).

MPAs in Brazil now include several coastal and marine ecosystems, such as coastal and oceanic islands/archipelagos, dunes, mangroves, lagoons and salt marsh habitats. But a recent study on MPAs has shown that their management is, in general, weak, due to ineffective management plans, a cavalier attitude to enforcing laws, inadequate research and a paucity of technical expertise and funds.

A major reason for the lacklustre performance, however, lies in the way these protected areas were established. User groups, in particular, traditional populations, were never consulted beforehand and, according to existing legislation, they have to be transferred out of the protected areas. But these traditional communities have used these habitats with a relatively low level of impact on the flora and fauna and should rightfully have been considered important allies in the conservation process, more so because the MPAs are created by federal and State agencies, mostly keeping municipalities out of the picture. The local authorities therefore

do little to support the conservation effort, making the support of the local people crucial.

In some communities, fishers are also engaged in small-scale agriculture. This is an activity that government agencies frown upon though they are more lenient towards fishing activities. They encourage local communities to be associated with tourism, especially in the coastal national/State parks. Making available incentives to make fishers switch to providing tourist services is also a strategy of big international NGOs, which want to wean fishing communities away from their traditional dependence on one natural resource. However, the expansion of tourism and encroachments by urban people have resulted in many artisanal fishers selling their houses and boathouses and moving to areas far away from their traditional beaches.

NO-TAKE MPAS AND THEIR IMPACT ON FISHING COMMUNITY LIVELIHOODS

The distribution of Brazil's MPAs, both protected and for sustainable use, can be seen in Map 2. With the exception of biological reserves, which are generally small, almost all no-take areas have people, particularly fishworkers, in them.

Table 1: Coastal/marine no-take protected areas with populations living inside

Category	Number	With inhabitants	% with inhabitants
National Parks	12	11	91.5
State Parks	5	5	100
Ecological Stations	5	5	100
Biological Reserves	5	2	40

Source: IBAMA, 2003

Map 2: Different categories of MPAs and their location



As the laws governing protected areas are very strict, fishers and others dependent on natural resources face great difficulties in carrying on with their traditional activities and sustaining their way of life. In many of the protected parks, conflicts become a part of daily life and this often leads to members of a community deciding to abandon their houses and move to urban areas in coastal towns. Needless to say, what they have to put up with there is no less unpleasant—poor living conditions and underemployment.

Conflicts involving fishers and park administrations have been reported from various MPAs all over Brazil. In the State Park of Ilhabela, São Paulo State, which was created in 1977, coastal communities have been prevented from pursuing their traditional way of life that combined small-scale agriculture (now forbidden) and fishing (permitted with several restrictions) (Angelo, 2000). The State Park of Ilha do Cardoso in the same State was established in 1962 and it had more than 700 peasants and fishers living in it. Only around 350 remain. Many of the inhabitants were compelled by circumstances to move to surrounding coastal towns and those that remain are only allowed to make a living from tourism (acting as tourist guides or running small hotels), not from the traditional use of natural resources. In both these parks, there are severe restrictions on the use of wood to rebuild old houses and to make the dugout canoes artisanal fishers in the area use. The residents also have only limited access to healthcare and educational institutions (Parada, 2004, Furquim, 2000, Diegues, 2004).

The situation in the Ecological Station of Jureia, in São Paulo State, which was set up in 1987, is more or less the same. Two-thirds of the traditional population was forced to leave the area because most of their customary activities were forbidden (Oliveira, Rita, 1993, Prado, Dauro, 2005). In the National Park of Superagui in Paraná State, which came into being in 1989, fishers face restrictions on fishing and cultivation. They are also packing up and moving to the outskirts of coastal towns (Cunha, 1989).

In the Peixe Lagoon National Park on the southern coast, local fishers have been forced to give up their traditional occupation much against their wishes and earn a livelihood from ecotourism, the only permitted activity (Adamoli, 2002). In the northeast, in the National Park of Lençóis Maranhenses, established in 1981, the authorities have reportedly imposed restrictions on traditional fishers while according priority to promoting ecotourism (D. Antona, 2000). In the Ecological Station of Anavilhanas in the Amazon region the process is no different. After 1981, many dozens of fishing families have been removed from, or been constrained to leave, the area they traditionally inhabited.

On the basis of papers, reports, theses by graduate students and information supplied by some NGOs, severe restrictions have been placed on the traditional way of life of coastal (and inland) fishers elsewhere as well.

ARTISANAL FISHERIES IN BRAZIL

Brazil has a coastline of around 8,000 km, which stretches over diverse ecological systems such as estuaries, lagoons, coral reefs, mangroves and rocky and sandy beaches. It is estimated that the country has nearly 600,000 people who could be described as artisanal fishers. This number does not include the fishers who live along the Amazonian rivers and consume fish as a major part of their diet. If one includes everybody along the chain, including those engaged in processing and marketing fish and fish products, more than two million people depend directly on fishing and activities allied to it.

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

Coastal Regions	Registered artisanal fishermen	Percentage
North (Amazon coast)	49,991	18.5
Northeast	114,205	42.3
Southeast	52,956	19.9
South	52,396	19.4
Total	269,548	100

Source: IBAMA, 2003

Note: Only fishermen registered in fishermen's guilds (*colônias*) are considered. The number of artisanal fishermen in the north, for instance, seems under-reported.

More than 40 per cent of the artisanal fishers in Brazil are concentrated in the northeast. Artisanal fishing is practised in a variety of ecosystems in the country and this greatly influences the way fishing activities are organized. Sea currents, winds, tides, waves, coastal vegetation, fauna and flora and ecological cycles vary from area to area, and these are all factors artisanal fishers have to consider when they go about their daily tasks. They mostly have a deep traditional knowledge of their ecosystems, which has enabled them to evolve fisheries management practices that best suit their particular areas.

In Brazil, as in many other tropical countries, artisanal fisheries are embedded in mixed land and sea-based economies, with commercial, semi-commercial and subsistence components. In some cases, very little of the catch from artisanal fishers reaches the market place. However, this does not mean it is any less

important for the livelihoods of fishers. On the contrary, where there are few other alternatives, it is often the backbone of marginal communities in terms of food supply and income (Cordell, 2007).

A second feature distinguishing artisanal production is its variability and versatility. Artisanal fisheries are multi-species, multi-purpose and multi-dimensional. They use remarkably varied technologies in terms of equipment and fishing craft, running the gamut from traditional to high-tech. Fishing is carried out in a diversity of habitats and coastal micro-environments. These fisheries are also characterized by a division of labour 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. The rights to fish and use resources are based on customs and principles that have emerged from traditional resource management systems. These traditional systems have had a pronounced—and positive—effect on the way resources are used, though they are often hard to interpret and quantify (World Bank, 2006).

The pattern of decline in Brazil's marine capture fisheries follows the trajectory for the world as a whole. Production increased from 1960 to the mid-1980s, mainly because of the expansion in large-scale, industrial fishing. This has been followed by a stagnant phase. Only fish cultivation, or aquaculture, has been recording a continuous increase in the last few years and it now contributes to more than 20 per cent of the country's total fish production.

Brazilian marine biodiversity is concentrated in the coastal and estuarine areas, in a variety of habitats such as the mangroves in the Amazon basin, the sandy beaches and coral reefs of the northeast, and the lagoons, estuaries, islands and salt marshes of the southeast. Even before the advent of European colonizers in the 15th century, Indians in the coastal areas harvested shells and oysters and fished using dugout canoes and bamboo traps. Until the 1960s, artisanal fishers dominated most of the fisheries in the country and accounted for more than 80 per cent of the total catch.

Then the government decided to develop an export-oriented fisheries industry and provided generous loans (seldom paid back) to buy large vessels and build factories. There was little control on fishing effort, while the compulsion to export was great. In less than 15 years, overfishing led to the depletion of most of the commercial fish stocks, particularly of shrimp and lobster. Many of the big industries have had to be closed down and many of the large boats lie rusting at piers. But artisanal fisheries were able to subsist even without government

assistance, supplying most of the fish for the domestic market and providing jobs and incomes, particularly to people in the north and northeast (Diegues, 2004; Cordell, 2007).

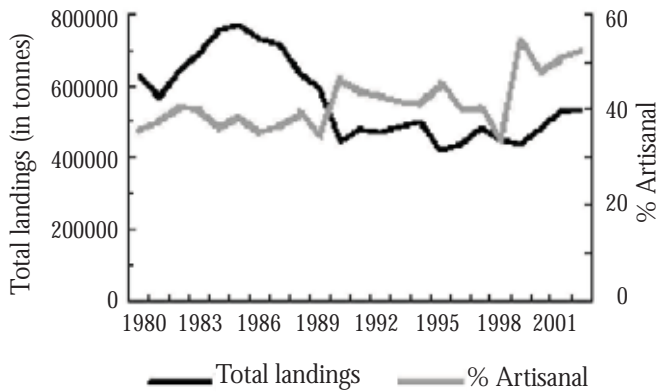
From the 1960s onwards, industrial centres and harbours were built in the larger estuaries, which, combined with growing urbanization, have caused large-scale coastal degradation and pollution. The consequences of situating almost all industrial centres (chemical, petrochemical, fertilizer, sand and heavy-metal mining), which produce the largest number of pollutants, in fragile coastal areas, estuaries and bays, have been disastrous for the environment and livelihoods of artisanal fishers. The aquatic habitats that have been hit hardest by pollution are those that can least afford to bear the impacts and costs of environmental degradation.

Other factors that have contributed to degradation of the coastal zone are: urbanization and urban sprawl, fuelled by a dramatic increase in migration to cities in the northeast; expansion of the transportation system; oil exploration and drilling; and State-sponsored tourism and recreation projects such as Prodetur. Tax incentives to develop industrial fisheries and large-scale shrimp farming have yielded short-term profits for investors but they have also intensified the competition for limited coastal space and resources, thus contributing to the extensive destruction of mangroves.

Since the late 1980s, large-scale shrimp farms have mushroomed, destroying mangroves at a rapid rate and having an adverse social effect on fishing communities. Right now, the gravest threat to coastal biodiversity, artisanal fisheries and the livelihoods of Brazil's coastal residents is the unregulated, highly speculative and environmentally destructive expansion of large-scale shrimp farms, especially in the northeast (Diegues, 2004). The country's shrimp farming exports jumped from US\$14 mn in 1999 to US\$244.5 mn in 2003 but this has come at a tremendous cost to fragile coastal habitats and the well-being of fishing communities.

Artisanal fisheries systems are highly vulnerable to a variety of pressures such as the uncontrolled development of industries operating at the land-sea interface, population pressure in the coastal zone and the expansion of modernized inshore fisheries and industrial fishing fleets. Yet, small-scale, inshore fishing traditions have continued to prevail and remain the economic backbone of Brazil's coastal poor, with an estimated two million or so fishers and their families depending on the artisanal fishing economy. Following the collapse of industrial fisheries at the end of the 1980s, artisanal fishers have reoccupied some coastal waters in a process that can be described as "re-artisanalization" of fishing activities, landing a higher proportion—54 per cent—of the total catch.

Figure: Total landings: Catches (in percentage) by the artisanal and the industrial fishing sectors



Source: IBAMA, 2003

DESTRUCTION OF TRADITIONAL MANAGEMENT AND OPEN ACCESS

Before the industrial fishing fleets began large-scale operations in the 1960s, access to fisheries was regulated by traditional practices. These practices among fishing communities were unofficial and informal—local sea tenure systems could be based on artisanal fishers’ vernacular, environmental knowledge, kinship and social networks, contracts and alliances or a collective sense of “use rights” (Cordell, 1989; Diegues, 2004). In many places, coastal areas and estuaries were used as “commons” by adjacent fishing communities. These local tenure arrangements that controlled access to fishing grounds had an impact similar to the quota and limited-entry provisions employed in contemporary fisheries management frameworks.

The traditional practices mostly set norms to control fishery access and activities within a socially demarcated sea space. They were basically designed to allow fishing communities to intervene in the life cycles and natural processes of marine species. In recent years, anthropologists have found this an enlightening way to explain and understand why tenure systems develop and how they work in many tropical coastal areas, which were thought to be open-access areas by governments, fishery entrepreneurs and regulatory agencies. The prevailing wisdom behind most recent fishery management regimes and legislation stems from what is turning out to be a naïve and erroneous assumption about the ownership status of inshore fisheries and coastal sea space, much of which has long been held and managed in a sustainable manner under traditional tenure arrangements (Cordell, 2006).

Anthropological and social science literature is now replete with examples of local fishing traditions that intentionally or unintentionally regulated access to resources and the sea, created fishing rights and corresponding social obligations, and regulated the use and distribution of fishing gear to reduce social conflicts. In some cases, they even controlled fishing pressure itself. Also, as Cordell (1989) points out, sea tenure traditions include not only subsistence strategies, but also reflect basic cultural values, social identity and a sense of place.

The industrial fleets, which needed “freedom”, or open access, to fish anywhere along the coast, encroached on existing traditional management arrangements, contributing to the disruption of most of them. In addition, anyone who is professionally registered and licensed as a member of a fishing guild (*colônia*) can fish commercially anywhere in Brazil. Apart from this registration, which formerly was the only way most impoverished artisanal fishers could claim a minuscule pension, there is no regulation of the number of people who want to fish for a living. Given the chaotic conditions of resource competition today, it is difficult to enforce even the registration requirement.

The main concern therefore is finding a way to limit the open access that has been created by industrial fishing, especially the illegal invasion of the artisanal fisheries zone of 1.5 km along the coast. The second problem is controlling access to artisanal fishing areas (mangroves, estuaries), which look like they will be overrun by the large number of urban poor who are turning to fishing as a last resort.

The government’s coastal management planning and implementation have, in general, remained technocratic exercises that have had no major impact. But, in some areas, coastal communities are doing their bit to manage their neighbourhoods. In Ceará, for instance, local communities had been suffering from real estate and tourism ventures invading their beaches and from the overfishing of lobster, mainly by industrial fleets and divers from a neighbouring State. Assisted by local NGOs and research institutions, they proposed a Coastal Forum, where various problems could be discussed by representatives of the local communities, the tourism sector, the industrial fisheries sector and the federal, State and municipal governments. The forum has put in place a management plan for lobster fishing, in co-ordination with the industrial fisheries sector. When IBAMA announced that no funds and boats were available for surveillance activities, the forum equipped one of the boats to undertake surveillance. Lobster fishermen who violate regulations are at first reprimanded but taken to court for repeated offences.

Along some beaches, community councils have to approve the sale of a plot of land to a foreigner. Some other coastal communities are focusing on sustainable

use so that reserves exist for community members over the long term. Apart from sport fishermen, few outsiders are permitted into their area. In most of these initiatives, there is a strong resource conservation component and this frequently wins them the support of government bodies and NGOs (Diegues, 2004).

THE ROLE OF MPAs IN FISHERIES MANAGEMENT

MPAs have become the main management tool for conserving biodiversity in most developing countries, especially since the 1980s. They are usually created in response to growing threats to the marine environment—from habitat destruction, overuse of resources, pollution runoff, large-scale aquaculture, oil exploration, high-impact tourism and conflicting interests over resource use (Cordell 2007).

Tropical countries, especially those with extensive coral reefs, are being encouraged to expand and improve management of their MPAs. At present, there are around 1,500 MPAs of different categories the world over but they represent only 0.5 per cent of the earth's oceans and coastal areas. IUCN recommends that a system of representative networks of marine and coastal protected areas be established by 2012, with roughly 20 to 30 per cent 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 intertidal 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, all of them fall under two main categories: no-take zones and sustainable or multiple-use areas. No human activity is permitted in no-take zones while the sustainable use of resources is allowed in multiple-use areas.

According to the United Nations Environmental Programme (UNEP), the main objectives of MPAs are to conserve marine biodiversity, to maintain productivity and to contribute to economic and social welfare. In addition, MPAs are sometimes used to support conventional forms of marine resource management that have not managed to make an impact. They also play the role of being buffers against management mistakes or unforeseen declines in environmental quality and marine production.

There are few studies on the social and cultural implications of MPAs, particularly in developing countries, where the vast majority of professionals and scientists

in the field tend to have a background in biology. However, this lack of an interdisciplinary approach can also be noticed in developed countries, according to a 2003 paper by the National Marine Protected Centre of the National Oceanic and Atmospheric Administration (NOAA) of the United States (US), entitled Social Science Research Strategy for Marine Protected Areas. The paper indicates six priority themes for a social science strategy: governance, institutions and processes; use patterns; attitudes, perceptions and beliefs; economics; communities; and cultural heritage and resources. It insists that the inputs of social sciences (including anthropology/sociology, economics, geography, history, archaeology, psychology, law and ethics) should be used in planning, creating and evaluating MPAs.

The information gap noticed in the US is much wider when it comes to tropical countries, where, in addition to marine biological diversity of species and habitats, there is great cultural diversity. The lack of knowledge about cultural differences, cultural property interests, community resources and claims in coastal waters becomes a core problem. If the cultural and the biological components of MPAs are not effectively integrated, the prospect of mobilizing long-term community support fades while the risk of social opposition, conflict, and eventual project failure loom large.

SECTION II

THE DEVELOPMENT OF MARINE EXTRACTIVE RESERVES IN BRAZIL

Protected areas of a new sort came about in Brazil from the late 1980s. These were the sustainable use reserves, which combined the idea of sustainable use with the aim of conserving natural resources. To cite a definition, they are “protected areas aimed at sustainable use and conservation of natural renewable resources by traditional extractive populations”. They can also be described as social and ecological interest areas because it is possible to use resources in a responsible fashion within them without jeopardizing the objective of conservation.

Unlike the no-take reserves, which were created by the government and backed mainly by NGOs, sustainable use reserves were an outcome of pressure from traditional communities, such as rubber tappers in the Amazon, who wanted to save the resources that afforded them a livelihood before they were completely destroyed.

An MER is essentially an effort to modify and extend the concept of “extractive reserves”—a conservation and sustainable development framework successfully instituted in the western Amazonian forest economies—to the coastal and marine domains of traditional fishing communities. Acknowledging that the environment and society stand to benefit from helping the coastal poor secure access to their traditional sea territories, and livelihood resources, MERs were a radical departure from setting up and managing no-take MPAs.

In the past, most MPAs were established opportunistically, and, more recently, almost solely on the basis of biodiversity. An MER requires that certain biological, social and cultural criteria be satisfied before it is established. A marine reserve for sustainable development (MRSD) is created when fishing is not the only economic activity and local communities are involved in pursuits such as making handicrafts, serving tourists, cultivating the land or collecting forest produce. In MERs, fishing or aquaculture is the main, and often only, economic activity.

So an 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).

MERs can also be considered “new commons” that are being built by coastal communities, particularly fishworkers, to protect their fishing territory from

encroachment by other economic activities such as tourism, industrial fisheries and commercial shrimp farms.

PRINCIPLES AND STEPS FOR THE CREATION OF MERs

The basic principles guiding MERs are:

- a) **Social and ecological sustainability:** The basic assumption is that the area of the reserve and its natural resources should be able to maintain the livelihood of fishers and other members of the reserve (small-scale aquaculturists, extractivists, tourist guides, etc.). Special attention should be given to the renewal of living resources through participatory management (CNPT, 2004).
- b) **Precautionary principle:** The absence of reliable information and the risk of overusing natural resources make it imperative that users' associations set targets for the reproduction of living resources.
- c) **Adaptive management:** This principle is linked to the previous one. Given the lack of reliable information on the main characteristics of the natural resources, and also of the market, the management plan should be flexible enough to accommodate, in the short run, changes in the environment as well as in the social group living in the reserve.
- d) **Participatory approach:** As a reserve is created after local communities demand it, their participation is essential, both in setting targets and in monitoring socioeconomic activities.
- e) **Synthesis of knowledge:** Traditional knowledge and management approaches as well as those recommended by modern science will be used to plan and monitor sustainable fishing practices.
- f) **Multi-use approach:** Almost all existing MERs are based on artisanal fishing. But there are also reserves that combine fishing, small-scale agriculture and tourism. Any reserve should encompass all the activities in the area and try to resolve conflicts existing among them.

Employing a framework that restricts the use of coastal sea space gives Brazil a way to begin to control the highly destructive, still unmanaged, development of its extensive coastal zone. At the same time, it reinforces the resource-use rights and territorial claims of local communities to their fishing grounds (Cordell, 2006).

PHASES IN THE PROCESS OF ESTABLISHING AND IMPLEMENTING MERs

PHASE I: PREPARATION

Unlike no-take reserves created without consulting the local people, an MER is established only in response to a formal demand made by local communities, fishermen's co-operatives and other associations. The application, addressed to CNPT/ICMBio, should also indicate approximately the area traditionally used by the local fishermen.

The CNPT, through research institutes and NGOs, organizes an interdisciplinary assessment study that takes into account the biological and socioeconomic potential of the proposed reserve as well as factors that act as constraints. The biological assessment is essential to identify fish resources, their abundance and location, and to indicate which level of use is optimal to guarantee their renewal. The socioeconomic assessment concentrates on existing economic and social issues, fishing technology, existing and potential markets and level of social organization, among other issues. Potential conflicts with other communities are also taken into consideration. Traditional knowledge and management skills are also analyzed.

The marine boundaries of an MER usually coincide broadly with the coastal/marine area traditionally used by the local communities. The coastal/marine area has to be declared State (public) land and given as a concession to the user association. Finally, the MER has to be officially created by law, by the federal or State government. The official document has to be signed by the President of Brazil.

PHASE II: IMPLEMENTATION

Once a project is approved and the presidential decree is published in the federal public registry, the implementation process begins. A director is appointed for the MER by ICMBio/CNPT and he or she plays a crucial role in mobilizing financial and technical resources. One of main responsibilities of the government is dealing with the land tenure situation, which has to be legalized, most often with private land becoming State land. In the case of an MER, beaches and aquatic areas are already owned by the State. In general, the aquatic environment suffices to establish an MER but studies are under way on a proposal to bring areas where the fishermen, live, into the public domain (Pinto da Silva, 2002).

The members of the MER have to be organized into a legal entity that will act as an intermediary between the State (ICMBio) and the users of the resource. In most

cases, a new association has to be created. Once it is officially registered, a contract is signed whereby ICMBio gives the association usufruct rights as a concession for a period of 50 to 60 years. Although the State maintains ownership of the physical area, the members have rights of access to resources in the MER. These rights cannot be traded or sold and can only be passed on through inheritance, something that makes it an incentive for sustainable resource use.

A utilization plan for the MER has to be compiled and implemented by the association, and officially approved by ICMBio in a co-management process. This temporary plan establishes the activities and practices that are permitted in the area. It also defines penalties for those who do not obey the rules. If the association's activities deviate from the utilization plan in a way that causes environmental degradation, the contract can be cancelled. Next comes the co-management plan, which replaces the utilization plan and has to be completed in the first five years of the MER's existence. It defines the type of use—restricted access to some areas, multiple use of other areas for activities such as aquaculture and tourism and non-use of certain areas. Authorized fishing techniques and penalties as well as the role of each institution in the governing council are specified. Monitoring and surveillance measures are also agreed upon and the local fishermen are requested to participate in these activities.

Decisions over establishing rules are taken by the MER's members in a public forum, where they have the right to vote on decisions made. It is essential that all the members participate at this stage since adherence to the rules will depend largely on a widespread understanding of them and prior approval.

An important process at this stage is setting up the MER's deliberative council. This body was created in 2002 for all extractive reserves, even for those established before that date. It is the highest decision-making level in an MER and its decisions are very crucial, more so because only half its seats are occupied by local fishers' representatives, NGOs and tourism associations. The other half is occupied by government (federal, State, municipal) institutions. It is the deliberative council's task to resolve conflicts among different users of the sea space and their associations. The operational aspects of the MER are taken care of by the members' association. The deliberative council has to approve the co-management and the sustainable development plans the association formulates.

Sustainable development plan: One of the main aims of MERs, in addition to resource conservation, is improving the living conditions of the people within them. Where fishing is the main activity, efforts are made to improve the marketing process (often through co-operatives), maintain the quality of seafood and

involve women in small-scale fish-processing activities. Auxiliary activities such as handicraft making and involvement in local tourism have also been supported. Priority is also given to education and health, both very important when coastal villages are far from cities.

PHASE III: CONSOLIDATION

The consolidation phase occurs when an MER is able to partially, or totally, depend on funds generated by its members or co-operatives. Facilities for healthcare and education should not only exist, but also function efficiently. The members' association and the deliberative council should be performing their duties while everybody fully participates in the decision-making process. At present, very few MERs in Brazil have achieved economic self-sufficiency or succeeded in getting all their members to participate.

The most important source of funding is still the federal government, through the CNPT, which usually has a small budget for each MER, ensuring its office within the reserve functions in addition to those of the association and deliberative council. Some associations derive income from the contributions of associated members, from levying a percentage on the fish traded by its members (when there is no co-operative), from fees paid by industrial fishing craft that cross the MER's space and from the operations of commercial harbours that exist within them.

Map 3: Location of MERs

Source: CNPT, IBAMA

THE PRESENT SITUATION OF MERs IN BRAZIL

Several MERs have been established by CNPT/IBAMA and several others are in the process of being created, particularly in the north and the northeast.

As shown in Map 3 and Table 3, there are 17 MERs in nine Brazilian States, stretching from Para to Santa Catarina, encompassing 1,659,690 ha of sea space. Existing MER communities have approximately 28,250 artisanal fishers. An additional 68 MER proposals in 15 of the country's 17 coastal States are under ICMBio's consideration.

Table 3: List of approved MERs, area, number of families who benefit and year of creation

Name of MER	Municipalities/ST	Area (ha)	No. 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 Baía 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: Relatório de Avaliação da Gestão 2003-2006, Brasília: Disam, January 2007

Of the 17 MERs that exist, 40 per cent are located on the north coast (Amazonian coast) and another 40 per cent on the northeastern coast. These regions have the largest number of artisanal fishers. Only 18 per cent of artisanal fishers are on the southeast coast and 6 per cent on the southern coast.

A majority of the MERs on the Amazonian coast are in mangrove, estuarine and river delta areas, and the main activities are small-scale fishing and mollusc harvesting (mainly for crabs). The area covered by MERs in this region is 355,320 ha of sea/coastal waters or 21 per cent of the area under MERs in Brazil. The largest area under MERs is in the northeast (1,153,360 ha, 70 per cent of the total area under MERs). The smallest area under MERs is in the south (1,445 ha). The southeast has 57,945 ha or 3.5 per cent of the total area.

As for the number of users, around 28,250 people live in MERs. The largest number of fishers in MERs is in the north (13,700 fishers or 48.5 per cent of the total) and in the northeast (11,700 fishermen or 41.5 per cent of the total). As the total number of artisanal fishers along the north or Amazonian coast is 50,000, about 27.5 per cent of them live in MERs. Similarly, around 10 per cent of the total in the northeast (114,200) live in MERs.

Around 60 per cent of the 17 MERs were established after 2002, a bit too recent to evaluate their performance.

ISSUES AND CHALLENGES IN MER IMPLEMENTATION

The following is a discussion of some specific and crucial issues to do with the implementation and management of MERs.

DIVERSITY OF ECOLOGICAL AND SOCIAL SETTINGS

MERs occupy a variety of coastal landscapes, including estuaries and mangroves, and are inhabited by fishing communities with different cultural backgrounds and livelihoods. In the northeast, for instance, most coastal fishing communities do not practise agriculture or collect forest produce. After having been dependent almost exclusively on fishing, many now combine fishing with tourism and handicraft manufacture. In the Amazon and the southeast, many artisanal fishing communities combine different economic activities. In the north and the northeast, artisanal fishers are more organized, sometimes with the support of the Catholic church. Social and political organization has become important at a time when the pressure of investors on beaches and other coastal areas is increasing.

This pressure, plus the fact that the government lacks funds to buy up coastal land to lease out to fishing villages, persuades the authorities to declare MERs in

areas that are already in the public domain such as coastal waters, estuaries and mangroves. Coastal land, particularly beach land, costs a great deal, especially in the northeast and the southeast. So much so there is the risk that artisanal fishing communities may end up having control over the coastal waters but lose their houses and plots of land to businessmen.

The area under each MER varies. For instance, the Mandira MER, established in a mangrove area for oyster management, is only 600 ha and managed by 25 families. The coastal waters reserve in Corumbau, on the other hand, is 90,000 ha and is home to five communities, including semi-urbanized ones. So, at least in theory, it is easier for outsiders to control the smaller reserve. The pressure from outsiders depends on the unemployment rate in the surrounding areas, given that fishing is an occupation people take to only when nothing else is available.

MULTI-USE MANAGEMENT

Although MERs are planned for fishing, many coastal communities today involve themselves in small-scale aquaculture, providing tourism services and hosting recreational fishing. All these economic activities have to be taken into consideration in the planning and management of the reserve. In the management plan, areas are reserved for different activities so as to avoid conflicts and foster co-operation among the inhabitants. In addition, all the relevant economic sectors are represented in the deliberative council.

CHALLENGES IN INCLUDING TRADITIONAL MANAGEMENT IN THE OVERALL MANAGEMENT PLAN

In many areas on Brazil's coast, areas of the sea "belong" to different groups of artisanal fishers by virtue of the fact that they are their traditional users. Traditional appropriation of the marine environment occurs within such a framework of territoriality. A major challenge for social scientists is developing a better working relationship with management agencies so that local communities can be assisted in explaining their traditions and passing on the environmental knowledge that is relevant to their cultural situation. They also have to discover new uses for local knowledge to strengthen the modern-day management of MPAs and fisheries (Maldonado, 2000, Cordell, 2007).

Traditional management systems are still dominant in some areas even though fishing techniques have changed. Ways have to be figured out to integrate these traditional practices in a co-management process that includes modern management techniques. A traditional management system is a set of regulations that has evolved through customs and practices. For example, there may be a

regulation on the amount and type of fish that can be caught, keeping in mind the time it is going to take for this resource to renew itself. The system is based on a thorough understanding of the physical and biological characteristics of habitats and living resources. There are no written laws and the regulations are passed down orally from one generation to the next. Very often they are loaded with myths and social symbols and a transgression meets with social disapproval and loss of respect.

Traditional management by artisanal fisheries is closely linked to coastal (lagoons, estuaries, mangrove) and sea tenures. A sea tenure works by restricting access to certain areas of the coast or sea. The following section looks at some of the tenure systems that exist in some MERs.

Brush park

A brush park is built with mangrove poles laid in the shape of a circle or a rectangle. Inside it, the artisanal fisher lays branches, similar to the *akadjás* of West Africa. It is not known whether this technique was brought from West Africa by African slaves or developed locally. Brush parks are mainly used by the fishers of Mundaú-Manguaba lagoon in Alagoas State. They are set in shallow spots with weak currents. Fishers tend to be very well informed of the fish species that can be caught in the brush parks.

The “*marcação*” fishing of the northeast

Caminho e assento or *marcação* is a system in which a fishing ground is discovered in the sea and remembered by using a complex method of mentally constructed reference points. The fishers use no compass, yet, by crossing imaginary lines (*caminho*), using geographical landmarks such as the top of mountains on the continent for reference, they are able to return to the rocky-bottom fishing grounds (*cabeças*) several miles away from the coast. These fishing grounds are “owned” by the fishing craft captain who discovers them. Other fishing craft may try to follow him but if he becomes aware of it, he changes his route. After some years, some of these productive fishing grounds may be made public but retain the name of the skipper who discovered them. The secret of the *cabeças* is transmitted by fathers to their children.

Rosters for the benefit of all

In the MER of Arraial do Cabo in Rio de Janeiro State, fishers use encircling nets launched from large canoes. If all fishing groups work on the same day, the catch each of them lands is meagre. So they have developed a system by which only two fishing groups work on any given day. Some areas of some beaches are considered to be more productive than others, depending on factors such as the phase of the

moon and the proximity to cliffs. To avoid conflicts in such areas, the fishers have developed a complex system of rotation, by which each group gets a turn in the more productive as well as less productive part of the beaches.

It is necessary to ensure that the resource management practices and the environmental knowledge of artisanal fishing communities are not lost by giving fishers the opportunity to adapt to new fisheries management regimes and the biodiversity conservation agenda of MPAs (Cordell, 2007). As the world's last tropical sea frontiers vanish, once remote traditional fishing societies are being increasingly marginalized or disappearing altogether, along with many highly productive, potentially sustainable small-scale fisheries. Alternative discourses and concepts of sea management and property rights merit more careful consideration than what they have so far received (Cordell, 2007, Diegues, 2001).

A big challenge is integrating traditional management practices in the overall management of an MER, especially in cases where they are not used by all the local fishers. Much then depends on how well the fisher groups that rely on these practices are organised. It may also be difficult to make fishers outside an MER respect these practices. However, inside an MER, they can be enforced once they are incorporated in its management system, as has happened in the MER of Cabo Frio, where the sequential casting of nets has been incorporated in the management plan.

THE CHALLENGE OF INTEGRATING MODERN SCIENCE AND TRADITIONAL KNOWLEDGE

Another challenge is working out how traditional knowledge can be used in the assessment, planning and implementation of MERs. Information on artisanal catches could form the basis for appropriate fisheries planning and management but very little of this is available in Brazil. Some MERs, such as Corumbau and Mandira, now employ young people to collect data and organize it. Such efforts are usually assisted by local NGOs but they are not easy because fish landing centres are often widely dispersed.

These MERs are also complementing the information on quantity with information on other aspects of the catch provided by the fishers. This is rather new in Brazil, where only "scientific information" was considered good enough for fisheries management. The benefits of combining scientific and traditional knowledge are now stressed by the ICMBio officials in charge of MERs.

Spheres of local knowledge include classification of aquatic species, fish behaviour, taxonomy, patterns of reproduction and migration, feeding relationships among

species, physical and geographic characteristics of the aquatic habitat, climate (cloud formation, winds, storms, weather change), principles of navigation and the relative merits of different fishing techniques in a range of micro-environments. Traditional knowledge may also reflect people's connections with the spiritual world, such as demarcation of sacred sites in the sea and the creation of myths.

In Brazil, there are now an increasing number of fisheries biologists involved in the study of traditional systems of knowledge (ethnoscience or cognitive anthropology) and some of their studies cover MER areas. There is, however, a lack of expertise in transforming this traditional knowledge into management tools.

THE CHALLENGE OF AN INTERDISCIPLINARY APPROACH

Brazil's no-take reserves were planned by natural scientists–oceanographers and marine biologists, in the case of MPAs. Very little attention was paid to the fishworkers living in the areas during certain periods of the year. Only in recent years have young natural scientists shown an interest in disciplines related to ethnoscience.

It is now officially recognized that an interdisciplinary approach, including traditional knowledge, is fundamental to the success of these reserves. This is important because in the other sector ICMBio is involved in, national fisheries management, only fisheries biologists, and sometimes fisheries economists, have a say. At the national level, data collection and fisheries monitoring are usually done only in the case of a few commercial, mainly export, species.

It is now clear that appropriate management is the key to resolving conflicts between different types of fishing: between commercial and industrial fisheries; between artisanal fishing and large-scale aquaculture; between groups of fishers using different types of gear and so on. Fisheries biologists are usually not trained in conflict resolution, and the expertise of other disciplines, in particular the social sciences, is required.

Through detailed ethnoconservation and ethnographic documentation, interdisciplinary research can do much to ensure that MPA frameworks build on, and reflect, the full range and complexity of the mixed economies and habitat dependencies–agriculture, forestry, foraging, fishing–of tropical coastal populations.

THE CHALLENGE OF MAKING CO-MANAGEMENT WORK

Co-management has been on the Brazilian scene since the 1980s when IBAMA worked with inland fishing communities on the Amazonian lakes. The approach

is seen as crucial to the success of MPAs and the development of sustainable fisheries. But national environmental agencies are very centralized and reluctant to share power with local institutions. Local organizations have to be empowered so that they have a voice in co-management processes, which means the difficult task of negotiating and implementing power-sharing arrangements has to be undertaken.

Co-management is very important for MERs. If small-scale fishing and aquaculture are the main activities, co-management works more easily than when other activities, such as tourism or recreational fishing, exist. In the former situation, it is the officer-in-charge of the MERs and the fishers' associations who are the primary players. Issues such as zoning and restrictions on fishing techniques are sorted out by both parties. The situation is more complex in MERs where other activities and actors are involved. Management measures are decided in deliberative council meetings in which representatives of the tourism, aquaculture and recreational fishing sectors participate. More often than not, fishers' association representatives discover they have little, or no, say in these meetings. There is the urgent need to improve the bargaining power of fishers' associations in many of the MERs.

A recent study (Seixas, 2004) shows that despite the co-management experience gained in the Amazonian lakes, the concept is yet to take off in coastal waters. It identifies several barriers in the different phases of implementing co-management in coastal/marine waters. One of the main hurdles is the historical marginalization of small-scale fishers in the decision-making process and the prejudice against their traditional knowledge. On the side of the government, there is a lack of ongoing support to participatory management and a lack of fisheries officers trained to cope with conflict resolution processes, mainly because they have a background in natural sciences. The government has also not shown much interest in enforcing the law on the seas, often saying it does not have the vessels to do so.

MERs: POTENTIAL AND CONSTRAINTS

If the MER initiative is successful, Brazil will perhaps come closer than many other tropical countries to establishing a socially responsive, economically realistic and environmentally sound multi-use MPA framework.

POTENTIAL

MERs and MRSDs offer the opportunity to:

- a) conserve marine biodiversity through sustainable use and setting aside areas of non-use, which, controlled by the communities, offer members the opportunity to be involved directly in biodiversity conservation;

- b) break the de facto open access regime in the sea, creating a “new commons” managed by coastal communities;
- c) improve the socioeconomic well-being of fishing communities and protect their culture, based on their traditional way of living;
- d) facilitate full participation of fishing communities in decisions on the sustainable use of natural resources, and monitoring and surveillance;
- e) introduce innovative approaches to marine conservation that fit better with the ecological and socioeconomic conditions of developing countries, including innovative activities, such as family-based aquaculture, in areas where fishing is the main source of labour and income;
- f) find new sources of income for women, such as part-time aquaculture and craftwork, and empower them to participate in deliberative council meetings;
- g) be part of larger conservation efforts, especially by creating a barrier to unsustainable use of resources by the growing number of large shrimp culture farms and expansion of tourism, and also hindering “free-riders” from using natural resources in unsustainable ways;
- h) establish participatory fisheries/aquaculture co-management plans;
- i) be associated with more restrictive MPAs such as marine parks, creating a mosaic of protected areas of different categories, fostering biodiversity conservation and sustainable uses of natural resources; and
- j) integrate a network of MPAs (both no-take and sustainable-use) in existing coastal management plans.

CONSTRAINTS

- a) Resistance from more intensive and destructive users such as shrimp breeders, industrial fishers, tourism developers and fish traders, who create strong lobbies in the Congress to hinder the expansion of MERs along the highly valued coastline.
- b) Insufficient managerial capabilities in government environmental institutions that, until recently, were trained for the management of no-take reserves. Neither the former lead co-ordinating agency for MERs, IBAMA, nor ICMBio has the technical capacity and experience to implement and manage a full-fledged national MER network. However, in these last few years, the CNPT has been upgraded and the number of its personnel at local levels has gone up.

- c) Suspicions of large NGOs and a strong, local conservationist movement, both of which believe that biodiversity conservation can be achieved only through no-take protected areas. Some of the NGOs favour large-scale conservation measures that meet the criteria of their donors (usually multinational corporations) rather than conservation requirements at the local level.
- d) Insufficient funds to support sustainable use of resources because most international funds are directed to strict, no-take protected areas.
- e) Lack of administrative experience in local communities makes it difficult to manage market-oriented undertakings such as marketing associations and co-operatives. Training and administrative support are, therefore, essential.
- f) The fishing communities' formal associations, the *colônias de pescadores*, lack sufficient authority and are often controlled by non-fishers. There is the absence of a strong national movement of fishers on par with the National Council of Rubber Tappers, which was able to make Amazonian extractive reserves viable.
- g) Lack of experience in community management of natural resources, particularly in reserves where migratory species are relevant to the local economy. Adaptive management (learning by doing) is probably the only option, given that biological and social data are scarce.
- h) Integrating scientific knowledge with traditional knowledge and management practices. It is important to draw attention to the cultural documentation and inputs from the social sciences that are required to develop MERs. Also, in Brazil, anthropologists with longstanding ties to communities tend to help legitimize and create a credible image for reserves by exercising a critical "gatekeeping" role in relationships with regulatory agencies. This role, which reinforces the power of communities to take decisions, needs to be strengthened.

CONCLUSION

Artisanal fishers and their communities have suffered from the extension of no-take areas, which were established without their approval or participation and generated problems that have almost put an end to their traditional way of life. These conflicts are described in the case study of the Peixe Lagoon National Park. To cope with this, a new type of protected area has emerged in Brazil—protected areas that would allow the sustainable use of resources, both in forest areas and in coastal/marine habitats. Until recently, no-take protected areas were at the head of biodiversity conservation efforts and received high priority. A change in emphasis can now be seen, with the government insisting that traditional peoples have a role to play in biodiversity conservation. This is the result of actions by grass-roots movements of rubber tappers, fishers and other extractivists. The new policy on traditional peoples—indigenous and non-indigenous—was published in April 2007 and it creates new opportunities and challenges for community-based biodiversity conservation. It was framed after nationwide conferences which, for the first time, brought together Indians and more than 15 representatives of different non-Indian communities, some of them fisherfolk.

Sustainable development protected areas are now considered to have the same importance as no-take areas in biodiversity conservation. In coastal/marine environments, these reserves function as “new commons”, restricting the “open-access” of industrial fishers, which led to overfishing and poverty in the coastal communities. MERs provide the legal framework for coastal communities to participate in the establishment and running of these reserves through co-management. They also require a new scientific approach that takes into consideration not only biological sciences (as is usual for no-take reserves) but also the social sciences and traditional knowledge. In developing countries such as Brazil, no-take zones in themselves are unlikely to ensure adequate biodiversity conservation because they are socially and politically expensive arrangements. A mosaic of different conservation areas, including no-take and sustainable-use areas, may be more efficient to protect biodiversity and cultural diversity. The challenges are enormous, requiring peoples’ mobilization, conflict-resolution strategies, training, innovation and an interdisciplinary approach. The initiatives taken are promising in that they have the potential to unify and reconcile positions that are all too often seen as incompatible.

SECTION III

LESSONS FROM EXISTING MARINE EXTRACTIVE RESERVES

Three case studies have been selected—the Peixe Lagoon National Park on Brazil's south coast between the Patos Lagoon and the Atlantic Ocean and the MERs of Mandira, São Paulo, and of Corumbau, Bahia (see Map 4). In the following case studies, the first one is a Marine National Park (Do Peixe Lagoon National Park, in Rio Grande do Sul) where fishers are continuously threatened with expulsion from the area and the other two (Corumbau in Bahia and Mandira in São Paulo) are Marine Extractive Reserves where the participation of fishers is condition for the establishment of those protected areas. They vary in size, in the number of families benefiting, in social organization and support, and in the types of conflict they face and the solutions required.

Map 4: Location of the three MPAs chosen for case studies



CASE STUDY 1: PEIXE LAGOON NATIONAL PARK, SOUTHERN BRAZIL³

THE PEIXE LAGOON NATIONAL PARK

The Peixe Lagoon National Park, established in 1986, is situated in the centre of Brazil's southern coast, in the narrow sandy strip between the Patos Lagoon and the Atlantic Ocean. The region is difficult to access and urban development in it is quite sparse. There are only two small cities (Tavares and Mostardas), which together have around 18,000 inhabitants, in the surroundings of the Peixe Lagoon.

Beginning with the first Portuguese immigrants to the region in the middle of the 18th century, the people of the area have been engaged in agriculture, rearing cattle and fishing in the lagoon and the adjacent ocean (Tagliani et al., 1992). Even today, the majority of residents around the Peixe Lagoon National Park continue to be fishermen and farmers. During the past few decades, some fishing villages have come up on the edges of the lagoon, a few kilometres away from the urban areas. There are three of them with around 50 families inside the National Park and two with 40 families outside it. All these villages are located just a few metres away from the beach and the ones inside the park are on the edges of the lagoon.

The lagoon periodically connects to the sea and serves as a nursery and feeding ground to many varieties of molluscs, crustaceans and fish, among other typical estuarine species (Knak, 2004). For this reason, the Peixe Lagoon has a great abundance of endemic and migratory birds that periodically visit it from the south (Argentina) and from the northern hemisphere. The region attracted the interest of local researchers and international ones from North American institutes during the 1980s due to the richness of its bird population (Resende, 1988). Recognizing the Peixe Lagoon's importance in the study of migratory birds, the former Brazilian Institute for Forest Development (IBDF), decided to transform the area into a National Park. The park's area is 34,000 ha and it covers the lagoon and other surrounding ecosystems such as spit forests, dunes, beaches and small freshwater lakes.

According to the law, the people who inhabit the National Park have to be relocated away from it and there can be no exploitation of the natural resources within it. This has resulted in a serious conflict between the environmental agency responsible (ICMBio)² and the local people who have been historically dependent on fisheries for their livelihood. ICMBio has not yet officially moved any fishermen from the National Park because it lacks the staff and financial resources to do so.

One hundred and sixty-six fishers have temporary licences to work inside the protected area and some of them are also allowed to live in it. Despite this, park officials indirectly pressure those within the protected area to move. Quite a few fishermen have moved to villages outside the National Park or to the nearby cities without any assistance from the government though the authorities are legally obliged to help them relocate.

The lack of participatory mechanisms in the National Park lends strength to the arguments of the local people who are very opposed to this type of conservation unit. They question the legitimacy of the park, pointing out that it was imposed on them without popular consultation, disrespecting their traditional right to live near the lagoon and manage its resources. Primary data was collected when the park was set up by conducting semi-structured interviews with 40 local fishermen and 11 government officials. This was complemented with a document analysis, which included the Peixe Lagoon National Park Management Plan and a local newspaper.

FISHERS' LIVELIHOODS IN THE NATIONAL PARK

The Peixe Lagoon fishermen work not only in the lagoon but also in adjacent coastal waters. In the sea, they use gillnets formed by three layers of different mesh sizes, locally called "*feiticeira*" to capture mainly southern kingfish, mullet, silverside and weakfish. Bagnets are used to capture Argentine stiletto shrimp. The fishing operations at sea are carried out without craft but old trucks are used to pull the nets to the beach. The catch is largely used for the fishermen's subsistence and constitutes an important part for their food security. Shellfishes are also collected by fishermen with their own hands or using shovels, and are also mostly consumed.

In the lagoon, the fishermen use small open craft made of wood, locally called "*caíco*" (Borsato, 1992). These craft are approximately 20 ft long and are not motorized. The species mainly caught with stownets is the pink shrimp, which are attracted to the nets by gas lamps. Mullet, blueside and flatfish are also caught from the lagoon with one-mesh gillnets.

There are two distinct seasons governing fishing operations: the summer season, when there is the chance of making a good profit, and the winter season, when the catch is usually only enough to feed a fisherman's family. In summer (from January to May), efforts are concentrated on the pink shrimp, which is the species with a high commercial value and thus the main source of income. Towards the end of summer, mullet is caught in the sea, especially in years when the pink shrimp is scarce. In the winter, most of the fishermen live off the money earned during the summer.

The majority of the families depend exclusively on fishing for a livelihood and the art of fishing is learned from a young age. Children and women participate, directly or indirectly, in fishing activities. While many women do fish, others take part in post-harvesting activities, such as cleaning fish and shrimp, catching shellfish, and washing the craft and nets. Unlike large, commercial fishing outfits, the artisanal fishermen give part of their catch to people in the community such as widows, children, neighbours and relatives. Their production system is similar to that of other small-scale fisheries systems in Brazil, incorporating a social and economic dynamic different from that of industrial fisheries (Diegues, 1996).

The Peixe Lagoon fishermen do not generally accumulate a lot of wealth. Their lifestyles are simple and their modest houses inside the National Park lack electricity and running water. Very few fishermen have their own means of transportation and the catch is almost always transported using horses or old pick-up trucks.

THE ROLE OF TRADITIONAL ECOLOGICAL KNOWLEDGE

The knowledge used by the fishermen in their day-to-day activities is closely related to the Peixe Lagoon and its adjacent ecosystems, the environments they directly depend on for survival. In fact, the routines of the local people as such are shaped by and largely adapted to local environmental conditions such as wind and rain patterns.

The fishermen are very knowledgeable when it comes to the weather, the life cycles of different species, their relationships with other living beings and the local ecosystems. Such knowledge enables them to manage resources in a responsible way and ensure that ecological resilience is maintained. An example of traditional knowledge in action is the voluntary fashion in which the fishermen cease catching pink shrimp when there are small shrimps in the lagoon because it makes sense to wait until they reach a larger size. Another example is the annual opening of the mouth of the lagoon. The Peixe Lagoon naturally closes its link with the sea at the end of the summer but the local people have opened the Lagoon's mouth every year at least since 1820 (Saint Hilaire, 1887). This allows algae, nutrients and larvae to enter the lagoon from the sea, biologically enriching the waters and preserving the food chain.

The Peixe Lagoon fishermen have informal institutions based on their respect for traditional practices and agreed rules. For instance, there are fishing spots "owned" by fishermen both in the lagoon and on the beach. This ownership is respected by all and sanctions are virtually unnecessary, despite the fact that there is no official document backing such arrangements.

Their culture includes a distinct way of speaking, a distinct way of designating ecosystems and natural phenomena, a distinct way of creating local artifacts and a distinct system of religious beliefs. Peixe Lagoon fishermen have developed their traditional ecological knowledge into an intricate and complex knowledge-practice-beliefs system intimately related to the local environment. We argue that such knowledge can provide the basis for a resilient management system of natural resources and ecosystems, which fits the objectives of a protected area.

SOCIAL CONFLICT WITH THE TRADITIONAL POPULATION

The fishermen of Peixe Lagoon constitute a traditional population and should have their way of life and culture valued and protected, according to the SNUC. However, the reality is quite different. The National Park administration still threatens fishers with removal from their residences and bans on fishing activities, which are the basis for their livelihoods and culture. Though they continue fishing and living in the protected area, the authorities impose innumerable prohibitions such as restricting their access to social services such as schooling, electricity and running water.

Conflicts are engendered when the National Park officials, in the perception of the fishermen, try to restrict the activities of the local population inside the protected area. The fishermen have, on many occasions, complained that the officials act in hostile ways and do not respect basic civil rights. They accuse the officials of spying on their daily activities, entering their houses without permission and setting fire to their fishing craft, trucks and tents. Sometimes the fishers have reacted, leading to fights and physical violence against the park officials. Such pressures and conflicts have seen fishermen move out of the protected area without fair compensation, something that the law guarantees.

The history of the Peixe Lagoon National Park has been marked by conflicts. In 2003, for instance, around 3,000 people (more than half the population of Tavares city) demonstrated against the National Park administration, demanding that the rights of the local people be honoured. Residents of the area argue that the establishment of a protected area disregarding the aspirations and needs of the local people will create insoluble social problems that will threaten the viability of the park in the long run.

The question that should be critically addressed is whether the traditional fishermen of the Peixe Lagoon have to be removed from the protected area. According to the SNUC's current objectives and guidelines, relocating traditional populations from their homes makes no sense. The law says that the participation of the local population in the creation and establishment of conservation units

should be assured, and that their culture and ecological knowledge should be respected and valued. This is also in accordance with international instruments such as Agenda 21 and Conventions No. 107 and No. 169 of the International Labour Organization (ILO).

No study has been carried out to show that the fishing activities of locals in the Peixe Lagoon have had a negative impact on the environment. The only research project that was conducted before the creation of the park indicated there was no negative impact caused by the fishermen, and that conservation of that area could be more effective if the local population was not excluded but made a partner in assisting government officials with rule enforcement in the area.

The case of the Peixe Lagoon National Park is an example of government and conservationist practices based on unproven ideologies and inadequate top-down conservation management models. Little attention has been paid to discussions about a more appropriate category of protected area that will protect the environment more effectively and respect the cultural identity and social security of the traditional fishers. Co-management in this case could provide a mechanism towards reconciling conservation policies with social justice. Similar participatory initiatives are taking place in other lagoon complexes 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

- The Peixe Lagoon National Park was established without consulting the local fishers, who are still being threatened with eviction. There is little respect for the rights of traditional fishers.
- Restrictions on the use of fishing gear and of fishing grounds were imposed without consulting the local people. These restrictions have led to the “voluntary migration” of several fishers’ families to towns outside their traditional fishing territory.
- In addition to imposing restrictions, the park authorities have not improved social facilities such as providing schooling for children, thus contributing to further deterioration of the quality of life.
- Continuous conflicts have led to street demonstrations and even violence against the parks officials.
- The top-down management plan does not make use of traditional knowledge. It further marginalizes and impoverishes the local fishers.

Map 5: Boundaries of the Peixe National Park

Source: Veja, 2007

CASE STUDY 2: MANDIRA MER, SÃO PAULO

A BRIEF HISTORY OF THE MANDIRA MER ON THE SOUTHERN COAST OF SÃO PAULO

This is a very small reserve comprising about 600 ha of estuarine area, mainly mangroves, on the southern São Paulo coast (see Map 4 on page 33). This MER was created in 2002 by the federal government to benefit 25 families of traditional fishers and oyster collectors. The Mandira extended family has been in the area since the 18th century. Its members were farmers who gradually shifted to fishing and seafood harvesting when changing economic conditions seemed to favour it.

Mandira is a *quilombola*, a community made up of descendants of slaves, who have been in the area for long and can trace their ancestry over generations (through

church records and oral histories). The Mandiras, like other *quilombolas*, have collective rights over their land, something protected by the law.

Before the MER was set up, the market chain for oysters was dominated by traders, who paid little attention to the laws, the hygiene and health standards set for shellfish processing. There was also overexploitation of some stocks. Outside fishers (often from distant States) tended to “invade” the region with little regard to local traditions.

Preparation phase

Work on the project was begun in 1993 by Nupaub, the research centre on wetlands conservation at the University of São Paulo, and Gaia, a local NGO. Mandira village was selected for a sustainable use project because it had a community with strong family ties and effective leadership. For almost two years, the main effort was directed at community organization and the setting up a local association, an approach that proved to be beneficial in the long run.

In 1996, an official request for the creation of an MER was sent to the IBAMA/CNPT, signed by members of the families in the area that made use of the mangrove area. The biological and socioeconomic assessment was done by Nupaub, which was impressed by the knowledge the locals had about the mangroves.

The local income was low, less than the minimum wage in the southeast of the country. Most families depended on extracting adult oysters from the mangrove by cutting the roots of vegetation there. The product was sold at a very low price to local traders. Once the MER loomed on the horizon, the community adopted a new technique for raising oysters, one in which they would not have to harm the mangrove. Assisted by the NGO and the Fisheries Institute, they experimented with the use of oyster-rearing frames—bamboo frames covered with a plastic net to keep away predators. These frames were laid in the estuary and, surprisingly, young oysters reached the adult phase much quicker than earlier, allowing for three harvests a year.

Implementation phase

In 1997, even before the MER was formally approved, funds from the federal government and other sources were used to form a co-operative. At that time, it benefited 40 oyster cultivating families belonging to five different communities, of which 17 were in the proposed Mandira MER.

A headquarters was built for the co-operative, a water-purifying system was installed and efforts were made to market oysters using a small, insulated truck. The co-operative focused on setting high quality standards for the oysters so that

they could be sold for a better price. It initially accepted members from villages that were not part of the MER on the condition that they adhere to the same rules on environmental protection and product quality as the members of the MER.

The co-operative and the MER soon secured the backing of a number of donors—the Margaret Mee Botanical Foundation, Shell Brazil, World Vision, the Brazilian Fund for Biodiversity (Funbio) and the Forest Foundation of São Paulo (Fundação Florestal). The reserve also won an international award from the Tropical Initiative at the World Summit on Sustainable Development (WSSD) Johannesburg Conference in 2002 (Medeiros, 2004).

Mandira is one of the few MERs where the utilization plan has worked in a participatory way, in the sense that rules were made by the users and monitoring was undertaken by them and the IBAMA. Although there are natural and social scientists involved in the project, the community's approach is adaptive management. There are various examples of how the learning-by-doing process has worked. Initially, bamboo was used to construct the oyster-rearing beds but now concrete is used, when affordable, because it is more durable. In response to high oyster mortality from solar heat stress, co-operative members began covering the oyster beds with palm fronds in summer. Fisheries researchers then suggested mediating the heat stress by elevating the top mesh like a tent. Now both local and outsider-mediated mechanisms are used.

Monitoring of oyster stocks by the MER, co-operative members and fisheries researchers ensure that they are not being depleted. If there is a negative report, appropriate action will be taken to limit the harvest. This could include measures like enforcing the regulations more strictly and imposing more severe penalties. All this has not been written into a formal management plan but both fisheries researchers and co-operative members understand what will have to be done to secure the valuable oyster stock. The co-operative members may have to be provided with alternative avenues to earn an income if there is a period of restricted production (Medeiros, 2004).

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 forests do not need to be cleared to provide rearing space, since the oyster-rearing beds are placed in shallow lagoons and waterways. 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 macro fauna to grow on, thereby serving as an artificial reef. Various species of fish and crustaceans were observed on and around the rearing beds.”

Consolidation phase

In December 2002, Mandira was officially declared an MER by the federal government. Legally, only inhabitants of the reserve have access to the oysters and a lot of effort and expense goes into preventing outsiders from illegally harvesting them. In 2004, the deliberative council was organized and approved by the IBAMA.

The success of the co-operative has meant an increase in income to the Mandira community and other members of the co-operative. This has made neighbouring communities interested in the idea of becoming MERs. Co-operative and MER members receive twice as much for a dozen oysters if they sell to the co-operative instead of to middlemen. However, being part of the co-operative requires finding the time to participate in various, lengthy meetings. The co-operative also cannot always buy all the oysters that its members have to sell if it has not yet sold its stock. So some co-operative members still sell oysters to black market middlemen. These middlemen buy cheap and this enables them to make it difficult for the co-operative to charge more for its oysters along the São Paulo coast (Medeiros, 2004).

Most social and infrastructure improvements have been at an individual or family level. Community benefits include the co-operative headquarters and a community centre. Other than serving as a venue for official meetings, the headquarters is also used for social events and other community activities, such as *capoeira* lessons (Medeiros, 2004).

Several initiatives have been taken to benefit women in the reserve and they include a series of training courses and workshops on making handicrafts and sewing. The users' association is also looking into the issue of identifying alternative sources of income. Rice cultivation, ecotourism and the making of handicrafts are among the ideas being mooted.

generations to make their own economic choices. In many ways, the experience of Mandira restores extractive activities to their proper place—where traditional knowledge and management practices are adapted to modernity and the lives of artisanal fishers and their families are improved.

SUMMARY OF THE MAIN CHARACTERISTICS OF MANDIRA MER

- Small in area and only a few users when compared to the other MERs studied (see Map 6 on page 43).
- A single, homogeneous and organized community with a clear leadership. All its members belong to the same religion (Christianity) and have a strong cultural identity.
- The ecological and socioeconomic assessment was undertaken jointly by members of the community and the research institute. Local knowledge was extensively made use of. There was a change from an ecologically unsound way of collecting oysters—cutting mangrove roots—to a new technique involving the use of oyster-rearing beds.
- Community organization and initial discussions on setting up the reserve took more than one and a half years, and this helped build the reserve on a solid base.
- The MER's members have a strong commitment to protecting its boundaries and improving the quality of oysters sold.
- A co-operative has been built up and MER members occupy the key posts and represent the core group.
- Strong support has come from different State and federal agencies, local NGOs and research institutes.
- The MER was able to raise funds from public and private sources for its establishment.
- Co-management is working, with an emphasis on ensuring the deliberative council's decisions are respected.
- Several training workshops on different aspects of community organization like oyster rearing and book-keeping have been conducted.
- The MER's leaders are often invited by other fishing communities along the São Paulo and Rio de Janeiro coast for tips on how to rear oysters.

CASE STUDY 3: CORUMBAU MER, BAHIA

The MER of Corumbau was established in 2000 through a presidential decree. It covers 89,500 ha in the municipalities of Porto Seguro and Prado in Bahia State. Being a federal reserve, the ICMBio is responsible for its management and it is meant to protect marine biodiversity and improve livelihoods in five small fishing communities—Caraíba, Corumau, Embassuaba, Cumuruxatiba and a village of the indigenous *pataxós* group. All five villages are dependent on reef and soft-bottom fish captured with handlines, spears and nets, shrimp and small-scale tourism. Some villages already have an established tourist season, from December to February, and Caraíba hosts a few luxury hotels. Some communities also practise small-scale agriculture and women play an important role in this.

Corumbau was the first MER specifically designed to protect coral reefs. It harbours roughly 1,750 people, including fishers and their families, directly dependent on extractive activities in the area.

The Bahia coastline has extensive areas of what remains of Brazil's Atlantic Forest and the most important portions are within protected areas on land and the sea. The MER at Corumbau, for instance, borders Monte Pascoal National Park, which has reserves for both indigenous people and traditional populations.

Although it is a new conservation unit, the Corumbau MER is now setting up its deliberative council and drafting a management plan that supports members' participation in its activities. This MER occupies a large open sea surface unlike the one in Mandira, which is inshore. It therefore has a great number of fish, belonging to different villages, which do not necessarily have the same views and demands within the deliberative council. So, the issue of social participation is more complex in Corumbau than in Mandira. Fisheries management is also more complex as there are many migratory fish that require specific management measures. 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 part of a regional protected area network that includes the Marine Archipelago of Abrolhos. It is also considered an important line of defence against the large shrimp farms that are now threatening to engulf the whole of Bahia's coast.

The Corumbau MER is, however, beset with several problems, beginning with the physical distance that separates the five villages and insufficient transportation facilities. The three users' associations function unevenly, depending on the type

of leadership they have and the conflicts that exist in each community. Conflicts with tourism seem to rank high in the fishing villages as the whole area attracts a large numbers of visitors.

But the main conflict involves the shrimp breeding farms that are expanding along the southern coast of Bahia. There is a plan to build the largest shrimp farm in Brazil, covering 5,000 ha, very near to the MER. The users' association, ICMBio and NGOs are fiercely opposed to this but the project is backed by important politicians and investors who have a strong lobby in the State parliament. There is also a proposal to develop a new MER in the place where the shrimp farm may be located.

Another important issue is that only the coastal/marine area has been declared a protected area, not the land on which the fishers live. Some of them are selling off their plots to tourists building second houses. If this trend continues, some fishers will be forced to live far away from the beaches. Some communities have requested the authorities to extend the protected status to the land but hotel owners in the region are against the proposal.

A recent study reveals the fragility of the social institutions connected to the MER (Di Ciommo, 2004). According to it, the villagers are organized in three users' associations but only a small percentage of them are aware of the norms that regulate the MER and the need to participate in its activities—14 per cent in Cumuruxatiba, 25 per cent in Corumbau and 45 per cent in Caraiva. According to Di Ciommo “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, 2007).

Referring to the fact that very few or no women participate in users' association meetings, the author says the inhibiting factors have been motherhood and cultural traditions. Men and women also have different views of the problems of the MER. While men are worried that their associations lack strength and inadequate roads will hamper them in selling their products, women are more concerned about the lack of piped, potable water, the absence of health and education services and day-care centres for children. Not to mention the lack of avenues for alternative employment. Women, pointing to job opportunities that exist during the tourist season, are asking for training courses in tourism-related activities.

According to Di Ciommo “[Men] expressed their wish to have better working conditions, starting with the purchase of boats and the possibility of collective transportation that 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, 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, 2007).

Apart from these issues, very little money has been found from outside sources to improve the fish landing areas, the marketing system and the functioning of schools and hospitals. For now, the only advantage the MER has is that it has kept trawlers out of it and there is more fish available for the artisanal fishers within it.

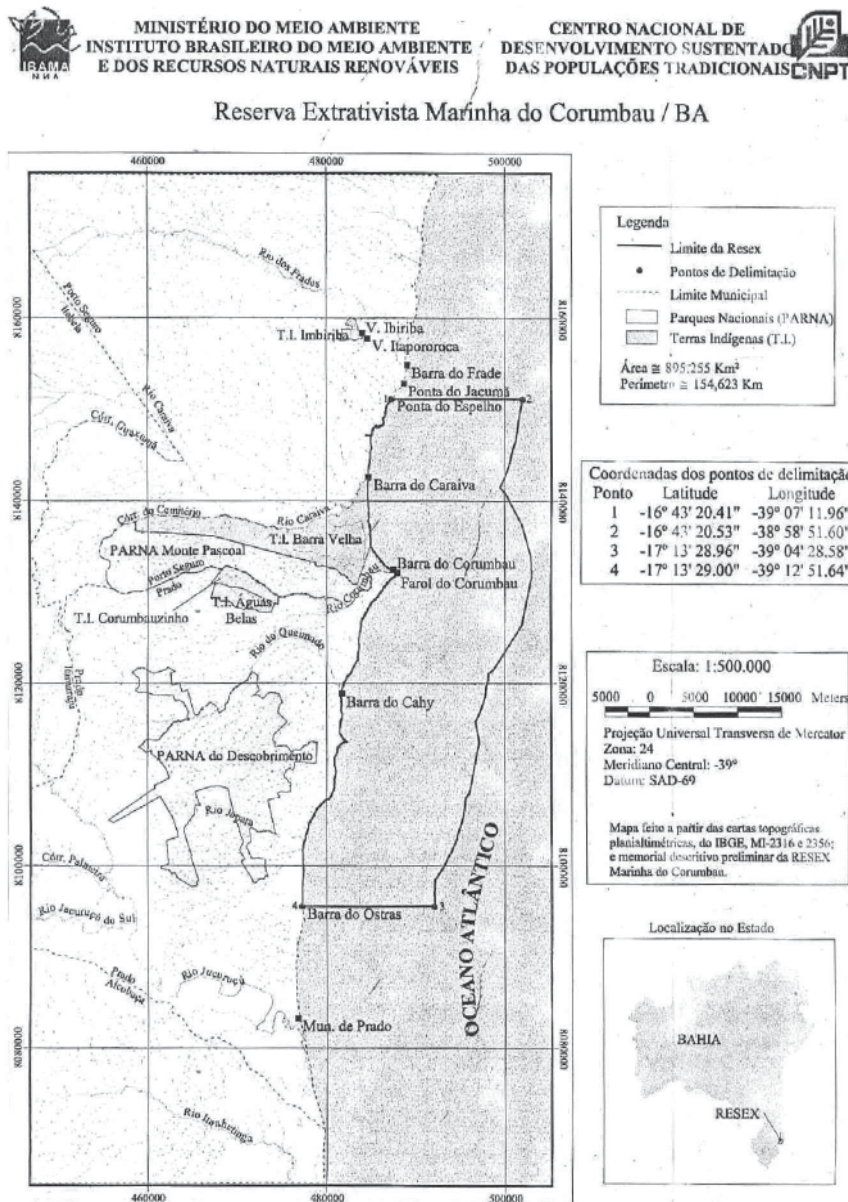
Finally, the presence of the ICMBio/CNPT, as co-managers with the users’ associations, is weak, with just one official responsible for this large MER. The reserve, though supported by local NGOs, does not have enough funds to function properly and owns no boats for surveillance of the open sea. Fish marketing is still in the hands of traditional fish traders, resulting in low incomes for the fishers. Some of them are also engaged in small-scale agriculture to make ends meet.

SUMMARY OF THE CHARACTERISTICS OF THE CORUMBAU MER

- Large open sea area and a number of dispersed villages, including one in an urban area (see Map 7 on page 48).
- Diversity of fishing techniques employed.
- Diversity of ecosystems, including beaches, mangroves, coral reefs and islands.
- Great distances between villages and problems of communication.
- Limited participation of women in users’ associations.
- Villages where fishers live are not part of the protected area. As some villagers are selling their houses on the beaches to tourists, the whole MER could be in danger.
- Increasing importance of tourism in many villages.
- Co-management is still in its initial phase although the utilization plan has been approved.
- Difficulties in controlling boundaries because appropriate boats are lacking. Surveillance is often done with the infrastructure of the nearby Abrolhos National Park.
- The southern part of Bahia is seriously threatened by the expansion of shrimp cultivation farms. The Corumbau MER has been encouraging fishers of the area to resist the expansion of these farms and create more MERs in the region.

- Weak users' associations and insufficient staff from government institutions (ICMBio/CNPT).
- Limited and badly maintained physical and social infrastructure (roads, health and education).

Map 7: Limits of Corumbau MER



CONCLUSIONS

The following conclusions can be drawn from the case studies:

1. Marine national parks have been established in Brazil without consulting the artisanal fishers concerned. Their traditional fishing rights have not been respected. In most cases, severe restrictions on their use of sea resources have led to migration to urban areas. The changes introduced by SNUC, under Law 9985/00, include creating consultative committees and promoting the sustainable development of fishermen's communities, but these provisions are seldom honoured.
2. Restrictions and threats of eviction, as in the case of the Peixe Lagoon National Park, are the main causes of conflicts between traditional fishers and park administrations. When this happens, fish resources and traditional fishers are the main losers.
3. Fisheries management plans, usually drawn up by natural scientists, do not incorporate traditional knowledge and management skills. This increases social marginalization, leads to serious law enforcement problems, the loss of cultural identity and impoverishment.
4. The recent creation of MERs and coastal/marine sustainable use reserves opens new possibilities for the involvement of traditional fishing communities from the planning to the implementation phases.
5. MERs require a formal demand from the fishers asking for their establishment as well as interdisciplinary studies that incorporate traditional knowledge and management practices.
6. Assessing social and cultural structures, internal conflicts, economic capacities, leadership skills and marketing facilities are crucial elements for a viable reserve in addition to biological potential.
7. The definition of boundaries is also crucial and it usually involves discussions with neighbouring communities. Although only the fishers belonging to the users' association are allowed to fish within these boundaries, the rights of the fishers in surrounding communities that traditionally fish in the area have to be considered, provided they respect the agreed management plan.
8. Fishers' associations must be encouraged to establish no-take zones inside the MERs to protect their natural resources.
9. Co-management involving local fishers and reserve officials is crucial for the success of a project. Until now, however, due to a series of difficulties described in the case studies, co-management has come up against many

constraints. Law enforcement and penalties for those who disobey the management plan's directives are more effective in smaller and less complex reserves.

10. Smaller reserves with more homogeneous communities such as in the Mandira MER prove to be more sustainable than larger ones, with several communities inside their boundaries, particularly when the latter involve urban fishers and those involved in the tourist trade.
11. The more successful reserves are those that, in addition to the sustainable use of natural resources, are able to improve fishers' incomes and provide adequate social services, particularly schooling and health services.
12. Women's participation in the users' associations greatly contributes to the success of MERs.

Endnotes

1. The Research Assistant for this project was Fabio Henrique de Souza of NUPAUB
2. The mandate of ICNBio, created in 2007, is to propose, implement, manage, enforce and monitor all federal conservation units. Before the creation of this Institute, this responsibility was IBAMA's, which continues to be responsible for environmental licences, and their authorization and enforcement.
3. This case study was undertaken by Tiago Almudi and Daniela Coswig Kalikoski of the Federal University of Rio Grande (FURG), Brazil. The authors would like to thank the Brazilian National Council for Scientific and Technological Development (CNPq Process No. 109984/2004-8; Institutional Process No. 800730/1990-9) for supporting the research. The fishing communities of the Peixe Lagoon and IBAMA's officials were also helpful in completing the study.

References

- Adamoli, Gianpaolo. *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. Porto Alegre: Federal University of Rio Grande do Sul, 2002.
- Angelo, Sueli. *Lugar e cidadania: implicações socioambientais das políticas de conservação ambiental: Parque Estadual da Ilhabela Tese de Doutorado*. São Paulo: Depto de Geografia, University of São Paulo, 2000.
- CNPT/IBAMA. *Roteiros Metodológicos: plano de manejo e uso múltiplo das reservas extrativistas federais*. Ed. E. Rodrigues, A.e de Paula and C. Araújo. Brasília: IBAMA/Ministry of Environment 2004.
- Cordell, John. *A Sea of Dreams: Valuing Culture in Marine Conservation*. Berkeley: The Ethnographic Institute, 2007.
- Cordell, J. "Dynamics and challenges of MPA Development and coastal protection." In *Taking Marine Management to Scale: Connecting Societies, Coastal Landscapes and the Sea*. Washington: World Bank, 2006.
- Cordell, John. *Brazil's Coastal Marine Extractive Reserves (MER) Initiative: Protected Area Management: Capacity Building, Social Policy and Technical Assistance*. Rio de Janeiro: The Ford Foundation/IBAMA/CNPT, 2003.
- Cordell, John. "Remapping the Waters: The Significance of Sea Tenure-Based Protected Areas." Keynote address at the III Conference on Property Rights, Economics and the Environment. Aix-Marseille: Centre d'Analyse Economique de l'Université d'Aix-Marseille, 2002.
- Cordell, John. *The Sea of Small Boats*. Cambridge, Massachusetts: Cultural Survival, 1989.
- Cunha, Lucia Helena. *Comunidades litorâneas e unidades de proteção ambiental: conflitos e convivência. O caso de Guaraqueçaba*. São Paulo: Nupaub/University of São Paulo, 1989.
- D. Antona, Alvaro. "Tempos e lugares nos Lençóis Maranhenses: considerações sobre o modo de vida de comunidades residentes junto a um parque nacional." In *Imagem das águas*, ed. Antonio Diegues. São Paulo: Hucitec-Nupaub, USP, SP, 2000.
- Dayton, P, E Sala, M Tegner and U S Thrush. Marine Reserves Parks, baselines and fishery enhancement. In *Bulletin of Marine Sciences*, 66, 2000.
- Diegues, Antonio. "Traditional Fisheries Knowledge and Social Appropriation of Marine Resources in Brazil." Paper presented at Mare Conference, "People and the Sea", Amsterdam, August-September, 2001.

- Diegues, Antonio and E Arruda, Rinaldo. *Saberes Tradicionais e Biodiversidade no Brasil*. Brasília: Ministry of Environment, 2001.
- Diegues, Antonio. *A pesca construindo sociedades: leituras em antropologia marítima e pesqueira*. São Paulo: Nupaub/University of São Paulo, 2004.
- Diegues, Antonio. "Artisanal Fisheries in Brazil." *SAMUDRA Monograph*. Chennai: ICSF, 2006.
- Diegues, Antonio. *The Myth of Untamed Nature in the Brazilian Rainforest*. Sao Paulo: Nupaub/USP, 1998.
- Di Ciommo, Regina. "Gender, Tourism and Participatory Appraisals at the Corumbau Marine Extractive Reserve, Brazil." *Human Ecology Review*, Vol. 14, No. 1. Michigan State University: Society for Human Ecology, 2007.
- Furquim, Ana. *A ilha do Cardoso: O parque Estadual e os Moradores*. Dissertação de Mestrado em Ciências Florestais. São Paulo: Esalq, 2000.
- IBAMA. Cadastro de Pescadores, MMA, Brasília, DF, 2003.
- ICMBio. Brazilian Protected Áreas 2004-2007. Chico Mendes Institute for Biodiversity Conservation, MMA, Brasília, DF, 2007.
- Kaliloski, D C, M Vasconcellos and L M Lavkulich. "Fitting Institutions and Ecosystems: The Case of Artisanal Fisheries Management in the Patos Lagoon." *Marine Policy* 26 (03). Oxford: Elsevier, 2002.
- Kalikoski, Daniela. *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, 2004.
- Kaliloski, D C and T Satterfield. "On Crafting a Fisheries Co-management Arrangement in the Estuary of Patos Lagoon (Brazil): Opportunities and Challenges Faced through Implementation." *Marine Policy* 28. Oxford: Elsevier, 2004.
- Kelleher, G and R Kenchington. Guidelines for Establishing Marine Protected Areas, Marine Conservation and Development Report, IUCN, Gland, Switzerland, 1992.
- Knak, R B (Org.). *Plano de manejo do Parque Nacional da Lagoa do Peixe*. Brasília: IBAMA/FNMA/FURG/NEMA/UFPEl, 2004.
- Maldonado, Simone. "Caminho das Pedras: Percepção e Utilização do Espaço na pesca simples." In *Imagem das Águas*, ed. Antonio Diegues. São Paulo: Hucitec-Nupaub, 2000.
- Medeiros, Dean. *Lessons From the Equator Initiative: Cananéia Oyster Producers' Co-operative, Brazil*. IDRC/UNDP/Centre for Community-based Resource Management, Winnipeg: University of Manitoba, Canada, 2004.

- Oliveira, Rita. *Populações Humanas na Estação Ecológica de Jureia-Itatins*. São Paulo: Nupaub/University of São Paulo, 1993.
- Parada, Isabel. "Mudanças socioambientais de comunidades caiçaras do Parque Estadual da Ilha do Cardoso, O Olhar do Pesquisador." In A Diegues. (Org.) *O Olhar do Pesquisador: Enciclopédia Caiçara*. Vol.1. Hucitec/Nupaub-USP, SP, 2004.
- Parada, Isadora. "Mudanças socio-ambientais de duas comunidades caiçaras do P.E.da Ilha do Cardoso." *Monografia em Ecologia*. São Paulo: Inst. Biociências, 2002.
- Pinto da Silva, Patricia. "Common Property to Co-management: Social Change and Participation in Brazil's First Marine Extractive Reserve." Ph D diss. London: London School of Economics, 2002.
- Prado, Dauro. "Os caiçaras em áreas protegidas." In A Diegues. (Org.) *Enciclopédia Caiçara História e Memória Caiçara*, Vol. 4, Hucitec/Nupaub-USP, SP, 2005.
- Resende, S. "Breeding Strategies of Migratory Birds of Lagoa do Peixe, Rio Grande do Sul, Brazil." Masters thesis. New York: Cornell University, 1988.
- Resende, S and F Leeuwemberg. "Ecological Studies of Lagoa do Peixe." Report of Project "Lagoa do Peixe" to the World Wildlife Fund, 1987.
- Saint Hilaire. *Voyage a Rio Grande do Sul*. Orleans: H. Herlison, 1887.
- Seixas, C. "Barriers to local level participatory ecosystem assessment and management in Brazil." Paper presented at the Millenium Ecosystem Assessment Conference: Bridging Scales and Epistemologies: Linking Local Knowledge and Global Science in Multi-scale Assessment, Alexandria, March 17-20, 2004.
- Seixas, C S and F Berkes. "Dynamics of Social-Ecological Changes in a Lagoon Fishery in Southern Brazil." In *Navigating Socio-Ecological Systems*, eds F Berkes, J Colding and C Folke. Cambridge: Cambridge University Press, 2003.
- Tagliani, C R et al. "Geologia e geomorfologia da Porção Sul do Parque Nacional da Lagoa do Peixe, R S, Brasil." In *Congresso Brasileiro de Geologia*, 37. SBG/SP, São Paulo, 1992.
- Tagliani, P R A. "Estratégia de planificação ambiental para o sistema ecológico da Restinga da Lagoa dos Patos-Planície Costeira do Rio Grande do Sul." Ph D diss. São Carlos: Universidade de São Carlos, 1995.
- Whale, C. Preface, in NOAA Social Science Research Strategy for Marine Protected Areas. Washington, DC, 2003.
- World Bank. *Scaling up Marine Management: The Role of Marine Protected Areas*. Report No. 36635. Washington DC: Environment Department and Sustainable Development Network, 2006.
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Marine Protected Areas and Artisanal Fisheries in Brazil

Marine protected areas (MPAs) are being promoted around the world as an effective means of protecting marine and coastal resources and biodiversity. However, concerns have been raised about their impact on the livelihoods, culture and survival of small-scale and traditional fishing and coastal communities.

Yet, as this study from Brazil shows, it is possible to use MPAs as a tool for livelihood-sensitive conservation. Based on detailed studies of three sites—the Peixe Lagoon National Park in Rio Grande do Sul, and the marine extractive reserves (MERS) of Mandira, São Paulo, and Corumbau, Bahia—the study shows how communities in Brazil have been able to use protected areas to safeguard their livelihoods against development and industrialization projects, like shrimp farms and tourist resorts.

The study also highlights the many challenges facing communities in the process of setting up sustainable-use MERS. These are related to, among other things, the need for capacity building of government functionaries and communities; funding; strong community/fishworker organizations; an interdisciplinary approach; and integration of scientific and traditional knowledge.

This study will be useful for researchers, analysts, non-governmental organizations and anyone else interested in fisheries, biodiversity, conservation, communities and livelihoods.



ICSF is an international NGO working on issues that concern fishworkers the world over. It is in status with the Economic and Social Council of the UN and is on ILO's Special List of Non-Governmental International Organizations. It also has Liaison Status with FAO. As a global network of community organizers, teachers, technicians, researchers and scientists, ICSF's activities encompass monitoring and research, exchange and training, campaigns and action, as well as communications.