

**COMMON PROPERTY TO CO-MANAGEMENT: SOCIAL CHANGE
AND PARTICIPATION
IN BRAZIL'S FIRST
MARITIME EXTRACTIVE RESERVE**

By

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To my grandfather,

Dr. António Pinto da Silva

Acknowledgments

This thesis is the product of over six years of interest in Brazilian culture and conservation issues. This incredible period is deeply marked by a few individuals who have provided inspiration, guidance and support. Although there were many more, some are mentioned here.

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Abstract

Maritime Extractive Reserves, a new type of government-community collaborative management regime, are being established in coastal areas of Brazil in order to protect natural resources while sustaining local livelihoods. The long-term participation of resource users provides the cornerstone of this conservation and development model. This approach to conservation is supported by common property theory that questions the inevitable destruction of collectively managed resources.

This thesis explores the relationship between Maritime Extractive Reserves in Brazil and the traditional coastal communities they are created to protect. Specifically, it investigates the quality of the institutions which have traditionally governed the beach seining community in Arraial do Cabo, Rio de Janeiro, Brazil. It then analyses the levels and kinds of participation and perceptions of the newly created Extractive Reserve, which attempts to build upon these traditional relationships. Finally, the study identifies community level factors that constrain or provide potential for long-term participatory conservation in this area.

A case study approach is adopted, involving both quantitative and qualitative research methods. Data were collected through a questionnaire, participant observation, formal and informal interviews, focus groups and document review. This hybrid approach enables contextual exploration for which qualitative methods are essential ensuring a higher degree of accuracy and reliability than either could offer in isolation.

The data reveal that, although local traditional resource management institutions have a long history and were once effective, they have weakened over time. The data also indicate that there are significant social barriers to collective action within this user group which have implications for the operational viability of the Extractive Reserve concept. These barriers include weak organization, hierarchical structures, high levels of intra-community conflict and mistrust of government. Consequently, both the quantity and quality of participation in the reserve is low and therefore, local fishers are not becoming decisive players in the decision-making process. The implications of these conclusions for future maritime conservation policy in Brazil are explored.

Acronyms

A.C.	Arraial do Cabo
ACRIMAC	Association of Shell Collectors and Mariculture of Arraial do Cabo Associação dos Collectores e Criadores de Marisco de Arraial do Cabo
APA	Environmental Protection Area Area de Proteção Ambiental
APAC	Fishers Association of Arraial do Cabo Associação dos Pescadores de Arraial do Cabo
AREMAC	Association of the Extractive Reserve of Arraial do Cabo Associação da Reserva Extrativista do Arraial do Cabo
CNPT	Nacional Center for Traditional Populations Centro Nacional para Populações Tradicionais
CPR	Common Property Resource Regime
CNS	National Council for the Rubber tappers Conselho Nacional dos Serengueiros
FIPAC	Foundation Institute for Fishing in Arraial do Cabo Fundação Instituto de Pesca do Arraial do Cabo
FIPERJ	Foundation Institute for Fishing of Rio de Janeiro Fundação Instituto da Pesca do Rio de Janeiro
IBAMA	Brazilian Institute for the Environment Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis
IBGE	Brazilian Institute of Geography and Statistic Instituto Brasileiro de Geografia e Estatística
ICDP	Integrated Conservation and Development Project Projeto integrado de desenvolvimento e conservação
ICLARM	International Centre for Living Aquatic Resource Management
IEAPM	Admiral Paulo Moreira Institute for the Studies of the Sea Instituto de Estudos do Mar Almirante Paulo Moreira
INCRA	Brazilian Institute of Colonisation and Agrarian Reform Instituto Brasileiro de Colonização e Reforma Agrária
IUCN	International Union for the Conservation of Nature União Internacional para a Conservação da Natureza
MMA	Brazilian Environment Ministry Ministério do Meio Ambiente
MONAPE	National Fishers Movement

	Movimento Nacional dos Pescadores
NGO	Non Governmental Organization Organização Não Governmental
PESCART	Plan of Assistance for Artisanal Fisheries Plano para a Assistência da Pesca Artesanal
PIN	Programme for National Integration Programa de Integração Nacional
PP G-7	Pilot Program to Conserve the Brazilian Rainforest Programma Piloto para a Proteção das Florestas Tropicais do Brasil
PT	Workers Party Partido dos Trabalhadores
R.J.	Rio de Janeiro
RESEX	Extractive Reserve Reserva Extrativista
SNUC	National System of Conservation Units Sistema Nacional de Unidades de Conservação
SUDEPE	Superintendency for Fisheries Development Superintendência para o Desenvolvimento da Pesca
UNCED	United Nations Conference on Environment and Development Conferência das Nações Unidas sobre o Meio Ambiente e Desenvolvimento
UNEP	United Nations Environment Program Programa das Nações Unidas para o Meio Ambiente
WB	World Bank Banco Mundial
WCED	World Commission on Environment and Development Comissão Mundial de Meio Ambiente e Desenvolvimento
WCS	World Conservation Strategy

Glossary of Terms

Artisanal/ Traditional fisheries	Fishing characterised by the use of small crafts (such as rafts or dugout canoes), simple technology that often has not changed for some time. Artisanal/Traditional fishers often have intimate knowledge of their ecological surroundings with belief systems often adapted to the conservation of special areas.
Baptizing fish	Fish are baptized when the lookout announces his prediction of the type, size and quantity of fish passing.
Canoe fishing/beach seining	A fishing method involving a large canoe and net and a work team (companha) of between 9-12 people.
Caicaras	Small fishing communities which developed in the southern coastal areas of Brazil.
Carioca	A person from the state of Rio de Janeiro.
Companha	Team of 9-12 men who work together in the beach seining tradition.
Extractive Reserve	A direct use conservation category created by the Brazilian Government in 1990.
Fluminense	Anything from the state of Rio de Janeiro
Gill nets	Nets on which the gills of fish get caught.
Lookout/Vigia	Member of the work team who spots passing shoals and communicated through hand signals to the skipper in the canoe.
Muncões	Those climatic circumstances which affect the ability for beach seining to take place successfully.
Upwelling	A natural phenomenon whereby deep, cold and fertile oceanic waters emerge near the coast and provide an important feeding ground for fish.
Flow	Migratory patterns, flow of renewable resource
Stock	Total numbers and availability of fish
Veranistas	Brazilian tourists who own homes in small beach towns and visit every summer.

Map A: Brazil



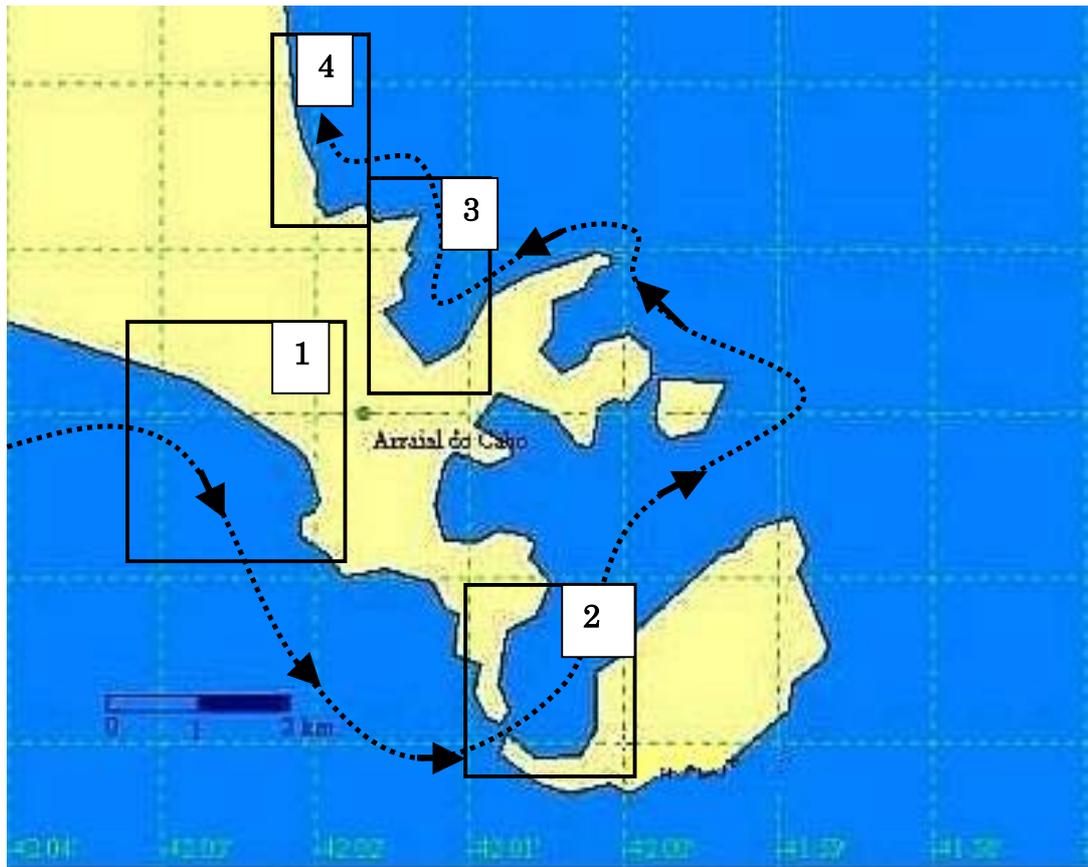
(Source:www.lib.utexas.edu)

Map B: RESEX Arraial do Cabo, RJ



(Source: CNPT/IBAMA)

Map C: Resource flow and fishing grounds of A.C.



- | | | | |
|---|-----------------|--------|--------------|
| 1 | Praia Grande |➔ | Flow of fish |
| 2 | Praia dos Anjos | | |
| 3 | Prainha | | |
| 4 | Pontal | | |

(Source: Author)

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Chapter 1 Small-Scale Fishers and Extractive Reserves

1.1 Introduction: purpose of the study

Small-scale fishing communities around the world are at serious risk from depleting fish stocks and other threats to the marine environment. There are an estimated 100 million people whose livelihoods depend on fishing (The Ecologist, 1995). The poorest two-thirds of the world's population obtain approximately forty percent of their protein from fish (The Economist, 1994). Not only are the diets of these groups dependent on fish but many are employed in this sector. Significantly, artisanal fisheries employ twenty times as many people as the industrial fisheries that are replacing them. These facts indicate that fishery policies are an essential element in global poverty reduction strategies. This is particularly so for those countries with vast coastlines and river systems such as Indonesia, the Philippines and Brazil.

Often the strategies of small-scale fishers are congruent with conservation goals. Over time, many of these groups have developed locally appropriate resource management systems influenced by the characteristics of their

natural resource base and their cultural context (Ostrom, 1990; Baland and Plateau, 1996; Ghimire and Pimbert, 1997a; Diegues, 1994). Supporting these types of regimes may be relevant not only for strengthening local livelihoods but also for conserving marine resources.

There has been increasing concern about the future of the ecological systems that the world's oceans and rivers encompass. Many of the most threatened marine areas are found in the developing world. Conventional approaches to marine area management involve preservation of 'untouched' areas and are therefore questionable in terms of their appropriateness for the developing country context. Often, these strategies mean excluding traditional resource users from their fishing grounds. Conservation practitioners, social policy experts and fisheries managers have begun to develop alternatives to traditional conservation approaches.

This thesis explores alternative approaches to marine conservation that involve collaborative efforts between the State and communities. These innovative initiatives are commonly called collaborative management or co-management regimes. Specifically, this thesis is based on case study research carried out in a small-scale fishing community in Arraial do Cabo in the state of Rio de Janeiro, Brazil. This community is of particular relevance to the concept of participatory marine conservation as it is the first open-water area to be declared an Extractive Reserve (RESEX) within the 'direct use' conservation category in Brazil.¹

One of the primary goals of Brazil's first Maritime Extractive Reserve is to protect the beach seining community that has traditionally fished in this municipality. The traditional fishing practices employed by this group along with the formal and informal institutions that support their activities were identified and subsequently targeted with this innovative conservation

¹ Direct use conservation areas are those that allow individuals to benefit directly from the resources these areas encompass.

and development regime in order to protect its cultural diversity. The creation of the Extractive Reserve was also seen as a vehicle for the long-term protection of the area's natural resource base, nurtured by the upwelling phenomenon and intrinsically linked to these traditional activities. In part, protection of these aspects of the community is seen as important because local fishing activities are based on sustainable principals and local knowledge.

As a result of both internal and international pressure, the Brazilian Government has been expanding their protected area network over the last ten years. Although the Extractive Reserve conservation category was created in law in 1990, it was only in 1997 that this concept was applied to open water marine areas. There are future plans though, to create these direct use marine conservation areas along the coastline in order to protect the cultural and ecological diversity that exists in this area. This study is the first of its kind to evaluate the social sustainability of these types of initiatives in the Brazilian context. The results of this study will be useful within Brazil as well as internationally where collaborative management regimes are still young and learning from case studies which are emerging from around the world.

Because the Maritime Extractive Reserve of Arraial do Cabo (RESEX A.C.) is the first of its kind in Brazil, there is little prior experience of how traditional maritime fishing populations and their management systems interact with these initiatives and what role they play in them. The aim of this thesis is to:

1. Investigate the institutions which have traditionally governed beach seining activities and determine the state of these institutions (weak/robust)
2. Explore the levels of participation in the newly created reserve and perception of the reserve by this resource user group

3. Analyse the community level factors that constrain or provide potential for long-term participatory conservation.

The conceptual analysis used in this study has been adapted from the framework used by Ostrom (1990), Oakerson (1992) and Berkes and Folke (1998) in their analyses of common property regimes. The framework is designed to help identify the characteristics of the ecosystem, people, technology, local knowledge and property rights institutions that characterise the case study as a strong or weak common property resource regime (CPR). Because this framework has been tested and tried in other cases, it makes the results of this study easier to compare to similar studies.

The methodological approach adopted in this thesis is based on the case study method. This approach involves the empirical investigation of a particular contemporary phenomenon (Maritime Extractive Reserves) within its real life context using multiple sources of evidence. This multi-method approach increases the validity and reliability of data gathered through triangulation. Twelve months of fieldwork were conducted at the case study site living and working with the sample group. Methodological tools used to collect data for this thesis included document review, structured and unstructured interviews, focus groups and a questionnaire. Participant observation was particularly useful for gaining an 'insiders' understanding of the case study site. A more detailed account of the methodology employed and problems encountered can be found in Chapter five.

1.2 Thesis Structure

The first half of the thesis concentrates on the evolution of policy approaches to biodiversity conservation. This policy analysis is followed by a review of relevant theory including common property resource theory and the related concepts of community, participation and social capital.

Afterwards, this thesis explores how these theories have been translated into practice within innovative approaches to environmental management. Chapter five presents the methodology employed in collecting data and analysing the selected case study. The second half of the thesis presents the data related to the key research questions and analyses them using the theoretical framework presented in the first half. The following paragraphs detail the purpose and content of each chapter.

Chapter two provides an overview of the evolution of policies towards environmental conservation. This chapter is divided into three main sections. The first section reviews how the idea of people's participation in conservation has emerged as a central theme in global strategies to achieve sustainable development. It does this by reviewing the outcomes of the main conferences and documents that have addressed this issue over the last thirty years. Then it discusses some of the criticisms of conventional approaches to conservation and presents alternatives to these approaches. The second section of this chapter reviews the origins of conservation and the exploitation of natural resources within the Brazilian context. This section begins with the period of colonialism and commercial resource extraction of Pau Brasil and finishes with a description of the developments in Amazonia over the past thirty years. The chapter ends with a review of fisheries policy in Brazil and how this policy has recently merged with conservation policy through extending the Extractive Reserve conservation category to the realm of fishing communities and the natural resources upon which they depend.

Chapter three provides an overview of developments in social theory related to environmental management. It includes a discussion of factors that have influenced conventional environmental policies that tend to be socially exclusionary towards traditional resource users. The chapter then looks at the circumstances under which local communities have become active participants in the process of natural resource conservation. It also reviews

the factors identified thus far that are common to successful common property management regimes. Lastly, this chapter explores in depth some of the fundamental concepts associated with alternative strategies: community, social capital and participation.

Chapter four discusses recent attempts to operationalize collective resource management. It presents a hybrid approach to the management of common property resources where rural communities work in partnership with government, a process often referred to as collaborative or co-management or joint resource management. This chapter begins with a general discussion on collaborative management regimes including the different definitions, types and dimensions of these regimes. It also presents the design principals identified in the literature which are relevant to creating co-management arrangements involving long-term community participation. Afterwards, this chapter reviews collaborative management efforts in Brazil through a discussion of the Extractive Reserve conservation category. This section will briefly describe the factors that led to the creation of this collectively managed conservation unit. Lastly, this chapter reviews some of the characteristics of this type of reserve including the process of establishment and other legislative aspects.

Chapter five presents the methodology employed to collect and analyse the data used for this thesis. The methodology chapter is divided into three sub-sections. The first section defines the general approach to the research including the decision to follow a case study design as well as a mixture of qualitative and quantitative approaches. The second section defends why certain methodological tools were selected over others. This section also describes how these tools were employed to gather the necessary data. The final section presents some of the site issues that complicated or contributed to the successful completion of the fieldwork.

Chapter six builds on the background given on the social and environmental context of Arraial do Cabo, RJ, presented in the second half of Chapter one and provides a more specific breakdown of the characteristics of the fishing community itself. This is done initially by describing the different gear type groupings that exist among the fishers in the municipality. It then describes the organisations which have represented fishers over the years first, in a Colónia (fishermen's guild) and then with the onset of democracy and the opportunity for greater individual and collective expression into a number of 'free' associations. The last section of this chapter analyses the process that led to the establishment of Brazil's first open water Extractive Reserve as well as the Utilisation Plan that governs it.

The purpose of Chapter seven is to evaluate the strength of the common property resource regime which has developed over generations to regulate beach seining activities in Arraial do Cabo. This chapter begins with the presentation of data related to the physical attributes of the resources involved. It then describes the decision-making and institutional arrangements that regulate the access and use of these resources. Afterwards, it identifies some of the key characteristics of the beach seining community which effect opportunities for successful long-term collective action including the presence of deep divisions and conflict. Finally, this chapter analyses the resilience of this regime using Ostrom's (1990) design principals (presented in Chapter three) as a guide for evaluation.

Chapter eight analyses the way that the canoe fishers' institutions described in previous chapters were contemplated in the Utilisation Plan and looks at the articles in that plan that directly impact on their activities and their management arrangements. It also presents data related to the type and intensity of participation of this group in the reserve with a particular focus on their ability to influence management decisions. This chapter also analyses how different aspects of the reserve (management, monitoring, etc.) are perceived by fishers. The chapter will then conclude

with a discussion about the impacts of the reserve on the sustainability of the canoe fisher CPR and in achieving the primary social objective of the RESEX A.C.

Chapter nine is the concluding chapter of this thesis. It presents the conclusions drawn from this study along with the associated policy implications. The second half of Chapter one will describe the case study site and the relationship between natural resource use and social change in this area since before colonization began in 1503.

1.3 History and ecology of Arraial do Cabo

This background section is included in order to provide an overview of the social and ecological linkages that have characterised the case study site selected. The term socio-ecological is used to emphasise the integrated concept of humans-in-nature as opposed to the artificial distinctions often associated with distinctly separate notions of social and ecological systems (Berkes, 1989). This section begins with a description of the different ecological systems present in the municipality of Arraial do Cabo, located 180 kilometres from the city of Rio de Janeiro in the state of Rio de Janeiro (See Maps A and B). Afterwards, a review of the current socio-ecological relationships is presented through a description of the most significant events that characterise the socio-economic development of the municipality. It will also show how these different phases of development have utilised local resources. This overview will set the stage for the presentation of data collected during the field study and its analysis.

Understanding current socio-ecological relationships within Arraial do Cabo is impossible without a grasp of the main ecological systems that it houses and of the evolution of strategies previously used to exploit these resources. The natural resources in Arraial do Cabo have provided the basis for the local economy for thousands of years and continue to do so. Although this

study focuses mainly on the more recent phases of this resource use, a socio-ecological time line perspective is helpful in placing today's situation in the broader historical context. A brief description of the physical characteristics of the different ecosystems will be presented followed by an overview of the corresponding economic/livelihood strategies over time.

The physical characteristics of Arraial do Cabo's resources can be somewhat broadly if artificially separated into two overall systems: terrestrial and aquatic. Artificially in the sense that aquatic attributes are deeply intertwined with the terrestrial. Land formations are in part a result of distant ocean currents and the movements of sediments just as the migration of fish has been encouraged by favourable conditions for feeding related to the quiet bays surrounding the Cape. The use of these resources has never been limited to one or the other but instead, complement each other. Fishers have used materials from the forest and dunes for making their nets, while salt mined from nearby lagoons served to preserve fish before the arrival of industrial freezers. As we will see, approaches to resource use have rarely been restricted to one system or another but rather use the two systems as complementary.

Terrestrial ecosystems

The hills that today surround the dense urban centre of Arraial do Cabo once formed an archipelago of volcanic islands. Over time, winds and strong ocean currents deposited sand along the coast creating sandbanks. These sandbanks eventually linked the former islands together connecting them to the mainland and forming a cape extending 40 kilometres into the Atlantic Ocean (see Map B). This cape is surrounded by distinctive coastal formations ranging from protected coves and harbours to rough and rocky open ocean terrain. This process also created favourable conditions for a variety of different ecosystems to emerge all of which have at some point or another been utilised in supporting local livelihoods. Ecosystems

represented in the municipality include sand dunes, *restingas*², patches of the acutely threatened Atlantic Rainforest, salt lakes, coral reefs, lagoons and mangroves (FEEMA, 1988). Apart from the newly established reserve, there are a number of smaller municipal level conservation units that have been established to protect these resources with greater and lesser degrees of success.

Aquatic systems

The richness of the aquatic ecosystem surrounding the cape is due largely to the oceanic phenomenon referred to as 'upwelling'. Waters at depths of 120 metres or more receive little sunlight essential for the survival of phytoplankton. The absence of these small creatures maintains a high nutrient density at this depth. In a few coastal areas around the world, due to oceanographic, geographic and meteorological factors, deep oceanic waters upwell bringing with them nitrates and phosphates that act as fertilisers for the more superficial coastal waters. The availability of these nutrients thereby attracts a high diversity of aquatic plants and animals and increases the richness of the ecosystem.

Approximately seven areas around the world are affected by this occurrence and all consequently have important fishing activities associated with them. These locations include Peru (home to the largest fishery in Latin America), South Africa/Namibia, and Southern California (Carson, 1950). Biologically, the up-welling phenomenon is very important, because the cold water is so rich in nutrients that it provides the base of the aquatic food chain. The result is an extremely diverse aquatic system which has sustained the livelihoods of the inhabitants of the cape over thousands of years (see Annex D).

² Ecosystem characterised by sand dunes, cactus, and low-lying fruit bearing shrubs and trees.

In the area surrounding the Cape, the body of water that upwells is called the Central Water of the South Atlantic (CWSA). This water body is the result of the meeting of the warmer Brazil Current with that of the Arctic Falkland Current. The principal cause of up-welling in the Brazilian Southeast is the constant north-eastern winds. These winds run parallel to the coast, pushing the superficial coastal waters farther out to sea and revealing the ice cold fertile waters emerging from a depth of over 200 metres. With the CWSA nearby along with the north-easterly winds and the fact that the Cape's coast houses some of the deepest coastal waters along Brazil's 6,000 kilometre coastline, all the ingredients exist for this rare up-welling to occur.

In principal there are two main categories of fish that inhabit the region: pelagic and migratory. Pelagic fish are those that stay on shore in coastal areas and not only feed off reefs but live for the majority of the year in the same area. Migratory fish are those that come in schools following certain water channels that flow along the coast in search of protected waters. Because of the rich nutrients available off the A.C. Cape and the inland bays and estuaries, many different fish species choose the Cape as a site to spawn. The principal commercialised species that follow these aquatic paths are: mullet (*mugill spp.*), bonito (*Auxis sp.*), blue fish (*pomatomus saltatrix*), and squid (*Liligo sanpaulensis*). As we will see later, these passing schools provide the basis for the traditional fishing methods practised.

1.4 Socio-ecological timeline

The history of Arraial do Cabo can be divided into four main socio-ecological phases. Although it is the dynamics of the last phase which are of most concern and have most relevance to the scope of the research, present day Arraial do Cabo is much influenced and affected by the other three phases.

This information is therefore useful in understanding the roots of current social relations, and will be frequently referred to throughout the text.

Table 1.1 Four Phases of Development in A.C

Phase 1	Pre colonial	3,500 BC - 1503
Phase 2	Colonial	1503 - 1900
Phase 3	Modernization	1943 - 1988
Phase 4	Post Modern Transition	1980 - present

Phase I: 3,500BC - 1503

The first development phase is defined as the period before European colonisation. This period is characterised by the presence of hunting and gathering populations, beginning with the shell collecting Sambaquis tribe. Later, there is evidence of the occupation in the region of tribes with highly developed fishing techniques that are often referred to as the Itaipu phase of Indian settlement in coastal regions of southeastern Brazil.

According to Dias (1977) these Indian communities selected geographical locations with specific ecological characteristics for their settlements. They were not nomadic but rather sought the long sandy stretches of the *Fluminense*³ coast particularly at locations where high hills approximated clear oceanic waters. Many of these locations are still valued by today's fishers who use them as the Indians did as lookout points for the arrival of migrating fish from southern waters. Archaeological digs in the area reveal the remains of populations that inhabited the cape and built their cemeteries or Sambaquinas (shell piles) in a variety of spots along the coast.

Phase II: 1503-1920

The second major shift occurred with the arrival of sea-faring Europeans in the New World. Amerigo Vespucci and his ships landed in the comfort of

³ Fluminense refers to anything belonging to the state of Rio de Janeiro.

the deep and well-protected Baía dos Anjos (Angel Bay) and left twenty-four men to build a settlement and protect the area from foreign invaders. The community subsequently built is recognised as one of the very first European communities in the New World. Throughout this period, starting roughly in 1503 and lasting until the beginning of the 20th Century, Arraial's port was used to ship natural resources extracted from the region starting with Pau Brasil or Brazil wood, then salt, fish and other raw materials for export to European markets. It was also used as a point of entry for slaves brought to provide labour for these extractive industries.

The Cape itself marks a strategic point along the Brazilian coastline. It represents the geographical point where the continent changes direction, from Northeast to Southeast. For explorers, discoverers and traders during this period, the island of Cabo Frio was (and still is) the first land sighted after the long transatlantic trip from Europe and the first lighthouse in Latin America was built here in 1583. As a result, it was often used as a rest point for ships heading to the commercial centre of Rio de Janeiro.

Although the *Baía dos Anjos* provided an excellent environment in which to harbour transatlantic ships, the entry to the bay proved precarious through the small opening (misleadingly called *Boqueirão* - 'wide opening') between the mainland and the island of Cabo Frio. Also, the builders of the lighthouse failed to take into account the constant cloud coverage over the island that constantly disrupted the lighthouses' beam. As a result, to this day there are eighty-eight shipwrecks documented in the waters and coast surrounding the Cape (Filho, 1993). These factors created an environment in which there were many new people on the Cape at any one time, adding to cultural diversity of the location that is still distinct and visible today.

Phase III: 1920 - 1988

The third phase in the history of the Cape's development can be described as a period of modernisation or industrialisation. This phase is epitomised by the establishment of the government owned Alkalis industrial plant. This phase is also characterised by changes in fishing activities as a result of the introduction new technologies such as motorised boats and icehouses. It was during this phase that industrial fishing fleets supported by government policies first appeared.

Due to the accessibility of salt, sand and calcium, obtained by mining shells from nearby lake beds, and the existence of a deep water port on Praia dos Anjos, Arraial was a prime site for the establishment of Brazil's *barrila*⁴ industry formalised in 1943 as the National Company of Alkalis⁵. It is the only one of its kind in the country (in the U.S. the substance is mined and exists naturally, in Latin America its absence makes its creation though a chemical process necessary) and regionally continues to be the biggest industrial plant. Nationally, the creation of the Company was heralded as a step towards the country's industrialisation and modernisation. Like many other national strategies at the time, it assumed that the local population's 'primitive' lifestyle would be transformed in the wake of modern industrial progress. According to many local inhabitants, it was during this period that Arraial do Cabo became 'civilised'.

This period brought waves of immigrants from other areas in Brazil and abroad. Some of these immigrants came from the poorer north-eastern states looking for work. Others were recruited as specialists and brought from around the country to run this strategic industry. At its peak, Alkalis employed a few thousand people living in its vicinity. These immigrants contributed to a skyrocketing of the local population. From 1955 to 1965 the

⁴ A material that occurs naturally and can be produced chemically from which a range of products are made including cosmetics and fertilisers.

⁵ Companhia Nacional de Alkalis

Cape's population grew at three times the rate which existed before the arrival of Alkalis (Prado, 2000). Its creation also had important impacts on the local class structure through the introduction of wage labour and as a result of the hierarchical management structure introduced by the company. During this period, many fishers were employed in this industry, though never abandoning their fishing activities completely.

The Alkalis plant has since been privatised and is in a state of decline. With 720 employees, the once all-important local industry now employs only a fraction of that employed in past years. Of these, approximately 200 are native to the Cape and the rest have emigrated from other areas (Prado, 2000). With the current total population of the municipality at approximately 26,000 inhabitants Alkalis' contribution to local employment has become much less significant (IBGE, 1996).

Other technological changes introduced during this period had important impacts on the Capes' socio-ecological systems. The availability of industrial nylon nets and other industrialised materials made fishers much less dependent on the terrestrial resources extracted from the *restinga* which had been utilised for making and dying nets. The availability of these products also increased the need for wages with which to buy them.

The introduction of freezing technologies through the establishment of icehouses in the municipality also had important impacts. Firstly, traditional salting and processing practices ceased. As it was mainly women who were responsible for these time-consuming tasks, their role in fishing was significantly reduced as a result. It was also during this period that motorised boats became a common sight in the municipal marina. Most importantly, it was a period during which government policy actively supported industrial fishing practices at the expense of small-scale fishers. Since 1967, industrial fishing has been encouraged in the country through tax incentives and the suspension of import tariffs on fishery technology

(Diegues, 1992a). The result has been the widespread destruction of fish habitats, over-fishing and the marginalization of artisanal fishermen.

With the decline in production at Alkalis, coupled with reduced fishing catches, Arraial began to look at other possibilities of capitalising on its rich natural resource base. The next phase describes this process and how tourism, mining and other activities have interfaced with traditional fishing activities. This phase is characterised by the contradictions and conflicts that exist between the different local development strategies.

Phase IV: 1988 - present

Since the late 1980s, the economy of Arraial do Cabo has opened up to include an even wider array of economic activities. Outside of fishing and the downsizing of the Alkalis industrial plant, other opportunities for employment within the municipality include working with local commerce, increased opportunities in a growing tourism industry and its associated services, and one of the municipality's biggest employers, the local government. With a fixed work force of approximately 1,000 (often doubling during election years), the local government plays an important role in generating employment opportunities.

This combination of economic activities has created an environment in which traditional and modern activities occur side by side. It is not uncommon for fishers to have jobs outside the fishing industry with the local government or other sector, or for wives to be working with computer technologies while their husbands earn a living by beach seining. While many of these outside activities complement fishing, others present serious threats to traditional practices.

Along with the uncertainty embedded in employment with the municipal government, work opportunities in the tourism industry are also precarious.

Much of the available work is seasonal and contingent on the flux of tourism during the summer months. Unfortunately, the tourist season coincides with the most important fishing months from December to March, making it difficult for tourism to become a complementary activity to fishing activities. As most fish is sold to outside markets, local fishers do not benefit from this local market by negotiating higher prices for their catch.

The aesthetic value of the Cape's crystalline waters, secluded bays, long stretches of white sands and aquatic diversity has encouraged many different types of tourism to develop. Beginning in the 1970s, the main flux of tourism in Arraial was characterised by *veranistas* or summer vacationers who often own homes in the municipality and stayed for long periods during the summer. This type of tourism is still present and many local residents take this opportunity to earn extra income by renting out their homes and moving in with extended family during these periods. Recently, the profile of area tourism has broadened to include higher end tourism such as those coming for ecological dive holidays (spurred by the local governments' inauguration of Arraial as Brazil's Dive Capital). These developments have led to the construction of numerous hotels and SCUBA dive shops.

The growing popularity of the Cape has also attracted a much larger scale of tourism over recent years. During the high season summer months, it is not unusual for the population to triple in size (PMAC, 2000). There are also plans for developing mass tourism by receiving cruise ships in the harbour (Ribeiro, 1999). Tourists and the financial resources they bring to the municipality have had lasting affects on the local economy as well as traditional fishing practices.

This intense seasonal population flux has had serious impacts on fishers in the area. Among them is the increased boat traffic that is blamed for startling fish from their traditional feeding grounds and changing the

course or flow of these resources. The physical presence of tourists on the beach is a particular problem for some beach seiners who require large amounts of beach space to pull in their huge nets. Furthermore, the uncertainty and seasonality of work in this sector reinforces the importance of fishing as a safety net for much of the community.

The riches of the municipalities' natural resources are not limited to the renewable resources. Others include such non-renewable resources as petroleum. Petroleum extraction has taken place off shore in the north of the state of Rio de Janeiro in what is called the 'Campos Basin.' Arraial do Cabo is an attractive place for this type of industry partly because of the accessibility of the existing harbour and proximity to oceanic wells (Ribeiro, 1999). Currently, the municipality's involvement in this industry is limited to carrying out mechanical and repair work on drilling platforms used in the region.

Apart from the impacts of tourism, other economic activities present important threats to the livelihoods of small-scale fishers in Arraial do Cabo. The continued presence of industrial fishers using predatory fishing techniques is cited as a source of the biggest threat to local fishing: the depletion of the fish stocks. Like the grounds of small-scale fishers around the world, the waters surrounding the Cape have fallen prey to industrial shrimp trawlers and gill nets since the 1970s.

Brazil's Environmental Protection Agency (IBAMA) classifies predatory fishing as the use of dragnets and gill nets with a weave span of less than seven centimetres. Although by law they are limited to trawling at a distance of 200 metres from shore, these fleets have historically disregarded these limitations and often trawl dangerously close to shore. These types of trawlers have the capacity to spend long periods at sea, as they have refrigeration facilities on board. Their threat lies not only in the quantities of fish that they can hold but the indiscriminate and wasteful processes

used to fish (The Economist, 1994). To extract large quantities of commercially valuable fish, their huge nets drag along the sea bed and scoop up both desirable and undesirable catch which are separated on board the vessel, and the by-catch is then dumped overboard.

Unsuccessful isolated attempts to challenge these ships have occurred sporadically over the years. More recently, FIPAC⁶, the local government fishery institute, with support from local fishers, began a somewhat systematic effort to confiscate illegal gill nets left in nearby waters. These efforts have since lost steam and although temporarily revitalised by the creation of the Extractive Reserve, have not seemed to make a significant impact on the trawling activities threatening stocks around the Cape.

1.5 Description of A.C. Fishing Activities

‘Arraial do Cabo’ means literally ‘Hamlet of the Cape’. This was in all probability a name given to it by early Portuguese explorers and settlers new to the area as nowadays it ill represents the true make up of the community. In fact, Arraial do Cabo was not one hamlet but two (Praia dos Anjos and Praia Grande). Over time, it grew into four with the third developing after the abolition of slavery in the late 19th Century into an Afro-Brazilian neighbourhood and a fourth, Praia do Pontal, with the establishment of Alkalis and the housing for its employees. Today, although the municipality spans the four hamlets, these distinctions are still relevant (although more in terms of local identity as opposed to actual physical separation) and do not take long for a first-time visitor recognise.

At the beginning of the 20th Century, the deep soft sand and lack of transport separated these hamlets. Now, increased urbanisation and paved roads have merged them together transforming them from independent

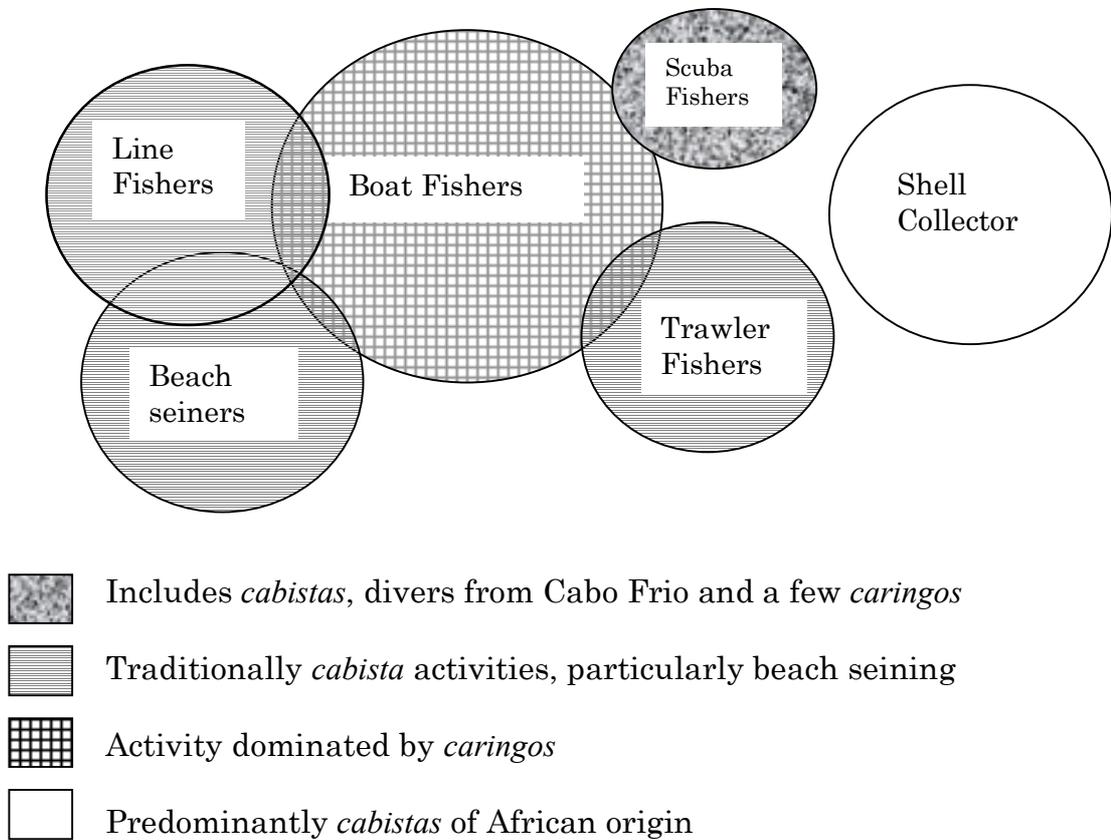
⁶ Fundacao Instituto de Pesca de Arraial do Cabo

entities into neighbourhoods of the larger municipality. The four main neighbourhoods get their names from the beaches with which they are associated: Praia dos Anjos, Praia Grande, Prainha, and Praia do Pontal, indicating the importance of the beach in the lives of its residents.

Arraial presently has approximately 26,000 registered inhabitants (PMAC, 2000). An attempt was made to identify the number of fishers that reside and fish in the waters surrounding the Cape. As there are no official statistics available from the local government fishing institute (FIPAC) or from the state institute (FIPERJ), this information was gathered by comparing estimates from different local fishing organisations and fishers and triangulating them with the researcher's observations. Responses included numbers of fishers ranging from the hundreds to the thousands with some including the important, albeit unclear, distinction between the number of fishers and the number of people in the community who depend directly or indirectly on fishing for their livelihoods. What is clear is that fishing still makes an important contribution to the local economy and, more importantly, represents a significant part of the livelihoods of many Cape residents. The following section will provide a breakdown the estimate of the number and types of fishers used for the purposes of this study.

Fishing modalities in Arraial are divided (locally) into five main categories. These categories include trawling, boat/line fishing, SCUBA fishing, shell collecting and beach seining. For the most part, fishers do not engage in different modalities simultaneously. Over time, some switch from one to the other with older fishers often having experience of a diversity of strategies. The figure below illustrates the different fishing modalities, the number of fishers involved in each as well as the distribution of some of the different groups that participate in each.

Figure 1.1 Group size and ethnic divisions among A.C. fishers



Source: Author

Of these modalities, boat and line fishing have the most participants with numbers reaching approximately 1000. With approximately 300 motorised small boats in the harbour with crews of between two and three along with a scattered number of fishers who fish off rocks, this group accounts for the vast majority of fishers in the municipality. There are ten trawlers working locally using work teams consisting of eight persons each, suggesting an approximate number of eighty full time fishers involved in this modality. A rough estimate of the number of beach seiners suggests that there are just over 150 people involved in this practice on all four beaches. With another 20 partaking in SCUBA fishing, and at least 90 involved in shell collecting activities, this brings the grand total to an estimated 1,340 fishers in the municipality.

Table 1.2 Number of fishers in A.C.

Boat/ Line	1000
Trawler	80
SCUBA fishers	20
Shell Collecting	90
Beach Seine	150
Total	1,340

(Source: observations, interviews)

Although the species of fish and the strategies used by and within fisher groups using different modalities to catch them are different, the fishing cycles and periods remain similar throughout. For the most part, the summer months are the most fruitful and account for the majority of fish caught throughout the year.

Apart from the estimated thirty families involved in collecting and processing shellfish, the other modalities no longer include the direct participation of women and as we will see later on, the role of women in fishing in Arraial has all but disappeared. Although many women were approached and provided useful and relevant information, as far as this study is concerned, it is the fisher *men* of Arraial do Cabo who have been at the forefront of the recent developments in local fishing organisations and institutions.

Beach Seining

The *rede de arrasto* or beach seining takes place on all four beaches with each beach having a corresponding residential neighbourhood community associated with it; Praia Grande, Praia dos Anjos, Prainha and Praia do Pontal. In principal, all beaches abide by a similar set of rules which define who is allowed to fish as well as when and how fishing activities take place. On all but one beach these activities take place during the day. It is only on Praia Grande that beach seining at night for squid has recently developed along with institutions to regulate it. Although some of the characteristics

of this night fishing are different from its day counterpart, the regulatory systems are similar and governed by the same groups that control the day seining.

The basic strategy for day seining throughout the Cape is the same. The physical characteristics necessary for the success of this activity are the presence of clear placid water, high nearby hills and sandy coves in the coastline. There are approximately nine members of the work team or *companha*. Although all are important and necessary for the success of the activity, it is the lookout who forms the cornerstone for this type of beach seining. Because these fishers do not use bait nor do they move from location to location looking for schools, they must actually see the fish that they are attempting to catch before they can effectively 'fence' them in with their net.

The height of the hills is used for the lookout to get a bird's-eye view of the incoming migratory schools of fish. The clarity of the water is also essential not only for the spotting of schools but also for the identification of the species, size and number present in the school, a process often referred to as 'baptising.' It is the lookout who baptises the schools and decides whether they are worthy and well placed for the *cercos* or fencing in to be successful.

Another important resource for the success of beach seining is the availability of a large dugout canoe. These are fashioned from huge trees, formerly available regionally, and when finished are approximately one metre in diameter and seven to eight metres long. Four men manoeuvre the canoe (rowers), two men are responsible for placing the huge net in the water, and the skipper or *mestre* is responsible for co-ordinating this process by receiving hand signals from the distant lookout and relating them back to the rest of the team. The last member of the team stays on the beach throughout this process and is responsible for a rope connected to the net that he pulls when signalled. As soon as the signal is given and the net

starts to go in the water, this person starts closing the sides of the net to prevent the fish from escaping. He is later joined by the rest of the crew and often by other participants who help in the lengthy affair of pulling the net on to shore (See Figure 1.2 below).

Figure 1.2 Fishers and community members pull in the net



Site Selection

Arraial was selected as a case study site for this research for one main reason. It is the site of the first Brazilian experience in fishery co-management in an open marine environment. The legal term for this conservation initiative is Extractive Reserve (RESEX). The Extractive Reserve of Arraial do Cabo (RESEX A.C.) was created by presidential decree on January 3rd 1997. According to representatives of the Brazilian Government National Centre for Traditional Populations (CNPT) it will not be the last as there are plans to create many more over the next few years along Brazil's extensive coastline.

This site is also of particular interest as it is the first Extractive Reserve⁷ to be created in an urban environment. The experience so far with with these conservation and development units has been in the North of the country managing forested tracts in fairly remote areas. The characteristics in Arraial do Cabo provide a challenging setting because of the diverse uses of aquatic space in the area; Navy frigates and submarines, to cargo ships, tour boats, divers, petroleum platforms just to name a few.

It was selected as a Brazil's first Maritime Extractive Reserve in part because of the presence of the beach seine fishers. Despite intense socio-economic pressures the municipality has faced, this type of fishing continues today with much of the fervour of the past. For this reason, the Arraial do Cabo beach seiners have been the object of interest of many anthropologists and sociologists trying to understand why some communities have survived while others have not.

These fishers, more than other fishers in the community, represent the historical evolution of traditional fishing practices in the region. For the most part, their fishing methods have not changed for hundreds of years. They are also among the few fishers in the area who do not use bait to attract fish and they also do not move to pursue fish but rather wait for the fish to come to them in selected fishing spots. This practice makes them the most vulnerable to changes in local fish stocks and flows or migratory patterns. It also represents a truly sustainable fishing practice, embedded in the ecosystem that supports it. By studying the institutions and people which have sustained these organisations we hope to achieve a closer

⁷ Extractive reserve is one of the categories created by the 1988 Brazilian constitution for the creation of conservation units. It is a category that accepts *direct* use of the natural resources it harbours. Through a co-operative management approach, a management plan is created which defines the level and type of use, often restricted to traditional local resource users. This differs from other conservation categories such as Biological reserves and Ecological stations that are established for *indirect* use only. Indirect use refers to the benefits society receives indirectly from the establishment of such conservation areas such as the protection of biodiversity, climate stabilisation etc.

understanding of the resilience of social organisations that support these processes along with insight into how resources can be managed successfully and sustainably.

Arraial is also an interesting case because of the existence of these rich informal institutions that have developed over time. These fishers have found themselves surrounded by threats to their livelihoods and it is interesting to see to what degree the newly created extractive reserve can serve as a vehicle for counteracting some of the processes which have undermined the state of their common property resource today.

For these reasons beach seiners were chosen as the primary focus of this study. It would be, though, impossible to isolate their experience from that of those participating in other fishing modalities that have developed over the last sixty years. For this reason, efforts were made to consult fishers from all modalities to place this experience in the broader context.

1.6 Conclusion

As we have seen in this chapter, ecology, history, culture and modernisation have deeply influenced the fishing community in Arraial do Cabo in different ways. Over the last 50 years, this group has struggled to maintain its traditional culture while adapting to these rapid changes. For the most part these influences have worked to destroy local culture and tradition rather than support it. The creation of Brazil's first Maritime Extractive Reserve in this municipality could mitigate against some of these destructive elements.

The following chapters will explore the relationship between this user group community and the newly created extractive reserve. This process begins with a review of conservation policies globally as well as in Brazil. Then, the literature on common property resources is reviewed and elements of

successful regimes are presented. Afterwards, collaborative management regimes are analysed and discussed in order to provide a solid theoretical foundation with which to analyse the Arraial do Cabo case study.

Chapter 2 Conservation Policy in Brazil and Beyond: From Exclusion to Participation

This chapter is divided into three main sections. The first section will review how the idea of people's participation in conservation has emerged as a central theme in global strategies to achieve sustainable development. It will do this by reviewing the outcomes of the main conferences and documents that have addressed this issue over the last thirty years. It will then discuss some of the criticisms of conventional approaches to conservation, which exclude traditional resource users as well as describing some alternatives to these approaches. The second section of this chapter will review the origins of conservation and the exploitation of natural resources within the Brazilian context. This section will start with the period of colonialism and the extraction of Brasilwood and finish with a description of the developments in Amazonia over the past thirty years. The chapter will end with a review of fisheries policy in Brazil and how this policy has recently merged with conservation policy through the expansion of the applicability of the Extractive Reserve conservation category to the realm of fishing communities and the natural resources they depend on.

2.1 Global Trends in Conservation

Over the last hundred years the world has experienced a dramatic shift in the way human beings perceive their relationship with Nature and how this relationship implies certain constraints for human development. Economic development has transformed the world economy and has created opportunities never before imagined for mankind. While impressive, these developments have not come without costs. For one, the benefits of this development have not been evenly distributed. Along with inequality, the market economy has resulted in massive environmental costs. Many of these costs are a consequence of the under-valuation of biological diversity and the environmental services Nature provides. The evolution of paradigms this century reflects the changing strategies which have been adopted to protect the natural resources upon which mankind depends. During the last forty years this relationship has been questioned in terms of its ability to be sustained and in terms of the Earth's ability to endure increased pressures from those countries which have not nearly reached exploitation rates which push technological limits.

Until quite recently, Nature was seen as boundless. Endless expanses of forests, mountains, oceans and other biomes seemed to exist for the sole purpose of supporting economic development goals. In this paradigm often referred to as 'frontier economics', not only was nature seen as being able to provide an endless supply of raw materials to fuel development, but also as a limitless sink for its by-products (Daly and Cobb, 1990; Colby, 1990). In recent years, the scope and scale of Man's dependence on these resources has also become alarmingly clear. Global climate change, accelerated species extinction rates, deforestation and desertification, among others, have provided tell-tale signs of the anthropogenic threats to the planet's resilience. Calls for action are often justified by the recognition that the world's development must be both socially and environmentally sustainable. The protection of genetic and biological resources, along with the

environmental functions that terrestrial and aquatic ecosystems provide, are fundamental in this search for sustainability. In addition, the importance of cultural diversity in this process is slowly becoming recognised. The close relationship that some societies have with their natural surroundings have in many cases protected them and in some even enhanced them through the creation of sacred groves or other locally designated 'protected areas' (Leach et al., 1996).

The emerging debate has resulted in some agreement that the world's resources are, in fact, finite. Suggestions, though, on how life on the planet will deal with these limitations have varied widely. Arguments sway between technocratic approaches which put faith in science to invent our way around these limits to those who argue that the man-environment interface must revert to a symbiotic relationship in which human activities enhance Nature's resilience. Between these two extremes lies a plethora of views which have moulded contemporary environmental policy. Sustainable development has been heralded as the new development paradigm. Although policy makers disagree over the definition of the concept, several options emerge as elements of most initiatives to operationalize sustainable development.

Conferences and Conservation Strategies

The notion of sustainable development is quite new and the broad support it now enjoys has developed over the last 20 years. The different conferences that have been held (and their resulting documents) during this period mark the evolution of ideas related to how to operationalize the concept. The Brundtland Report boasts the most recognised definition. This well-known report defines sustainable development as development that 'meets the needs of today without compromising the ability of future generations to meet their own needs' (WCED, 1987). Suggestions as to how life on the planet will deal with these limitations have varied widely. Lele argues that

the vagueness in the Bruntland definition is one of the strengths of the sustainable development debate (Lele, 1991). By not defining exactly what is to be sustained and for how long stakeholders from a range of backgrounds have found common ground in the concept.

The UN Conference on the Human Environment, which took place in Stockholm in 1972, was the first of the series of conferences that drew the world's attention to the environmental costs of industrialisation. Paul Erlich's 'Population Bomb' and Rachel Carson's 'Silent Spring' fuelled neo-Malthusian fears that provided impetus for the Stockholm conference. Focusing on a 'global crisis', this conference was widely criticised for its doomsday approach. Also, besides deliberate attempts to integrate international concerns into its agenda, the Conference was criticised for being embedded in a Western construct of environmental issues that had little relevance for developing countries (i.e. acid rain, pollution).

Although Stockholm is considered one of the key events in the emergence of global environmental concern, it was unable to ground these criticisms and fears into a practical guide for policy intervention and global action (Adams, 1990). There was little discussion on the links between poverty and environmental degradation nor were the more political aspects of these issues addressed. Besides drawing attention to (an albeit limited list of) global environmental concerns, Stockholm was also the birthplace for the United Nations Environment Program (UNEP), the first United Nations unit (not agency) created to deal solely with environmental issues. The World Conservation Strategy and later the Bruntland Report built on the strengths of the Stockholm conference but made some of the same mistakes.

The World Conservation Strategy (IUCN, 1980) prepared by the International Union for the Conservation of Nature (IUCN) followed eight years later and presented a slightly more balanced perspective than its predecessor. It intended to show governments, industry and commerce how

conservation can contribute to development objectives (Adams, 1990). Its three main objectives were:

1. To maintain those ecosystems that are 'essential for food production, health, and other aspects of human survival and sustainable development' (para 2.1), also referred to as life support systems.
2. To preserve of genetic diversity.
3. The sustainable development of species and ecosystems.

These objectives were then broken down into a list of necessary requirements (Adams, 1990). Requirements were based on a 'no regrets' approach whereby the aim was to retain future options for the use of natural resources.

One important element of this document was the fact that it integrated the concept of conservation into all areas of the economy (health, energy, industry) whereas it had previously existed as a distinct entity divorced from reality. In this vein, the WCS focused not only on the ecological aspects of sustainability but also how these processes interfaced with economic development. In general, the WCS managed to reach a broader audience than the Stockholm conference had even though many of its fundamental principals were similar. Questions of social justice, inequality were touched upon but were deepened in later documents/conferences. The document is criticised for focusing on local scale development without giving proper weight to the political and economic systems that reinforce issues of inequality and environmental degradation. The WCS, though, did recognise the need for 'people-centred' development and a wider distribution of the benefits. Although the idea of 'sustainable development' was introduced in this document, it was not until the World Commission on Environment and Development (WCED) in 1987 that a multidisciplinary group gathered in an attempt to operationalize the concept.

The Bruntland Report aimed to stimulate a multilateral impetus for addressing global environmental problems. This document was more successful than its predecessors in placing the sustainable development debate within the economic and political context of international development (Adams, 1990). 'Our Common Future' is often referred to as the marriage of environment and development. This was because one of the main premises of the document was that environment and development cannot be separated (Adams, 1990). Besides reconciling environment and development goals, the WCED conference is also known for putting the need for people's participation on the agenda. The report argues that environmental concerns need to be seen in relation to the underlying roots of poverty and inequality. It was understood that environmental degradation was often caused by poverty and inequality but that it could also be the source of these problems as well. In this way, the Bruntland Report put people at the forefront of any strategy for sustainable development.

While the outcome of the WCED was significant because it enjoyed support from a wide audience (economists, sociologists, environmentalists, etc.) it was not clear how the proposed agenda for action would work in practice for achieving sustainable development goals. Its focus on economic growth as the solution to environmental degradation left many wondering how this could possibly be sustainable (Adams, 1990). Although a rough outline for action was defined, it was only later, as a result of the 'Earth Summit', that practical guidelines for achieving sustainable development were defined.

The United Nations Conference on Environment and Development (UNCED), held in Rio in 1992, was a watershed event in the history of international negotiations, laying the foundation for a new global partnership to achieve sustainable development. The Earth Summit, as it was dubbed, resulted in a number of important conventions and documents related to this end, namely, the Convention on Biological Diversity, the

Framework Convention on Climate Change and Agenda 21. Agenda 21 is the forty-chapter action plan emanating from UNCED which analyses and provides recommendations across the entire spectrum of environment, development and social issues.

Chapter 17 of this document is entirely dedicated to issues related to ocean and coastal resource conservation and is one of the longest and most complex (UNCED, 1992). This chapter does not however specifically address the needs of small-scale fishing communities or their need for and potential contribution to marine and coastal zone conservation. On the other hand, the chapters related to forest resources stress the need to recognise local organisations and their ability to manage their own resources. Importantly, these sections formally acknowledged the idea that collective ownership of natural resources would not inevitably lead to environmental degradation as previously thought. The UNCED meeting reinforced the global importance of biodiversity conservation and, for the first time, stressed the need to involve local people in conservation initiatives. The Earth Summit called for local-level solutions, participatory approaches and the development of national strategies that incorporated civil society into conservation approaches.

As the Conference proceedings took place in Rio de Janeiro, the Earth Summit was an important opportunity for Brazil to improve its 'environmental' image. In fact, the purpose of hosting a global environmental conference in Brazil was, in part, to improve this image. During the years preceding the Conference, much attention had been drawn to the plight of Brazilian forests and indigenous groups that were paying the costs of destructive activities in the Amazon. As much pre-Conference attention was drawn to deforestation in Amazonia and its 'victims', the Brazilian Government was pressured to take action before the beginning of the Conference.

The Sarney government began with the abolition of some of the subsidies and other regulations which encouraged deforestation as well as the suspension of large government projects (Kolk, 1998). Later, under the new leadership of Fernando Collor, policies towards the future of the Amazon region changed from renunciations of foreign interference to a more collaborative approach recognising the need for foreign assistance. In this vein, Collor signed a programme of co-operation with the G7 countries to promote the sustainable development of Amazonia, the Pilot Programme for the Protection of Brazilian Rainforests. This was to be the largest ever multilateral environmental fund ever granted to a single country. This agreement will be discussed in more detail later in this chapter.

2.2 Protected Areas

An element common to the debates, discussions and strategies for conservation (i.e.: Caring for the Earth, World Conservation Strategy) that have emerged, is the establishment of protected areas. It is argued that National Parks, nature reserves, and biosphere reserves, among other protected areas, are the cornerstone of any conservation strategy and a first step on the path to sustainable development (Brandon et al, 1998). National conservation strategies worldwide are being developed in order to increase the percentage of land under these types of arrangements.

Over the past century, conservation approaches have revolved around the creation of protected areas. What is expected of them and how they are seen, though, has changed greatly. The design of protected areas has evolved from the creation of small refuges for particular species to the protection of entire ecosystems that are large enough to maintain most, if not all their component species. New approaches also call for the need to connect isolated parks and reserves to create networks of interrelated conservation areas. While other strategies are being pursued simultaneously (agro-forestry, organic farming, etc.), protected areas remain the cornerstone of all

conservation strategies aimed at limiting the reduction of the planet's biodiversity (e.g. World Conservation Strategy, 1980; Caring for the Earth, 1991).

In situ and ex situ conservation

Protected areas are an example of *in situ* conservation whereby biological diversity is preserved within its natural habitats. It is possible to conserve some plants, animals and other genetic resources outside of their mother ecosystem. It has been done to a large extent in zoological parks and gene banks. This process is called *ex situ* conservation. This high-technology approach, although useful, is criticised as a replacement for *in situ* conservation largely because of its exorbitant cost and the fact that these initiatives run a high risk of loss resulting from technical failure (Lipton, 1989).

In situ – or on-site conservation through protected areas such as national parks, sanctuaries and reserves has always played an integral part in strategies to conserve biodiversity and protect the environmental functions that these areas provide (IUCN/UNEP/WWF, 1991; Glowka, 1994). The Convention on Biodiversity signed at the Earth Summit in 1992 recognises *in situ* conservation as the primary approach for the conservation of biological diversity. The 1980 World Conservation Strategy prescribed increasing the total coverage of these areas to ten percent (nearly doubling the current coverage) of the world's land surface to mitigate the rate of biodiversity loss. This recommendation is particularly relevant for Brazil as their current coverage at approximately 3.8 percent is far below the Latin American average (Barbanti, 1994; IUCN et al., 1997).

In the last twenty years, the role of protected areas in conserving and protecting environmental services such as the stabilization of water flow patterns and climatic change, barriers against weather damage and the provision of nurseries for fisheries has grown in recognition. Most of the

world's wild plant and animal species depend on the remaining areas of land that have managed to avoid large-scale development. Habitat loss and degradation are the leading threats to biodiversity. These areas include different types of ecosystems such as tropical rainforests, tundras, coral reefs and savannahs. Usually species are found within a particular ecosystem and have limited geographic ranges. Therefore, the elimination of a unique habitat will lead to the irreversible loss of all species and genetic resources that are completely dependent on that habitat for their survival. Protected areas are seen as the most effective available method of maintaining large enough populations of species to ensure the genetic pool and physical range necessary for species survival.

Traditional approaches to conservation in the North have emphasised the establishment of protected areas that are independent of human interference, in the attempt to conserve examples of untouched ecosystems. The first formal protected area established, Yellowstone National Park in the United States, is often cited as the source of this trend (Diegues, 1998; Ghimire and Pimbert, 1997a; Brandon et al., 1998). Yellowstone was created in the late nineteenth century and along with others that followed in its example, such as game reserves in Africa, it was established mainly for recreational purposes (Munasinghe et al., 1994). US conservationists at the time maintained that the 'primitive and natural' wilderness should be preserved untouched (Kothari, 1995).

The 1964 Wilderness Act established a system of protected areas in the United States. This legislative framework defined wilderness as 'an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain' (in Diegues, 1998: 15). In order to maintain this ideal, traditional protected area management systems, often dubbed 'command and control style' or 'fences and fines', have used negative incentives for border protection. As their nickname suggests, these management systems have gone to extremes to keep people

separate from nature. By alienating local people, these strategies have turned residents into squatters, hunters into poachers, and gatherers into trespassers in newly established protected areas.

Interestingly, this 'people out' approach to conservation was not followed in Europe where there is a much higher percentage of people-inclusive protected areas. The landscape of densely populated Europe went through massive transformations centuries ago, leaving most of its larger species extinct. As a result, the European concept of a national park is strikingly different, including landscapes that have a much stronger human imprint and in many cases require human action to be maintained in their present shape (Kramer et al., 1997). Approaches to protected areas in the colonial world, though, did adhere to the restrictive principals applied to parks in the U.S. During the end of the 19th century and beginning of the 20th, game reserves were created in the colonies for the entertainment of European expatriates. These reserves excluded traditional African users, limiting the use of huge expanses of savannah to a small minority. In this vein, while white men were hunters, black men became poachers (Adams, 1990).

Today, there are approximately 8,500 protected areas throughout the world. Protected areas exist in 169 countries, covering approximately 7,734,900 square kilometres or some 5.2 percent of the Earth's land area. Strictly protected areas (national parks, strict nature reserves, natural monuments) cover three per cent of the Earth's surface. Of these areas, 1508 are Yellowstone-style national parks (Pimbert, 1995). Of these, the majority involves terrestrial areas while marine conservation has lagged behind. Most of the world's biota is found in the sea and marine communities are subject to a number of potentially adverse influences, including over-fishing, habitat disruption and particularly pollution from land-based activities.

Following the 1992 Earth Summit in Rio and the ratification of the Biodiversity and Climate Change Convention, developing countries have

come under increasing pressure to expand areas under protected regimes. Because much of the pristine landscape that once covered the West has now been commercially exploited, industrialized countries have come to recognise the importance of preserving these resources in developing areas. Today, most new protected areas are being created in developing countries (Ghimire and Pimbert, 1997b). Because of their slower rate of industrialisation, among other reasons, vast areas of relatively unexploited land still exist in the Southern Hemisphere.

The experience of the West, particularly that of the United States, has often been used as a blueprint for setting up protected areas in developing countries. It is often argued that, because the context, circumstances, resources, historical and cultural experience differ from their northern counterparts, this approach is inapplicable and inappropriate and often socially unjust when applied to developing countries (Ghimire and Pimbert, 1997a). It is also argued that solutions require case and context specific approaches to protecting the natural capital in developing countries while simultaneously supporting and strengthening the ability of local level stakeholders to meet their needs now and in the future (Chambers, 1994; Diegues, 1999a).

Partly due to the assumption that conservation is the prerogative of natural scientists, theories in biological science have dominated the development of these types of conservation strategies. Island Biogeography Theory, for example, has justified the establishment of centrally planned, 'people out' parks. This theory contends that islands of representative ecosystems are sufficient to preserve viable populations of plant and animal species and protect ecosystems. This is because studies have shown that as the area involved increases, the number of species present within that area increases more slowly (Begon, 1996). This theory is based on the notion of Pleistocene refugia where islands of non-frozen habitat held many important species during the last ice age. But the reality of these inland or on-shore 'islands'

for protected areas negates the security that their oceanic analogy implies. Instead of warm tropical waters lapping around their edges, parks are faced with threats stemming from the economic, political and societal interactions occurring around and often within their borders. Dr. Russell Mittermier, president of Conservation International said at a recent meeting in Brazil that ‘The reality is that many parks and other protected areas have become isolated islands in an ocean of agricultural land or entirely degraded areas’ (<http://forests.lic.wisc.edu/gopher/brazil/>).

2.3 Critique of the dominant paradigm

The characteristics of developing countries, including Brazil, complicate the usefulness of this approach even further. While governments do set aside areas for conservation, they are usually under tight financial constraints and protected areas most often have a tough time fighting for limited funds. Countries undergoing strict economic readjustment measures and external debt repayment do not place conservation high on the political agenda. Often, there are residents already living in areas set aside for conservation and there is insufficient funding to provide incentives for relocation or to finance resettlement schemes. Limited funds also make command and control style management prohibitive. Vast areas, often larger than entire countries, are impossible to manage using these traditional management strategies⁸. Also, vested interests and high earnings from resource extraction can put protected area personal in a difficult position to fine illegal activities. Minimal technical capacity, weak management and limited funds result in isolated protected areas that exist on paper but have had little success in protecting natural resources.

It is widely argued that the negative social impacts of traditional conservation strategies are reason enough to change course (Chambers,

⁸ An example of this is the recent establishment of the Amana Reserve in Amazonia that covers 2,350,000 hectares – 9,180 square miles in an area about the size of Belgium.

1997; Kothari et al., 1996). As Kothari, a promoter of participatory conservation in India states, 'A protection strategy with alienates local communities is unjust to them and disrespectful of their fundamental rights, as also short-sighted for conservation.' Authors assert that while parks may see the socio-economic activities taking place in and around their borders as a threat to conservation goals, local people often regard the establishment of protected areas as a direct threat to their livelihoods.

When protected areas are established, local people are frequently removed from their settlements and provided with few or no alternative sources of employment or income. Where resettlement provisions are made, they are generally insufficient or inappropriate (Ghimire and Pimbert, 1997a). Forced resettlement of local residents and alienation from natural resources upon which local livelihoods depend are examples of how traditional approaches to conservation have been socially unsustainable and how protected area planners have ignored the rights of local people and their relationship with the resources surrounding them.

Examples of this social exclusion process begin with the alienation of Native Americans from their lands during the creation of Yellowstone National Park in the 1870s. But they do not stop there, for removing traditional residents from their land or restricting access without offering viable alternatives in order to create a reserve or park continues to be an important issue in protected area creation. Authors arguing for participatory conservation defend people's involvement in conservation by saying that rural people deserve to have access to the resources required to meet their basic needs, economic safety and where possible, upward social mobility. In other words, conservation programmes are only valid and sustainable when they have the dual objective of protecting and improving local livelihoods and ecological conditions (Ghimire and Pimbert, 1997b).

An emerging paradigm for conservation and development

Increasingly, conservation programmes are attempting to take an alternative approach to local-level conservation. Two broad characteristics are common to these initiatives. First, local people are not only considered throughout the process but they are often active participants contributing to the conservation effort. Second is the idea that conservation areas should not be isolated as was once thought essential, but should be interconnected with other areas under different management regimes creating a 'mosaic' of land-use in a given region, with each area contributing to biodiversity conservation in differing degrees.

The emerging paradigm seeks to integrate conservation and development goals. It is in part a reaction to the criticisms of past approaches and is supported by the development of new theories in both the social and natural sciences. It recognises that protected areas cannot single-handedly protect all the natural processes that they were designed to conserve. It is now widely believed that much larger areas are needed to insure a genetic pool for species large enough to ward off threats of extinction and for the maintenance of other ecological processes (IUCN, 1996; Mairaua, 1996). This 'landscape' or 'bio-regional' approach to conservation depends on the involvement and support of the people living in these regions. This new paradigm emphasises the need to involve local resource users into conservation strategies reconciled with the livelihood strategies of local communities, a process labelled 'productive conservation' by Hall (1997a). It is the result of the recognition that the ability to preserve natural resources is inextricably linked to those people who interact with them (Caldecott, 1996). That is, conservation success is dependent on the ability to meet the dual goals of conservation and development. While previous strategies have alienated local communities, the new paradigm sees sustainability embedded in partnerships with them.

This is reflected in the policies of international environmental NGOs such as The Nature Conservancy (TNC), World Conservation Union (IUCN) and the World Wide Fund for Nature (WWF) that have made working in partnership with local communities a top priority for biodiversity conservation (Brandon et al., 1998; IUCN, 1996).

‘One of the main challenges facing those responsible for protected areas is putting the planning and management of protected areas in their broader context of regional and environmental planning, in particular by looking beyond the boundaries to work with local people’ (IUCN, 1996: 3).

The last decade of conservation and social research has provided a number of examples of projects with such goals. Figure 2.1 presents examples of the different types of Integrated Conservation and Development Projects (ICDPs). These include biosphere reserves, multiple use areas, buffer zones and large scale planning units.

Integrated Conservation and Development Projects

The view that underlies Integrated Conservation and Development Projects was underscored at the 1982 World Parks Congress in Bali – that “protected areas in developing countries will survive only insofar that they address human concerns” (Western and Pearl, 1989:134). Underlying the Integrated Conservation and Development (ICDP) approach is the belief that unless resource holders perceive conservation to be in their interests, sustainable conservation cannot be achieved (Caldecott, 1996). The challenge is to establish a nexus between the interests of resource custodians and the objectives of conservation management. The idea is that this may be achieved by improving the welfare of resource users through the promotion of ecologically sustainable social and economic development. It is necessary under these regimes to demonstrate that specific ecosystems, and the fauna

and flora they contain have tangible economic values that can be sustainably utilised to generate productive values for local resource owners. Such values will need to be comparable to the income available immediately from alternative development.

Clearly, successful examples of ICDPs are few and far between. This is partly because the field is relatively new and many projects are too young to be evaluated in these terms. Another reason is that ICDPs are intrinsically complicated and complex projects. A few examples do stand out in terms of their ability to create direct links and incentives for community involvement in conservation. They include CAMPFIRE from Zimbabwe where local residents co-manage wildlife tourism alongside NGOs and local government and share the revenue. Another is community eco-tourism in the Annapurna Conservation Area in Nepal where communities share in the benefits of conservation through tourism. A variety of projects is also emerging in the Brazilian Amazon and Atlantic Rainforest (see the following for more details Wells and Brandon, 1992; Lutz et al., 1996; Ghimire and Pimbert, 1997b, Hall 1997a).

Those theories that have influenced the development of ICDP initiatives at the local level have also put pressure on governments to create conservation policies which take the social impacts on conservation into consideration. The government of India, through its Joint Forest Management scheme, whereby communities share responsibility over forest resources with government, is an example of this (Kotari, 1998). Another example is the Extractive Reserve category in the Brazilian National System for Conservation (SNUC) that incorporates local resources into the design and management of these direct use reserves.

There are a number of different types of ICDPs emerging around the world. Although they share some characteristics they differ greatly in the degree to which communities actually keep or gain control over resources. Some

ICDPs are often no more than charity given to communities living in or around protected areas in the hope that it will provide sufficient incentive for them to ‘follow the rules’. These are often unsuccessful and unsustainable. Others attempt to go much farther in empowering the community by giving control over resources to these groups. These collaborative or co-management arrangements are often complicated projects. For the most part, these initiatives are still in their early stages and there are still many challenges ahead. Some of the different types of ICDPs are reviewed in the box below:

Figure 2.1 Examples of integrated conservation and development projects

ICDPs are land uses, activities and projects whose primary aim is to foster conservation in parks by promoting socio-economic development to provide local people with livelihoods that do not threaten the protected areas resources. They are based on the premise that management of protected areas must reach beyond traditional conservation activities inside protected areas to address the needs of local communities outside the boundaries (Wells and Brandon, 1992). Some examples are given below.

Biosphere reserves first appeared in 1979. They have a protected ‘core area’ surrounded by a ‘buffer zone’ and then a ‘transition area.’ Buffer-zone uses are limited to activities compatible with the core area while development activities involving local communities are intended to take place in the transition area. There are approximately 350 biosphere reserves worldwide.

Multiple-use areas are intended to sustain the production of water, timber, wildlife, pasture, and outdoor recreation. The conservation of nature is oriented to supporting economic activities. In some cases, zones are delineated to achieve specific conservation objectives. When this occurs, multiple-use areas are virtually identical to biosphere reserves, except that they lack the official designation. The Annapurna Conservation Area in Nepal is such a multiple-use area.

Buffer zones are areas peripheral to a national park or equivalent reserve, where restrictions are placed upon resource use or special development measures are undertaken to enhance the conservation value of the area. In ecological terms, buffer zones promote land uses and practices that are compatible with contiguous protected areas.

Large-scale planning units, such as regional conservation areas, attempt to link core protected areas, such as parks, with a progression of land uses. Uses compatible with biodiversity conservation, such as managed forests, are located next to parks, while less compatible activities (roads, dams, urban land uses) are located farther away. The CAMPFIRE project in Zimbabwe is an example of this type of initiative.

Source: adapted from (Brandon et al., 1998:94)

2.4 Brazilian Context

The magnitude of Brazilian biodiversity is difficult to grasp. This is true not only for those who set eyes upon it 500 years ago but also in modern times. With thirty-three eco-regions represented, Brazil is one of the most biologically diverse countries on the planet. It is often referred to as a country of ‘mega-diversity’. Coastal and Marine biomes alone cover an area of about 3.5 million km², under Brazilian jurisdiction, with cold waters in the southern and south-eastern coasts (Argentine zone) and warm waters in the eastern, north-eastern and northern coasts. These biomes support a wide range of ecosystems that include coral reefs, dunes, wetlands, lagoons, estuaries and mangrove swamps. Clearly, with 8,174 km of coastline, 54,000 km of navigable river systems, the sustainability of coastal zone development is an issue of global importance.

Resource Exploitation in Brazil

With this wealth of natural capital, it is no surprise that, since the onset of colonisation over 500 years ago, the exploitation of Brazil's natural resources has been at the forefront of international interest and to national development goals. Since the colonial period, these resources have been exploited for economic gain at huge environmental cost. The country's colonial history is marked by a series of extractive practices beginning with the Pau Brazil or brazilwood trade followed by the extraction of gold, minerals and semi-precious stones. After independence, the focus was on the boom-and-bust cycles of a variety of mono-crops. With sugar-cane

plantations in the northeast on a downswing during the late 19th century, sights were set on the coffee plantations in the south and southeast and the extraction of rubber from the North.

Initially, unrewarded with the precious metals found by the Spanish in other areas of the continent, early Portuguese colonisers were unsure of what Brazil had to offer the Crown. Brazil's coastal region was the sight of most early settlements, since formal development initiatives for Amazonia and the other northern states started only in the mid-nineteenth century. For the first few hundred years of occupation, brazil wood was the focus of extractive operations. The dyes extracted from this native species contributed to the riches of the Portuguese crown. In fact, because of its value, as well as the fear of French competition, in 1534 the crown declared all brazil wood trees royal property. This measure remained in effect for over three centuries, probably ending with near extinction of the species and the decimation of the Atlantic Rainforest in the process (Dean, 1995).⁹

Sugar plantations were the first attempt at large-scale agricultural production, as opposed to extraction, in the New World. Thanks to a virtual monopoly and increasing European demand, these plantations were highly profitable. The fertile coastal zone of the Northeast was the main site selected for this type of monocrop cultivation that resulted in high rates of deforestation in this area. These areas of the coastal zone possess some of the most degraded lands of what remains of the Atlantic Rainforest.

The eighteenth-century Brazilian gold and diamond strikes were the most important in the colonial New World. From 1700 to 1800 a million kilograms of gold were officially recorded along with the extraction of over 2.4 million carats of diamonds (Dean, 1995). The impacts of these finds

⁹ It is estimated that only approximately 7% of the original Atlantic Rainforest biome still stands. Although the exploitation of brazilwood was not the only cause, it began a process that continues today.

were not limited to the destructive mining activities themselves but, more importantly, contributed to the increase in population density. Successful mining attracted Portuguese immigrants in search of promised riches. This trade also increased the demand for African slave labour.

After Brazil gained independence from Portugal, the country's economy became dependent on the cultivation of crops for export to the West. During the coffee boom, much of the forested area in the Southeast of the country was decimated for the purpose of planting this crop. By the late 1800s coffee production provided two-thirds of the country's exports. With the abolition of slave labour, immigrants came from all over Europe to work these plantations. During this period, over 800,000 European immigrants, mostly of Italian descent, came to work on the coffee *fazendas* primarily in the south and southeast. With the onset of global economic decline in the post war era, coffee prices plummeted along with the industry.

Another economic boom followed as a result of the earlier discovery of the vulcanisation process that turned rubber into an important industrial material. Demand for *Hevea brasiliensis*, coming from estates in the Amazon region escalated with the invention of the pneumatic tyre and the expansion of the automobile industry in the U.S. during the late 19th and early 20th century. However, the rubber boom soon turned sour as cheaper and better sources of the material became available on the world market principally from estates in Malaysia. The colonial economy, constituted by boom-and-bust cycles of exports of agricultural products (especially sugar and later coffee and rubber), led to widespread devastation of the forests, and especially of the coastal forest. When international prices fell for one crop or resource, or if the resource was exhausted, efforts turned to other resources, leaving in their path a wake of environmental destruction.

Resource conservation in Brazil

The question of resource conservation evolved during the post war period from utilitarian concerns for the continued viability of commercial extraction to preservationism and environmentalism. It was only during the first half of the nineteenth century that formal initiatives to regulate the exploitation of natural resources occurred. In 1934, Brazil's First Conference for the Protection of Nature was organised by the Sociedade dos Amigos das Arvores (Society of Friends of the Trees) (Dean, 1995). In the same year, the first Hunting and Fishing Law (Codigo de Caça e Pesca), the Mining Law (Codigo de Minas), the Waters Law (Codigo das Aguas) and the Forest Law (Codigo Florestal) appeared (Diegues, 1998).

At the time, environmental policy here (as abroad) was limited to the establishment of protected areas. Specifically, islands of biodiversity were 'preserved' like museum pieces relying on command-and-control methods to protect their worth. These methods were characterized by strict vigilance and exclusion of human intervention in park areas as well as top-down decision-making arrangements. This approach was based to some degree on island biogeography theory that relates the abundance of species to the relative size of land masses (Dean, 1995). It was believed that by protecting these 'islands' a high percentage of the diversity present in the larger ecosystem would be preserved.

In this vein, in 1937, Itatiaia in the Serra da Mantiqueira in the westernmost point of the State of Rio de Janeiro was decreed Brazil's first national park. Modeled upon the U.S. interpretation of what a parks purpose should be, Itatiaia was created to encourage scientific research and offer leisure facilities to urban populations. This park was established by Article 9 of the Forest Law, approved in 1934, which defined national parks as 'natural public monuments that perpetuate the primitive forest composition of those areas of the country which, because of their unique and outstanding value, are worthy' (Quintão, 1983: 43). It was only fourteen

years later in 1948 that a second park was created. In September 1944, the National Parks Section of the Forest Service was given the responsibility of directing, supervising and co-ordinating these parks. Also in this year, the objectives of national parks were established. These were to conserve the areas under their jurisdiction for scientific, educational, aesthetic and recreational ends; to promote the study of the flora, fauna and geology of the respective regions and to organise regional museums and herbariums (Diegues, 1998).

Most of the National Parks created during this period were established in the densely populated south and Southeast of the country. It was only later, after agricultural expansion had led to the destruction of large tracts of forestland in the North of the country, that protected areas were created here. As opposed to early protected areas created for aesthetic and scientific reasons, the proposals for the creation of conservation units in the Amazon were a reaction to the rapid deforestation in the region and the need for protection.

Amazonia

Much of the environmental destruction of the Amazon region during the period of military rule was the result of a series of centralised development initiatives which focused on the need to consolidate Brazil's hold on this vast and sparsely populated frontier (Hall, 1989). Colonisation programmes were developed (and highly subsidised) in order to fulfil a variety of geopolitical objectives. Populating the region was seen as a method of protecting it from outside military aggression. These schemes were also seen as an opportunity to reduce the population pressures of the northeast of the country as well as to modernise the region. New technologies were to replace those that were regarded as 'primitive and backwards' (Hall, 1997a). By providing opportunities elsewhere, the government hoped to diffuse the agrarian tensions in the south of the country resulting from increased

mechanization and fewer jobs. It was also believed that these schemes could provide a refuge for those fleeing the droughts that plagued the Brazilian northeast.

Basing their development approach for the region on 'growth pole' theory, it was thought that concentrating regional efforts into 'development poles' would increase employment opportunities and incomes. In 1970 the Programme of National Integration (PIN) proposed fifteen development poles in Amazonia, investing in a series of high cost road works such as the Trans-Amazon Highway linking the nation's new capital city Brasilia to the northeastern states and to the new frontier, Amazonia. Colonisation programmes were developed to attract small farmers searching for land and new opportunities. For the most part, settlers fared badly due a number of factors such as the poor soil quality of allocated tracts as well as the lack of technical and agricultural support as well as weak links to the marketplace (see Hall, 1989). The POLOAMAZONIA Programme was an example of this where billions of development dollars were spent subsidising highly unsustainable development practices such as cattle ranching and logging (cattle ranching alone received over \$5 billion in subsidies) (Hall, 1997a). The combined impacts of unsustainable economic activities such as cattle ranching, highway construction as well as large-scale colonisation programmes were the driving factors of deforestation of Amazonia during the 1980s.

Amazonia reproduced Brazils heavily polarised land ownership structure as a result of this development pattern. Conflicts between peasant farmers, indigenous groups and cattle-ranchers generated poverty, violence and deforestation as well as rapid environmental degradation. Cattle ranching together with slash-and-burn agriculture were held responsible for more than 80 percent of deforestation in Brazilian Amazonia, the remainder accounted for by logging and mining (Hall, 1997b).

It was at the height of the military regime that most conservation areas in Brazil were created (Diegues, 1998). These initiatives were highly centralised and did not consider the welfare of people who lost access to important resources or were even expelled from areas designated for these purposes. During this period, protected areas were created by decree, leaving little room for civic participation in the process. In fact, government control over national territory was seen as a form of broader social control. The authoritarian characteristics of the military regime were an obstacle to class mobilisation in response to these initiatives as they were not tolerated.

At the time, outside pressure to create protected areas was also coming from international development banks (after being criticised themselves for their abominable environmental track record exemplified by their funding of environmentally destructive projects such as POLONOROESTE). In this process, the needs and welfare of local people living in and around these areas were not contemplated. In fact, local people were seen as having no constructive role to play. During this period, both local populations and the environment were seen as obstacles to national development.

Onset of Democracy

With Brazil's gradual return to democracy beginning in the mid-1980s, approaches to dealing with the relationship between conservation and development began to evolve for a number of reasons. Greater freedom of expression created space in civil society enabling the organisation of groups empowered with increased political freedom to articulate their demands. A critical factor at this point was the international outcry that resulted from the death of Chico Mendes. The appearance of socio-environmental movements, as we will see later in this section, has had an enormous impact on changing traditional assumptions about the role of local resource users in protected area planning and management. There has been growing international pressure on the Brazilian Government to make their

conservation approaches more participatory. Much of this pressure originated in the debate and resulting documents signed at the 1992 Rio Summit which emphasised the importance of local participation in the conservation process.

In 1990, the National Environmental Programme was set up with support from the World Bank and aimed to strengthen IBAMA (Brazilian Environmental Protection Agency) as well as the new state environmental agencies. It was officially thought that the decentralisation of environmental control from federal to state level would make this process more effective. New policies officially recognised for the first time the need to promote sustainable forms of natural resource use to benefit local populations. Specifically, one type of federal conservation category created during this period, the Extractive Reserve category, allows not only for the presence of populations within the units boundaries but actually encourages permanent occupation by traditional populations. In fact, the creation of a protected area falling in this category is only warranted in areas where these groups are present.

Other than the extractive reserve category, the UNESCO Biosphere Reserve concept has been brought to Brazil providing other possibilities for heightened participation in the conservation process. The first created in Brazil stretches across a significant part of the Atlantic Rainforest. Because it covers such a large area, it requires the co-ordination of many states and many more municipalities in order to implement a comprehensive management plan. So far, this initiative has not been what many socio-environmentalists once hoped it might be as it does not provide for significant levels of participation in decision-making or in its management structure (Diegues, 1998).

The G7 Pilot Program to Conserve the Brazilian Rainforests (PPG7), launched in 1993 and operational in 1995, is providing an important

impetus for the development of socially sustainable conservation initiatives. The specific objectives of the programme are:

'i) to demonstrate the feasibility of harmonising economic and environmental objectives in tropical rainforests; ii) to help preserve the huge genetic resources of the rainforest; iii) reduce the Amazon's contribution to global carbon emissions; and iv) to provide another example of co-operation between developed and developing countries on global environmental issues' (WB/CEC, 1991:3).

This initiative is embedded in the concept of sustainable development and therefore supports activities that aim at conserving the environment through development as well as development that does not threaten its natural resource base. An example of this effort is the proposal to set up five conservation 'corridors'; three in Amazonia and two in the Atlantic Rainforest. It is hoped that this bioregional strategy will help conserve larger areas under a wider variety of protected regimes.

Today, there are eighty-four federal indirect use¹⁰ conservation units in Brazil (national parks, biological reserves, ecological reserves and ecological stations), covering approximately 1.85 percent of the country. This represents a paltry figure in comparison with the world average of six percent. It is estimated that of these, 36 percent are occupied by humans (51 percent of National Parks, 26 percent of Biological Reserves and 28 percent of Ecological Stations) (Barbanti, 1994). Most funding goes to the indirect use protected areas with direct use protected areas such as extractive reserves and APAs¹¹ receiving very little. From 1989 to 1997, only two indirect use protected areas were created. During this period, the

¹⁰ Indirect use conservation units are those whose benefits (such as species conservation, watershed protection etc.) can only be consumed indirectly. This type of reserve differs from direct use conservation units. Direct use conservation units are those which allow for the sustainable use of resources within the reserve. For example, in the case of a marine reserve, direct use could allow for fishing to take place within the reserve boundaries.

¹¹ Environmental Protection Area (Area de Protecao Ambiental)

ability of the federal government to manage these areas has diminished. This is partly because of the lack of funds available for IBAMA to carry out its mission. With only one employee for each 370 km² of protected area along with a general lack of infrastructure and equipment, IBAMA does not have the means to command and control the borders of its protected areas, much less build educational/informational centres and other necessary park infrastructure (Barbanti, 1994).

2.5 Emerging trends in conservation in Brazil

A new conservation paradigm is emerging in Brazil which goes beyond crude protectionism and which offers alternatives to past approaches. Command-and-control style monitoring is slowly being recognised as important but insufficient on its own for controlling environmental degradation (Hall, 1997a). It is also becoming clear that U.S.-style parks require U.S.-style budgets, something that developing countries, including Brazil, do not have. The environmental debate has broadened here to a large degree to include the potential for integrating local people into conservation planning. This controversial debate is beginning to bring in the experience of sociologists to a field that was monopolised by natural scientists.

Over the last ten years, there has been an increase in attention given to the social impacts of the creation of conservation units. This is partly a result of a process of mobilisation by forest dwellers to protect their livelihoods from predatorial encroachment as well as a realisation by parties interested in setting up conservation units that the financial costs of excluding local people are prohibitive and the resulting social costs unjustifiable. This is particularly so as local people, instead of being seen as the cause of environmental damage, are under certain circumstances being considered as potentially the best stewards of the environmental resources upon which their livelihoods depend.

The rubber-tappers of Amazonia, for instance, are probably the best known example of environmental grassroots action in Brazil. During the 1980s, through peaceful means and through civil organisations, this group managed to draw international attention to destructive development policies that were not only environmentally unsound but also socially unjust. The result was the creation of a new category of conservation unit, the Extractive Reserve. Details of the evolution of this category and how it has developed and been adapted to different settings will be discussed in later sections.

Also in Amazonia is the Mamiraua Sustainable Development Reserve. Initially, those working towards the creation of this reserve thought that it should be categorised as a federal level Ecological Station. The implication of establishing a reserve under a category that does not allow direct use by local resource users would be that the area's resident community would have to be resettled. After years of living and working in the area these same conservationists realised that if they were to remove all inhabitants, in a few years the conservation unit would be defunct. Not only did they consider resettlement to be socially unjust but also politically unfeasible (Mamiraua, 1996). As there were no suitable federal level conservation categories, they lobbied for the creation of a new state-level category called a 'Sustainable Development Reserve'. Both the battle of the rubber-tappers for legal protection of their lands and livelihoods, as well as the need for researchers setting up Mamiraua to create a new category to fit their needs, are clear examples of indicators that the old system was not effectively addressing the conservation needs of society.

SNUC

The issue of redesigning and consolidating the Brazilian protected area framework is extremely relevant today. The debate and discussion of what

changes should be made and what form this new system would take has been on going since 1992. The process has culminated in the passing by Congress in July 2000 of the long awaited National System of Conservation Units (Law no. 2.892/92) that created the Sistema Nacional de Unidades de Conservação (SNUC). This process was, in part, a reaction to the frustration felt by researchers, local communities and policy makers to the rigidity and top-down approach taken by the earlier framework. It was also a sign that the earlier model did not correspond to the complex and dynamic realities on the ground that refused to fit into the categories established under previous legislation.

Since 1992, policy makers, academics, representatives of non-governmental organisations and international donors have been debating what a new system should look like. Much of this debate has revolved around the issue of the presence of human populations living within the boarders of protected areas (BRAZIL, 1996). This issue is one that has been of increasing relevance to other developing countries grappling with the same U.S. policy legacy (i.e. Zimbabwe and India¹²) and was highlighted in the 1992 IUCN Conservation Congress appropriately titled 'People and Parks'. In both the Brazilian and international context, criticisms of approaches to conservation included being socially unsustainable, highly centralised and financially non-viable.

Although many of those who participated in the discussions leading up to the creation of the new framework did not feel that it went far enough, it is clear that the new SNUC does provide much greater opportunities for community involvement than before. One of its main objectives is its commitment to the protection of the resources upon which some

¹² Both Zimbabwe and India's protected areas systems were criticised as been socially unjust and financially unfeasible. Recently, both have developed alternatives to 'people out' parks. In India, this takes the form of Joint Forest Management whereby villages co-operate with forest police to manage forest resources. In Zimbabwe, the co-operative management of big game rangelands has contributed to the national income as well as to the local economy.

communities depend. Specifically, this objective calls for the ‘protection of those natural resources necessary for the livelihoods of traditional populations, respecting and valuing their local knowledge and culture, promoting them socially and economically.’ Article 5 of the document underscores the importance of community participation on a number of line items. It calls for encouraging the involvement of NGOs in providing help and support to conservation units as well as providing incentives for local populations to manage reserves themselves. Article 25 addresses the need to create 'biological corridors' interconnecting the different reserves in the hopes of creating mosaics of different levels of protection as promoting community involvement in these initiatives.

The new SNUC divides the different categories of protected areas into two groups: ‘total protection’ and ‘sustainable use’. The total protection grouping which does not permit direct use of the protected areas resources was not significantly altered in the new framework. The sustainable use group gained two new conservation categories: Sustainable Development Reserves (RDS) and Private Reserves of National Patrimony (RPPN). Both the new groups involve the decentralisation of conservation efforts. Also, because many of the total protection areas are occupied by human settlements, time limitations were given to managers of protected areas to either find ways of addressing this situation or changing the type of protection regime the area is under. For example, a National Park unable to accommodate local residents could be required to change its status to that of a Sustainable Development Reserve.

2.6 Brazilian Fisheries Policy

Brazil’s approach to coastal zone and marine conservation has many parallels with their approach to forests and other terrestrial resources that have been degraded in the wake of unsustainable economic development. Brazilian fishery policy has consistently supported capital intensive

industrial fishing fleets while overlooking the significant contribution that artisanal fishing provides. This contribution relates to their respective share of the total Brazilian catch, job creation, livelihood security and their role in protecting fish stocks. As a result of this lack of support, artisanal or small-scale fishers are less and less able to provide these goods in the face of growing threats to their well being. Specifically, industrial fishing, tourism development and accompanying land speculation along with pollution from heavy industry and the establishment of 'people out' protected areas have put the future of these traditional populations at risk.

Before colonisation, fishing had already been highly developed by indigenous populations. The shell piles of the sambaquiiana communities¹³ that dot the coastal zone in the south and south east, along with the dugout canoes and rafts (still) used in the north and Northeast are proof of these developments. In some areas, where indigenous populations still exist, these practices continue much in the way they did before the onset of colonization. The process of colonization that attracted immigrants from four continents resulted not only in the genetic miscegenation process Brazil is so famous for but also cultural miscegenation. Indigenous practices were, over time, complemented by or absorbed by the practices of migrant fishers (and non-fishers) from all over the world. Each of these groups adapted to different sets of environmental circumstances. Over time, these isolated communities developed into communities which no longer had distinctly European characteristics nor indigenous ones. *Caicaras* (of the south and south east) the *jangadeiros* (of the Northeast), the *caboclos* and *ribeirinhos* (of the inland river systems in the North) are examples of non-indigenous

¹³ Sambaquiiana communities are some of the earliest recorded along the Brazilian coastline. Their livelihoods were based primarily on the collection of molluscs. Piles of shells found along the coast are all that remain of these groups that inhabited the region between 5520 and 120 BC (Moreira, 1992).

traditional fishing societies that have developed in Brazilian coastal zones over the last 500 years¹⁴ (Diegues, 1999b).

Traditional/Artisanal fishing

These indigenous and traditional communities make up a large portion of the artisanal or pre-industrial fishing practices. They have small crafts (such as rafts or dugout canoes), use simple technology that often has not changed for some time, and have intimate knowledge of their surroundings and seasonal changes with belief systems often adapted to the conservation of special areas. Frequently, they depend on forest resources to enable them to take advantage of those of the sea. Their simple boats, rods, masts, even nets are made from local terrestrial resources. It is not uncommon that over time, local management regimes have developed that dictate when, by whom and where both sea and terrestrial resources can be used (Diegues, 1983).

Kinship ties and a sense of local identity are often important factors in the lives of these groups. They are not limited to hunting certain species and often change strategies throughout the year in order to benefit from the seasonal availability of different species. Another characteristic of these groups is their limited capital accumulation. Traditional fishing communities in Brazil are integrated into the market system to differing degrees. They are not necessarily subsistence fishers but their limited extraction methods and low population density make their practices generally sustainable. Their contribution to Brazil's production is significant. From the 1950s, artisanal fishing has provided between 40 and 70 percent of the country's total catch (Diegues, 1997).

¹⁴ Others include the Acorianos, descendants of the Portuguese fishers from the Azores islands that settled primarily in the South, the Pantaneiros that exploit the riches of Pantanal floodplains, the Varjeiros (non amazonian river people), and the pescadores or fishers who use many different strategies to exploit marine resources in wetlands all over Brazil (Diegues, 1999a).

Industrial Fishing

Industrial fishers differ greatly from their traditional counterparts in a number of ways. As their name suggests, they are dependent on much more capital-intensive technology. Their large refrigerated hulls can travel for weeks, sometimes months to waters far away from the home of the crew on board. They are usually after specific species (sardines, ocean shrimp) and often catch others in the process which are discarded as waste. Although they are criticised for their wasteful practices they have nevertheless received the lion's share of government support. Because of their need to be near the market place, this type of fishing is usually associated with urban areas that have the necessary infrastructure in place for processing and marketing. All their catch is commercialised and crew is usually paid in wages as opposed to a share of the catch.

2.7 Evolution of Policy Approaches

Until the beginning of the 20th century, fisheries policy in Brazil only addressed issues relating to industrial fishing activities, leaving artisanal fishers to fend for themselves. The evolution of fisheries policy in Brazil can be divided into three main phases; the preindustrial phase (1500 - 1962), the industrial phase (1962 - 1990), and the regulated use phase (1990 - present). These phases represent not only technological changes which took place to exploit fishing resources but the policies which encouraged and supported those changes. The pre-industrial phase lasted until 1962 when SUDEPE¹⁵ was created. For the most part, fishing activities during this period were characterised by subsistence fishers using low levels of technology to extract amounts that were largely uncommercialized. The earliest legal acts related to fishing appeared in the early 17th century. Fishing policy during this period focused on the whaling industry and the earliest laws passed in this sector are associated with it. The first of these appeared in 1602 providing

¹⁵ Superintendencia do Desenvolvimento da Pesca/Superintendency for Fishing Development

whaling rights to the Portuguese (Menezes, nd). Other laws appeared only 150 years later and were related to the importation of salt for the purpose of conserving fish for export.

Until the mid-1880s, the fishing industry was closely tied to Portugal. Most of the commercial fishers themselves were Portuguese as well as the fleet. Many came from fishing villages in the north of the country and from the Algarve with others coming from the Azores and Madeira archipelagos. The whaling industry is the oldest industrial fishing practice in Brazil and was the first to be regulated. Originating in the colonial period, whale fishing was dominated by Portuguese immigrants who brought their fishing techniques from the Azores, Madeira and the European continent. It was only in 1856 that the first steps were taken to nationalise the industry, when it became illegal for slaves or foreigners to make up more than one fifth of any crew (Menezes, nd). In 1897 law No. 478 nationalised all maritime activities in Brazilian waters.

Regulatory institutions for the newly nationalised fishing industry emerged much later. The *Inspeccoria de Pesca* was created at the beginning of the century and during the same period, the Navy began its involvement with the nation's fishers and their crafts. Specifically, in this year, a programme called *Pesca e Saneamento do Litoral* (Fishing and Coastline Sanitation) was established by the Navy which required fishers to be registered with them as well as obliging them to participate in the national system of fishing Colonies (Guilietti and Assumpção, 1995). This was the first attempt to organise Brazilian fishers, locally and nationally. Fishers working along the extensive Brazilian coastline, along with those living inland on the countries vast river networks, were seen as living on the periphery of national life. For the most part, they were thought of as disorganized groups which did not contribute much to the nation and were in need of being consolidated and controlled.

The solution to this was to establish the Colônias or fishermen's guilds that would, through their multi-level network, organise and control the dispersed fishers. All fishers had to become members of their local chapter. The Colônias were created as the local chapters of the national fishermen's guild established by federal law just before World War I in 1912 (Breton, 1994). They are administered at the state level by the Federação de Pescadores (Federation of Fishermen) and at the national level by the Confederação dos Pescadores (Confederation of Fishermen). The Colônias were created with the purpose 'of uniting fishers through fraternal solidarity promoting instruction, mutual aid and the prosperity of their associates and their families' (Menezes, nd).

There was strong State intervention in the fisheries sector before the consolidation of capitalism. As in other sectors in Brazil, the motives behind the establishment of the Colônia were linked to political needs related to the protection of national territory, the reduction of class conflict and the consolidation of Brazilian nationalism. In other words, the Colônia system was more concerned with controlling people than with protecting coastal resources and the populations that depend on them. The centralising model of the time virtually excluded any possible participation of civil society (namely fishers and their local organisations), consolidating distortions and favouritism which still exist.

The Federal decree that created these guilds also states the importance of the fishers as the nations' coast guards, to help 'the marines during times of peace and war' (Menezes, nd). Fishers were to make up a reserve army to be called upon to protect the national territory should it be attacked from the sea. By organising this group, the fishermen's guilds were also to serve as educational centres aiming at improving the sense of 'citizenship' among fishers and at making them participate more actively in national life (Breton, 1994). Diegues and Silva (1992) suggest that these measures were also taken to control fishermen's rebellions sparked by the military draft. It

was thought that by organising them into guilds, they would not be able to organise themselves against the government. It was only after the signing of the new Constitution of 1988 that fishers were allowed to organise their own free associations (Diegues, 1995).

During the next few decades, fisheries policy was tossed from one organisation to another. From 1933 to 1962, responsibility for fisheries went from the *Inspeçtoria de Caça e Pesca* (Hunting and Fishing Inspectorate) which was changed to the *Serviço de Caça e Pesca* (Hunting and Fishing Service) and then to the *Divisão de Caça e Pesca* (Hunting and Fishing Division) within the newly created Department of Agriculture (Guilietti and Assumpção, 1995). In 1962, SUDEPE (the *Superintendência do Desenvolvimento da Pesca*)¹⁶ was created marking the beginning of the second phase of Brazilian fisheries policy. Although not a ministry in itself, during this period it was the institution responsible for planning and executing programmes for the development of the fisheries sector, as well as supervising, inspecting and controlling exploration and exploitation of resources. This phase was characterised by massive subsidies for industrial fishers and the marginalization of artisanal fishing groups.

The objectives of SUDEPE were to apply the Fishing Code and other legislation related to fishing activities or resources and to provide assistance to fishers in solving socio-economic problems (Menezes, nd). At this point, apart from a limited number of measures passed to control the whaling industry, fisheries policy still did not place any real emphasis on conserving fish stocks. Its main concern was short-term gain at whatever cost. The distribution of public resources spent in this sector illustrates the distorted policies of the time. From 1967 to 1972, 51 percent of resources were invested in the industry itself, 20 percent on the catch, seven percent on commercialisation and 13 percent on administration. During this period, no

¹⁶ Superintendency for Fisheries Development

funds were allocated for research and data gathering of fish stocks (Giulietti and Assumpção, 1995).

During the SUDEPE administration, the balance of power between commercial and artisanal fishers became even more distorted. Under this administration, the prevalent approach was to modernise the fishery sector by prioritising the development of the industrial sector. In fact, it was during this period that the industrial fishing sector expanded the most. SUDEPE was characterised by its highly centralised structure, lack of co-ordination with other agencies and organisations working in this sector, along with its inefficiency in carrying out its mandate and its legacy of favouritism towards industrial fishing practices. During this period, industrial fishers gained access to loans through the BNDE, Banco Nacional de Desenvolvimento Económico (National Bank of Economic Development). Another boon to industrial fishing came in the form of government subsidies, including such measures as massive income and import tax breaks. In a short period, the balance of the contribution to total catch of artisanal to industrial fishing began to change.

In 1973, PESCARD (Plan of Assistance for Artisanal Fisheries) was created to 'compensate' artisanal fishers for losses experienced during the previous decade. The plan was based on encouraging small-scale fishers to modernise their technology as well as to get them out of the grips of controlling middlemen. At the core of this new strategy was the introduction of technical assistance to fishers which was mainly comprised of new techniques for catching and processing the fish. Often, these techniques (along with the technical 'experts') were out of touch with the local situation and needs of small-scale fishers. Many were unnecessary or poorly designed since those providing technical assistance assumed that they had all the answers. Boats were built for fishers in inappropriate sizes based on loans that, given the potential earnings could never have been

repaid. The policy failed to support artisanal fishers or to achieve its other goals.

In 1990, SUDEPE was closed down and the responsibility for fisheries resources was passed to the newly created IBAMA (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais e Renováveis).¹⁷ This change-over of responsibility marked the first time that control over fisheries policy had been given to an agency whose primary stated objective was resource conservation and sustainable use of these resources as opposed to exploitation for short-term gain. In the second half of 1998, the Department of Fisheries and Aquaculture was created under the Ministry of Agriculture. Some functions such as monitoring and enforcement continue to be under the jurisdiction of IBAMA. This third phase, the phase that characterises Brazilian fisheries management today, faces many challenges. Financial limitations constrain the organisation's activities while industrial fishers still receive the lion's share of government support and subsidies. It is also unclear what the strategy of the new ministry will be as it is still very young.

Coastal Zone Protected Areas

In the past, there was no attempt to approach ocean resources as whole systems. Marine resources were considered solely for their economic potential through the capture of specific species. Although there is now a greater consciousness that marine resource conservation cannot be looked at only in terms of the available stocks of a few commercialised species (such as whales, starting as far back as the 1930's, sardine, shrimp and lobster) protected areas in this sector are still seen as conflicting, even mutually exclusive with fisheries regulation. Marine conservation areas in Brazil have been built on these assumptions. In fact, coastal zone protected areas have some of the most rigid management regimes of all protected areas in

¹⁷ Brazilian Institute for the Environment and Renewable Resources

the country. Many were created on sparsely inhabited islands for the purpose of preserving the area's natural beauty, the biodiversity and for encouraging scientific research. Other marine conservation initiatives focus on the protection of single species, usually aquatic mammals such as dolphins, whales and manatees.

Fernando de Noronha, an archipelago off Brazil's northeastern coast, was one of the first marine areas to be transformed into a national park to serve these purposes. The archipelago has been a military base for the Portuguese, French, Dutch, and even the Americans. It was also a prison at one point. The management regime in place now in the area is not so different than in the past. The military helps to monitor the island, only a select few tourists are allowed to visit at any one time, and very few fishing activities are permitted for the small community living on the island. For its size, relative to the national average, it has an exceptional number of guards and IBAMA representatives as well as environmental education programmes funded by international NGOs to service the ecotourists, who pay an 'environmental tax' of 10 £ per day.

All too often, the first step in setting up National Parks is to expel fishers from their traditional fishing grounds. To non-fishers, open water is seamless. No 'land marks' or points of reference are visible, just open water. Small-scale fishers see these resources very differently. They often use underwater markings or triangulation with points on land to demarcate fishing grounds. When parks are created, these groups, along with this local knowledge, are left out of the process. Cordell (1983:11) argues that artisanal fishers are marginalized, isolated and powerless:

'Marginality of the sort that plagues traditional small-boat fishing peoples in Brazil has its sources in more than spatial and cultural isolation, comparatively low earnings from less capital intensive fisheries and competing interests. It also stems from a whole

complex of prejudiced perceptions and classifications related to the nature of the fishery as a resource, inshore seas, tropics and perhaps the sea itself as contrasted with the land.’

Terrestrial conservation areas created to protect coastal ecosystems, such as the Atlantic Rainforest, have often limited the access of traditional fishing populations to important forest resources (Diegues, 1997). The coastal zone is the most populated region of Brazil. As a result, it is also the most degraded region in the country. Levels of depredation, though, vary throughout the coast with some areas being remarkably healthier than others. In many cases, this relative health is the result of the sustainable management of resources over time by local populations. Ironically, when protected area sites are chosen, it is often these areas that are selected and these social groups that are sidelined in the process.

Apart from falling prey to industrial fishers and the establishment of conservation areas, these villages and remote beaches that provide the basis for artisanal fishing activities are often degraded by the expansion of tourism. Until recently, coastal tourism was characterised by families/individuals who had homes in these villages and would come only during the summer months. Now, tourism includes people coming from greater distances, staying shorter periods and requiring temporary infrastructure (hotels, hostels, and restaurants) that the previous type of tourism did not demand. These activities have environmental, social and cultural impacts that are difficult to control.

Fishers movements and organisations

Small-scale fishers in Brazil have only recently begun to organise themselves in order to influence the policies and processes that affect their livelihoods. These struggles have largely come from fishers in the Brazilian Northeast in response to industrial pollution from sugarcane processing

plants as well as industrial fishing activities invading traditional fishing grounds. In addition, fishers from the Northeast have also been struggling to regain control over the fishing guilds that were often controlled by businessmen, politicians and other powerful non-fishers (Diegues and Silva, 1992).

These struggles contributed to the reversal of the legislation that restricted the free association of fishers in the 1988 constitution. They have also resulted, with the help of the Catholic Church, in the formation of the Pastoral dos Pescadores¹⁸, as well as the formation of the National Movement of Fishers (MONAPE - Movimento Nacional dos Pescadores). These efforts are intrinsically tied to conservation and the protection of the health of ecosystems upon which artisanal fishers depend. A meeting of the MONAPE in Juazeiro in the state of Bahia in 1990 fuelled the creation of a series of statements, denouncements and demands that were subsequently sent with their representative to the 1992 Earth Summit in Rio. This document denounced the process of degradation taking place on the marine and inland water systems as a result of land speculation, industrial pollution, development projects and conservation areas. Specifically, the document asked that 'artisanal fishers and their representatives participate in the elaboration of policies and monitoring activities as well as in the conservation of natural resources' (in Diegues, 1992b: 27). MONAPE does not accept the premise that it is possible to protect the coastal environment without the participation of artisanal fishers.

As a result of the collective action of the rubber-tappers before them, coupled with demands from the fishers themselves, traditional fishing communities are now gaining the opportunity to collaboratively manage their resources with the help of IBAMA. After the extractive reserves were

¹⁸ Pastoral dos Pescadores is one of the many Pastorais which developed in the 70s and 80s based on Liberation Theology and Freirian principles of raising the awareness of marginalized groups.

created in Amazonia, IBAMA established a department within the organisation dedicated to these direct use protected areas and to expand them into other regions. This arm of IBAMA is called CNPT (Centro Nacional para o Desenvolvimento Sustentado de Populações Tradicionais) or Centre for the Sustainable Development of Traditional Populations. Along with extending areas under RESEX regimes to include other areas in the north of the country, new efforts include bringing the Extractive Reserve concept to aquatic areas.

In this vein, an Extractive Reserve was created in the state of Santa Catarina in the Pirajubae estuary followed by the first Maritime (open water) Extractive Reserve established in the state of Rio de Janeiro in the Municipality of Arraial do Cabo (site selected as the case study used in this thesis). Apart from these, there are ambitious plans to extend the maritime reserve network throughout the Brazilian coastline. Although not yet formally established, many coastal communities are going through the initial steps of formalising their proposals to the government (with the encouragement of CNPT staff) to bring the concept to their areas. CNPT is still the black sheep in the IBAMA family as other departments within the organisation are not as convinced by the potential of the Extractive Reserves (RESEX).

2.8 Summary and conclusion

The purpose of this chapter was to provide the reader with a general understanding of the evolution of policy approaches to conservation internationally as well as in Brazil. The chapter was broken down into three sections; global conservation policy, Brazilian conservation policy and finally Brazilian fisheries policy. The chapter began with a description of some of the key conferences and documents that have influenced the global trend towards more decentralised and participatory conservation efforts. It also presented a brief history of conventional approaches to conservation

with a critique of these approaches as well as examples of efforts that reconcile both nature conservation and livelihood maintenance. The chapter then brought the focus down to the national level and discussed the evolution of the man/environment nexus in Brazil. An element of this section concentrated on the events over the last thirty years in Amazonia in which grassroots environmental action successfully influenced government policy to make conservation and development efforts in Amazonia more socially sustainable.

The final section of this chapter discussed trends in Brazilian fisheries policy. Only in the last ten years have marine resources in Brazil been managed by an organisation whose officially stated aim is to conserve the natural environment (IBAMA). Prior to this, massive subsidies benefiting industrial fishers along with minimal regulation resulted in the marginalization of traditional fishing communities whose small-scale fishing activities have depended on these resources for centuries. Although many obstacles still exist, there is beginning to be some hope for government support for traditional fishing communities through the creation of Extractive Marine Reserves. These reserves are the focus of this thesis and will be described in more detail in later chapters. The following chapter on Social Theory and Environmental Management will discuss the theoretical underpinnings of conventional approaches to conservation discussed above.

Chapter 3 Social Theory and Environmental Management

This chapter will provide an overview of developments in several branches of social theory relevant to environmental management. It will include a discussion of factors that have influenced conventional environmental policies, which tend to be socially exclusionary towards traditional resource users. The chapter will then look at the circumstances under which local communities have become active participants in the process of natural resource conservation. It will also review the factors identified thus far that are common to successful common property management regimes. Lastly, this chapter will explore in depth some of the fundamental concepts associated with alternative strategies: community, social capital and participation.

Policy approaches to the management of natural resources, in Brazil and beyond, have been based on either the privatisation of resources or centralised management by government. These strategies have been anchored in theories that have led policy-makers to believe that these are the only options available for successful resource management. In practice, the last decades of global environmental decay and growing social costs of conventional approaches have demonstrated that alternatives must be

sought. In terms of relevant theory, academics around the globe have documented a wealth of experiences that contest the fatalistic premises upon which most current strategies have been based. On-going analysis of these experiences have led to a growing belief that there are other policy and strategy options that may be more appropriate and effective, especially for the management of resources at the local or community level. These arrangements are often referred to as common property or common pool resource regimes.

3.1 Common Property (common-pool) Resources

Around the world, in almost every culture and context, there are examples of communities that collectively manage their natural resource base (Ghai and Vivian, 1992; Ostrom, 1990; Baland and Platteau, 1996; Berkes and Folke, 1998; Folke et al., 1996). Traditional knowledge of local ecological systems coupled with appropriate social structures have resulted in a wealth of cases where communities conserve and in some cases enhance their local resource base (Leach et al., 1996). Examples of these can be found in the traditional raft fishing communities in the northeast of Brazil where these groups have created physical and social maps of their fishing grounds using triangulation and other novel techniques to ensure reliability (Kottak, 1979). Such systems assist in the monitoring and management of these areas. These arrangements are not restricted to fishing though and can be found in the community management of forests in India and elsewhere. Some examples, like that of the Brazilian fisheries, are relatively new while others, such as the Zanjera irrigation communities in the Philippines which manage water resources are centuries old (Ostrom, 1990:82).

It is most often poorer groups in society that depend on communal resources for their livelihoods. Some estimates suggest that in India, over thirty percent of household resources come from these types of arrangements (Chambers, 1997). Until recently, communal arrangements established over

time for the purpose of defining access and use rights to property at the local level were largely ignored. In general, it can be said that little value has been placed on communities that have developed management systems embedded in their own environmental and social context.

Resources under collective use are referred to as common property or common-pool resources. The institutions that often manage these resources are called common property management regimes. Some trace their roots back a thousand years or more while others are relatively new. These communal management systems are distinct from conventional approaches not only in that they are indigenously defined and constructed but also because ownership, in most cases informal, is based on a group as opposed to individual or government control. Given the relative failure of conventional approaches along with the growing popularity of 'sustainable development', the recognition for the need of a more people-centred approach to conservation is drawing international attention to these locally developed management regimes.

The 'tragedy of the commons'

The previous chapter presented the evolution of policy approaches for resource conservation. It reviewed the centralising nature of approaches used in the West as well as the influence of these models on conservation strategies used in Brazilian marine conservation. These policies are rooted in theories that rule out the possibility of successful group ownership and management and are highly pessimistic about the potential contribution of user group participation. Specifically, Garrett Hardin's 1968 controversial article on the 'Tragedy of the Commons' followed by Mancur Olsen's 'logic of collective action' and the 'prisoners dilemma game' presented by Dawes (1977) have laid the foundation for serious scepticism about the capacity of groups to forgo short-term personal benefit to ensure long-term collective gain in resource management.

The 'commons' comprise natural resources such as forests, flowing irrigation waters, pasturelands and fisheries. They can also be specific resources found within a given area such as lobsters or a specific type of tree. Common property resources can have a fixed location or they can be a 'fugitive' resource such as fish (Oakerson, 1992). What differentiates them from other types of property is that they are not owned by individuals but rather by groups, such as fishers. Important distinctions exist between common property and open access. Common property is shared property (*res communis*) whereas open access refers to a situation in which there are no legal property rights (*res nullius*). A characteristic of these types of goods is that it is difficult in practice to exclude 'non-owners' from using them. The commons (shared property) has become synonymous with resource destruction. Based on the theories presented below, many policy-makers have come to believe that resources held in common are inevitably subject to over exploitation and degradation.

Hardin's article presents a scenario in which the rational actions of herders sharing a field ultimately leads to pasture degradation (through over grazing) and sub-optimal outcomes for all of those involved. 'Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in freedom in the commons...freedom in the commons brings ruin to all' (Hardin, 1968: 1,244). Given this, Hardin predicts that a Leviathan or centralised management structure is necessary for groups to escape the 'tragedy'. This scenario was later formalised as the 'prisoner's dilemma game'. In this model, players are expressly prohibited from communicating and are unaware of how their counterparts will behave. Given this, the dominant or most likely results of the game will be sub-optimal (just like the fate of Hardin's herders). In fact, the 'rational' or dominant strategy (given the constraints) leads players to choose the third best possible outcome. 'The logic of collective action', developed by Mancur Olsen (1965) is the third document which greatly influenced the depressing

outlook adopted towards the feasibility of individuals achieving collective goals. Olsen was also convinced that 'rational, self interested individuals will not achieve their common or group interests,' (Olsen, 1965:2). In each of these models, individually rational decisions lead to collectively irrational outcomes.

At the root of all three models is what has come to be understood as the 'free rider' problem or the problem of excludability. This argument assumes that the rational choice of individuals who use a scarce resource in common will be to inevitably take advantage of the fact that they cannot be excluded from the public good and will benefit without participating or 'free-ride' (Hardin, 1968). In each model, there is an inherent incentive for participants to free-ride or benefit from the common good without contributing towards it. Logically, if all or most participants choose this path, then the ability of the group to achieve its goals is sabotaged. Given this inevitable course of action, it is assumed that a central force or Leviathan is necessary in order to keep these selfish actions in check. In practical terms, these models have lead to the widely accepted belief that resources must be put under one of two types of management regimes: government control or privatisation.

Table 3.1 Types of Resource Regimes

Open Access	The absence of well defined property rights. Access to the resource is unregulated and free and open to anyone.
Private Property	The rights to exclude others from using the resource and to regulate the use of the resource are vested in an individual or group. The rights are usually recognised and enforced by the state and are usually exclusive and transferable.
Common Property	The resource is held by an identifiable community of interdependent users who may exclude outsiders while regulating use amongst members. The rights are unlikely to be exclusive or transferable and are often rights of equal access and use. These rights may be legally recognised or de facto.

State Property

Rights to the resource are vested exclusively in the government which makes decisions concerning who should have access to the resource, the conditions and the level and nature of exploitation

(Source: ICLARM, 1998:2)

Government control and privatisation

Policy responses to these assumptions have been either to centralise authority over resources through the State or to privatise those resources. Both centralisation advocates and privatisation advocates accept as a central tenet that institutional change must come from outside and be imposed on the individuals affected (Ostrom, 1990). Both options have been questioned in terms of their ability to adequately protect resources. State control over natural resources, as was discussed in the previous chapter, is by no means a foolproof option for effective resource management. While arguably more effective in the West, governments of developing countries often do not have the resources needed to police vast areas. The social costs, not to mention the financial costs, of relocating resource users from protected areas also make these arrangements financially prohibitive and socially unsustainable. Political aims are also often incongruent with resource conservation. An example of this are the efforts made starting in the late 1960's to 'integrate' Amazonia into the mainstream of Brazilian national development. These initiatives are often cited as the catalyst for unsustainable development in this region (Hall, 2000).

The argument for privatising resources is rooted in the assumption that individual users would have incentives to protect what they clearly own themselves (Bromley and Cernea, 1989). The market, though, ignores the full value of natural resources thereby creating perverse incentives for owners. Resource privatisation has not proved to be as effective as once thought and examples from around the world indicate this.

Developments in Amazonia during the 1960s and 70s are a reminder that private ownership does not always provide the necessary incentives for land conservation. During this period, the military regime embarked on a series of initiatives that aimed to integrate Amazonia into the rest of the country as well as to modernise the region. In this vein, massive subsidies were provided for cattle ranching and logging activities. The Trans Amazonian highway was constructed in order to enable the gradual occupation of the region. Disastrous colonisation schemes such as POLONOROESTE which sought to relieve population pressures in the Northeast and Centre-South through large-scale resettlement resulted (Hall, 1997b). These economic and political incentives encouraged land concentration, pasture formation, logging and rural conflicts as well as consequent deforestation in one of the world's most biodiverse regions containing approximately forty percent of the world's remaining tropical rainforests (Laurance et al., 2001).

Critique of the Tragedy

Critics of these theories do not attempt to discredit conclusions drawn from these models altogether, but rather demand that the models and their outcomes not be generalised and indiscriminately applied to each scenario where the collective good is sought. Authors (notably Ostrom, Folke, Berkes, Baland and Platteau) argue that the assumptions drawn from these models only fit certain scenarios and that the constraints built into them do not always reflect reality. As discussed at the beginning of this chapter, there are instances in which communities do co-operate and manage resources sustainably. What this new field of study is trying to understand is why some communities are more likely than others to reach these long-term collective goals. This process has three dimensions: questioning the assumptions behind conventional models, consolidating experiences from around the world where communities have 'escaped' the 'tragedy', and drawing from these experiences a set of factors or characteristics which they

believe influence the ability of certain groups to overcome these overwhelming odds.

One of the most criticised aspects of the three theories presented above is their central assumption that 'players' (or community members, neighbours, etc.) cannot effectively communicate with one another. In real life this constraint does not always exist. Resource users often live in small geographical areas and have continued interactions with other resource users. The tragedy also emphasises the selfish, individualistic nature of resource users as utility maximizers, without taking into account other factors that link or bond groups together. Family ties, shared identity, or what has come to be known as 'social capital' is becoming widely accepted as one of the factors that 'rational' individuals take into account in decision-making. This concept is discussed in detail later in this chapter.

Probably the most contested of the assumptions of the 'tragedy' is the idea that common property resources are always open and available to everyone. Even in Hardin's own example, it is pertinent to ask whether there are an infinite number of herders. Most resources are in practice shared by a limited number of users with some shared by more people than others. What has often been referred to as the problem of common property is more likely a problem of open access. If there is a defined set of resource users, the real problem is often the absence of or a weakened management regime.

Experience in various parts of the world has also shown that communities themselves are often capable of independently developing management systems for shared resources that do not depend on privatisation or centralised control (Ghai and Vivian, 1992). Examples where communities have collectively developed management schemes to govern natural resources and established incentives and sanctions for co-operation in the management of defined resources where the number and identity of users are known, have questioned the validity of past theories. The development

of a counter-theory is helping to provide a more realistic picture of some of the reasons resource users decide to participate in collective action.

In seeking factors that determine the likelihood of the long-term viability of common property regimes, social scientists have cited the importance of the qualitative aspects of decision-making that involve relationships between resource users. It has become clearer that immediate personal gain is not always the only factor that influences decision-making. As will be discussed later in this chapter, utilitarian factors along with a shared identity can play an important role in providing incentives for collective environmental action. Trust and norms of reciprocity established over time are fundamental to the resilience of these regimes. This is particularly so when trying to overcome the subtractibility issues (or the 'freerider' problem) related to common property management. If resource users are expected to forgo short-term individual benefit for long-term collective gain, each must feel that s/he is a part of that collective. As Cohen points out, trust between resource users is a fundamental premise for long term co-operation, 'Before the recognition of a common identity by others and by the participants themselves is secured, before group solidarity is attained, representation, which presupposes trust, is not possible' (1985:692). Cohen goes on to say that the process leading up to the creation of a collective identity by a group 'occurs through collective interaction itself, within and between groups.'

Small-scale fisheries have been the source of some of the richest examples of successful common property resource regimes. It has also been a field that has contributed to the continued development of common property resource theory. One of the most cited examples of CPRs originally included in Berkes (1986) and later in Ostrom (1990) describes a small fishing village where, over time, fishers developed a systematic approach to defining and distributing access rights to local fishing grounds. Faced with threats to the viability of their fishing grounds, fishers from Alanya, Turkey organised themselves to ensure the future of the local fishery along with their

livelihoods. This experience is not unique and many like it have since been documented. Because each case and context is different in terms of location, cultural and ecological factors, among others, it is not immediately clear what were the key conditions for their success. For this reason, academics have been collecting, publishing and systematically analysing these experiences in the hopes of defining a set of factors which are common to successful common property resource regimes. Arising out of case studies presented to the Conference on Common Property Resource Management in 1985, two sets of factors were identified as potentially relevant to CPR success: those relating to the resource and its management and those related to the appropriators of the resource themselves.

Key design principles

Ostrom's 'Governing the Commons' (1990), describes some of the factors that were relevant to the case studies she analysed. In this work, she divides these into three groups: the resource itself, the existing management structure (organisations and institutions), and the characteristics of the community. The existence of a local management structure is crucial to the success of CPRs since disorganized appropriators would have a difficult time co-ordinating and monitoring their activities. Appropriators should be tied to this structure through some sort of binding contract including sanctions for those appropriators who do not adhere to it. The ability to define the boundaries of the resource in question (such as a field, fishing spot or other area) as well as having a distinct set of users is also important, as is the ability of the CPR to exclude non-members. It is also necessary for appropriators to monitor the health of the resource itself. Management characteristics common to institutionally robust CPRs include the existence of incentives for individuals to act toward the common good. These may entail coercive or more positive incentives. Other factors include the absence of free riders or resource users who benefit without contributing.

Ostrom also identifies a set of community characteristics that would contribute to CPR success. Specifically, having a known number of users as well as a small population size is seen as an advantage as well as having a stable population. Group homogeneity and the absence of class or religious divisions are cited as common characteristics of robust CPRs. Vested interests can be an obstacle to community management especially where these individuals might gain from disorganisation. Historically, communities that have a history of collective action seem to be better placed than those that do not. Less tangible qualities presented by Ostrom include the existence of social capital and high levels of trust and shared values as well as a sense of a community or common future. She also cites the importance of appropriators gaining a major part of their economic return from the CPR thereby providing strong motivation to solve common problems to enhance or protect their own productivity over time (Ostrom, 1990).

Ostrom (1992) identifies four essential elements that need to be present for a CPR to be managed successfully by an appropriators' organisation (AO):

1. Participants must have a common understanding that their independent strategies, if continued, will substantially damage a resource that they consider important for their livelihoods. The capacity to develop this perception is related to the size of the CPR (or number of resource users involved), the level of scientific understanding of the resource and the extent to which the appropriators recognise the interdependence of their offtakes. Communication among resource users is central in this process and this is more likely to occur in small, local settings.
2. Appropriators must share a view that co-operative strategies are possible that reduce the risk of serious harm to the resource on which they all depend. There needs to be an understanding that individual

strategies are sub-optimal and that an alternative co-operative strategy can produce an improved result and can be made to work.

3. Appropriators must have confidence that most other appropriators from the CPR can be counted on to change strategies if they themselves promise to do so. This mutual trust and reciprocity tends to be easier the smaller and more intimate the group of appropriators and where peer monitoring is a practical option.
4. It must be reasonably clear that the cost of executing future co-ordinated strategies is less than the benefits to be gained from the adoption of co-ordinated strategies. These costs are affected by characteristics of the group such as size and organisational experience.

Within the design principles put forward by Ostrom and other authors studying the collective management of common property resources there are a number of concepts that deserve deeper review. They are concepts that are used broadly throughout the literature which are often ill defined. The following section will discuss the concepts of community, social capital and participation. They are intrinsically interrelated concepts that form a cornerstone for understanding the diverse elements of community participation in these types of initiatives.

3.2 Community

With the failure of coercive conservation strategies, policy makers and academics have turned to rural communities to provide alternatives to conventional approaches (Wells and Brandon, 1992). The temptation is to assume that communities will always be better resource managers than either the State or the private sector (Argawal, 1999). Conservation initiatives based on such expectations may prove unsuccessful, as a deeper understanding of the social relationships and processes at work within communities has not been taken into account in project design.

Assumptions about the ability of communities to manage resources effectively are commonly based on some misplaced assumptions about the nature of 'communities'. The literature surrounding community resource management often refers to an idealised notion of community. Visions of community in the resource management literature generally characterise it as an 'organic whole'. Communities are seen as small organisational units comprised of individuals sharing similar norms and values codified in long standing institutions with which resources are managed effectively and sustainably (Agrawal, 1999). The reality, however, is that few communities are characterised by such functional uniformity. Understanding the differences and conflicts within the community is important as these processes have an impact on the ability of a community to reach conservation goals. The degree to which these differences define or affect interactions between resource users also has important design implications.

Collective management regimes deal with resource user communities, that is, groups of individuals who share access to a common pool resource. Resource user communities throughout the world differ from one another in their history, experience, physical setting and ecology. Relationships within communities are not static. They are often influenced by the economic or political changes taking place regionally or nationally and, especially for rural communities, by changes in the natural environment. For example, a community may consist of older and more recent residents. This is often the case in coastal Brazil where fishing communities attract immigrants as diverse as members of the middle class moving to escape their urban lifestyle to families coming to the coastline in order to escape the drought-prone interior (*sertão*). Another example from Brazil comes from Amazonia where river dwellers (*ribeirinhos*) living within the Mamiraua Sustainable Development Reserve are semi-permanent and move to other areas from time to time (DFID, 2000). Social ties are fluid as whole settlements move and new ones are founded. Some settlements last years and others just months. The result is that there is little in the way of long-term

'communities' in the area covered by the reserve making the household the most important social unit.

These factors may strengthen the sense of identity shared by these groups or create deep divides among and within them. Crisis within the community can be a bonding factor where the community works together to overcome it, or it can reinforce the differences between members. The latter was recently illustrated by the conflict arising between different caste and religious groups in India during the earthquake. Muslims and poor Hindus accused dominant groups in earthquake stricken villages of monopolising the influx of aid (Harding, 2001). Communities are not static entities and most often are a dynamic combination of both factors that draw members together and others that divide them.

Individuals sharing resources may or may not experience a feeling of 'community' as a result of sharing that resource. In fact, individuals sharing resources may in fact see other resource users as a threat to their livelihoods. In resource user communities, there are often conflicting desires and needs that put resource users at odds with each other. Both the literature on CPRs as well as co-management identify the absence of these conflicts and differences within communities as strengths contributing towards the success of such regimes (Ostrom, 1990). McCay and Jentoft (1998) points out that these differences are not necessarily a handicap for collective action but may actually reinforce interdependence. The authors note that 'competition and co-operation are not mutually exclusive' (McCay and Jentoft, 1998: 23), as competition requires some general understanding of what people are vying for and what are the rules of the game.

This optimistic outlook gives some hope for initiatives trying to construct a sense of shared purpose in order to achieve common goals. Hall (1997b) notes that the rubber tappers of Amazonia had a far from ideal sense of common past (as most were immigrants to the area) but felt in some way

bound in terms of their future. Hall also notes that the physical distances between households both on the rubber tapping *colocações* and of the *ribeirinhos* in the Mamiraua Sustainable Development Reserve were challenges to collective action. What some academics and practitioners in the field are suggesting is not necessarily that communities with internal differences will not achieve collective goals, although in some cases this may very well be true (Jentoft, 1989; Agrawal, 1999). Rather, it is the recognition and understanding of these divisions that is essential in order to design projects which reflect local circumstances. In this way, policy interventions can be more strategic in attempting to construct co-operation at the local level.

Groups that are labelled 'communities' are very likely communities of communities. Within groups there exist sub-divisions such as age, race, gender, class and ethnicity within the broader resource 'community'. Other divisions include those related to the different ways resources are tapped into. In the case of fishing communities this could be manifested in the different strategies or gear types used for fishing. To compound these differences, power structures within communities can be both dividing and binding. These structures can be legitimate and supported by community members or they can often be the source of corruption and unequal distribution and access to resources (Leach et al., 1997). Care must be taken not to over-romanticise communities since their internal structures often mirror the inequalities existent in the wider society. Also, one must not exaggerate the traits of unity, homogeneity, coherence and stability within communities.

Communities are dynamic entities, changing over time and are often characterised by internal conflict (McCay and Jentoft, 1998, Schlager and Blomquist, (1998). Institutions which regulate resource use are therefore constantly being challenged and successfully or unsuccessfully deal with the changes that take place around them. Relationships among members

change, people come and go, the resource itself is often the source of change within communities and their structures. Environmental changes, the effects of modernisation and globalization, political changes and technology changes all test the resilience of community solidarity. Some resource user communities have demonstrated a greater ability than others to endure alterations to the environment in which they exist. An example of this comes from Arraial do Cabo where although government policies such as the creation of Alkalis intended to provide incentives to 'modernize' the community, fishing practices have not ceased and are continuously revitalized (Britto, 1999).

Heterogeneity can exacerbate the commitment of individuals towards collective action in a number of ways. Individuals are more likely to remain committed to a common goal or set of common rules if they have faith that other users are committed as well (Schlager and Bloomquist, 1998). 'Heterogeneity may affect the trust that individuals have in each other. For instance, cultural differences or resource differences may convince individuals that it is okay to break the rules because the only ones that would be hurt are those from a different group, or those who are wealthy' (ibid.: 7).

This is not to say that the notion of community is not useful at all. In fact, the evolving notion of common property is indeed a reaction to the absence of community in theories that support resource privatisation and government control. In Hardin's model, for example, there is no community. His herders are individuals who are not bound to any greater good other than what as individuals they can achieve for their own personal gain. While the concept of community is essential for critiquing the narrow view of human relationships put forward by Hardin, it is the disaggregation of these communities that will lead to a greater understanding of which types will avoid tragic end.

What makes communities more than simply aggregates of individuals driven by self-centred utilitarian motives are the collaborative social qualities that some groups have. These social networks are systems of relationships rooted in kinship, culture and history. When these systems are present, resource users feel an important connection whereby they identify with the past and future of fellow resource users. Drawing from his research in Caribbean fisheries communities, Hakan Sanderson stresses the importance of a well functioning civil society as a necessary condition for co-management (Sanderson, 1998). In the Caribbean, many communities are poorly organised beyond the household level. Kinship ties are strong but experiences in collective organisation are few and far between. Fishers and their families do not have a history of associations and institutions within the communities. They do not have a legacy of collective action to build on which might provide an important building block for introducing co-management arrangements.

In recent years, academics and researchers have further developed the notion of community and contributed to an understanding of the links and processes that underlie them. This research explores what has come to be known as 'social capital'. The following section will discuss some of the outcomes of these developments along with their implications for collaborative management initiatives.

3.3 Social Capital

Wealth is most often defined in terms of stocks of financial and human capital. In recent years, in the attempt to operationalize sustainable development goals, other forms of wealth or capital are beginning to gain recognition (See Table 3.2). Natural capital, the stock or flows of goods such as mineral wealth, forests, marine resources or even sunlight, is being recognised and valued as an importance aspect of human and economic development (Costanza, 1997). Another type of capital has recently been

identified as related to these other forms and an important asset for countries and communities alike. What makes communities more than just an aggregate of their individual members has come to be known as 'social capital'.

Definitions of social capital

Social capital has become a concept widely used to describe interactions both within civil society and between civil society and government or other external actors. At its most basic, Robert Putnam defines social capital as 'trust, norms and networks' that facilitate social co-ordination and co-operation for mutual benefit (Putnam, 1993:167). Social capital generally refers to the institutions, relationships, and norms that shape the quality and quantity of a society's social interactions. Increasing evidence shows that social cohesion is critical for societies to prosper economically and for development to be sustainable (Ostrom, 1990; Ghai and Vivian, 1992; Pretty and Ward, 2001). Social capital is not just the sum of the institutions or individuals which underpin a society, it is the 'glue' that holds them together.

Table 3.2 Types of Capital

Human made capital - generated through human ingenuity and technological change, the produced means of production

Natural capital - consists of non-renewable resource produced by the processes and functions of ecosystems and environmental services sustained by the workings of ecosystems.

Cultural capital - refers to the factors that provide human societies with the means and adaptations to deal with the natural environment and actively to modify it (Berkes and Folke, 1994).

Social capital - features of social organizations such as trust, norms of reciprocity and networks (Colman, 1990). Ostrom (1990, p.190) expands this definition to include institutional capital to refer to the supply of organisational ability and social structures, literally the capital of institutions that society has at its disposal. Source: adapted from Berkes and Folke, 1998:6

A narrow view of social capital regards it as a set of horizontal associations amongst people, consisting of social networks and associated norms that have an effect on community productivity and well-being. Social networks can increase productivity by reducing the costs of interactions between individuals. Coleman (1988) cites examples from the Jewish-run diamond industry in New York as well as the networks of co-operation present in Cairo's Kahn El Khalili market as examples of this. By building trust and networks of reciprocity between individuals and organisations, social capital facilitates co-ordination and co-operation.

A broader understanding of social capital accounts for both the positive and negative aspects by including vertical as well as horizontal associations among people, and includes behaviour within and among organisations. This view recognises that horizontal ties are needed to give communities a sense of identity and common purpose. It also stresses that without 'bridging' ties that transcend various social divides (e.g. religion, ethnicity, socio-economic status), horizontal ties can become a basis for the pursuit of narrow interests. These ties can actively preclude access to information and material resources that would otherwise be of great assistance to the community.

Components of social capital

The relationships described in the literature on social capital involve a number of different levels, intensities and directions. These relationships evolve at the local, regional and State levels and amongst these levels. Pretty and Ward (2001:212) identifies five groupings used to categorise these relationships: local connections involve relationships among community members; local-local connections describe linkages between communities; local-external connections refer to the vertical connections between local groups and government agencies or organisations; external - external connections are horizontal relationships between government or other external agencies (i.e. partnerships); and the last category describes

external connections as relationships amongst the individuals within these external agencies.

Strong networks of engagement at the local level can provide an important basis for successful co-operation between levels (Evans, 1997). Coleman (1988) argues that the potential of relationships between individuals or groups to result in effective norms of interaction is determined by the degree of 'closure' available between actors. Where actors are not familiar with each other (as, for example, in the case of a shop owner on a busy street and his/her clients - clients may have a relationship with the owner but not with each other) they are limited in their ability to combine forces and sanction (in this case) the shop owner. Coleman (in Dasgupta and Serageldin 2000: 25) argues that, 'Closure of the social structure is important not only for the existence of effective norms but also for another form of social capital: the trustworthiness of social structures that allows the proliferation of obligations and expectations.'

Coleman (in Dasgupta and Serageldin, 2001) also distinguishes between depth and diversity within human relationships. In his work, he cites the distinction made by Max Gluckman (1967) between simplex and multiplex relations. Simplex relationships are those that are based on one level of interaction such as that of the actors in the example of the shop owner and his/her clients. Multiplex relationships refer to those that involve multiple types and levels of interactions whereby people are linked in more than one context (neighbours, colleagues, fellow parent, etc.). Coleman argues that in the later case, obligations developed in one context can be harnessed when one has problems in another, enriching the interaction.

As both Evans (1997) and Pretty and Ward (2001) argue, stocks or *endowments* of social capital at the local level are important but not necessarily the determining factor for successful collaboration between levels. 'Effective states deliver rule-governed environments which

strengthen and increase the efficiency of local organisations and institutions' (Evans, 1997:1120). As Evans sees it, these synergistic relationships take on two different dimensions - 'complementarity' and 'embeddedness'. Complementarity refers to the roles played by government and society in collaborative efforts. When they are complementary, each is contributing what comparatively they have the advantage to contribute. The opposite of complementarity is when government policies work against local development goals and aspirations (Evans, 1997:1126). Embeddedness describes the depth, frequency and richness of interaction between the two levels that build important elements of social capital such as trust.

The ability of communities to create strong institutions and organisations is influenced by the characteristics of the State. The State has a role in determining the degree to which societies interact and how they interact. Civic organisation is often contingent on an enabling environment created by the State. For example, during the military dictatorships of the 70s and 80s in Brazil, free association was actively discouraged and illegal. In many cases, since the onset of formal democracy in the 1980s there has been a rapid growth in community action. In Sao Paulo alone there are over 1,300 neighbourhood associations and there has been an overwhelming proliferation of organisations among the rural landless and land-poor as well as the emergence of numerous indigenous and environmental groups (Brohman, 1996). Fox (1996: 1120) 'underscores the centrality of simple legal norms such as freedom of assembly and association in making civic organisation possible...' Government can go beyond just allowing social capital to be created to actually encouraging its formation. Tandler (1997) describes how building trust between government service providers and communities in Ceara (Brazil) was a critical element in the success of recent health care initiatives in this state.

By linking communities with strong associations and a sense of solidarity with an effective government framework, communities will be better able to

'scale up' their activities, increasing their impact. As Evans (1997:1122) reflects on the positive outcome of Grameen Bank-style microfinance projects in Vietnam he notes that, 'adding concrete ties across the State-society boundary to pre-existing kin and friendship ties helped transform traditional ties into developmentally effective social capital.' For those communities that are not endowed with high levels of social capital, it may be possible to create these relationships. Evans refers to this as the 'constructibility' of social capital.

Pretty and Ward (2001) argue that government policies are often at the root of the disintegration of social capital at the local level with negative outcomes for natural resource conservation. Traditional ecological knowledge is an example of this type of social capital that is being quickly lost in the process of modernisation/globalization. Hall (1998) reminds us of the importance of local traditional ecological knowledge, and other informal institutions, in this matrix. He states that traditional ecological knowledge is an outcome and/or source of social capital and represents (another) strong reason for involving local resource users in project design and management. For Amazonia, the recent recognition of these community assets through supportive government policies (such as Extractive Reserves) is allowing significant innovations to be introduced in environmental management strategies.

Local institutions that provide equitable and sustainable solutions to resource issues in developing countries have developed over many years and are not easily replaceable. Evans (1997) warns of the little experience to date on constructing the necessary stocks of social capital that provide the foundations for these initiatives. Pretty and Ward (2001) cite the importance of distinguishing between the quantitative and qualitative dimensions of social capital. While Putnam (1993) counts the number of civil associations in Northern Italy in order to quantify stocks of social capital, Pretty and Ward (2001:213) distinguish between 'social capital

embodied in such groups as sports clubs, denominational churches...even bowling leagues, and that in resource-oriented groups concerned with watershed management, micro-finance, irrigation management, pest management and farmer research.'

We can call this qualification the 'leisure vs. livelihood' distinction in the social capital discourse. There is also a need to qualify these types of endowments in terms of their 'replaceability'. The former types of networks can and are being replaced. Although bowling leagues are losing popularity and membership, other group activities such as hiking clubs and adventure tours are on the rise. As many of these new organisations are related to more physical endurance as well as greater preorganization, one could argue that organisational membership (at least in the United States) is gaining strength from a more proactive membership base. Destruction of the latter type (associated with livelihoods) has serious consequences for the wider society such as increased poverty and environmental degradation and will be extremely difficult to rebuild or replace (ex: common property resource management regimes). They are also qualitatively different in the degree to which they actually empower individuals and communities and enable them to reach local development goals.

Pretty and Ward (2001) identify three stages in group formation and development; reactive-dependence, realisation-independence and awareness-interdependence. Group formation is often the result of an external threat or encouragement from an external agency (ibid.). This initial reactive-dependence stage is characterised by a fear of change and desire to return things to their pre-crisis state. Communities with low levels of social capital may engage in group formation although there is little at this point to indicate whether robust institutions will develop later. The second stage, the realisation-independence stage, is defined by growing independence of the group. Norms and rules begin to develop as well as a growing capacity to develop solutions to existing problems. This is a tender

period in group development and does not guarantee long-term viability. The awareness-interdependence stage is the third and final stage of group development. The quality of interaction at this stage will determine the sustainability of the group's activities. It is at this stage that groups might begin to scale up their activities and look upward and outward to become involved in regional efforts in order to achieve higher-level aims. Group maturity is defined by success at this stage.

Social capital and collective management

Social capital is relevant to the discussion of collaborative common property resource management as it is seen as an important factor determining their success. The current debate and discussion about social capital has led to the emergence of ideas about how and under what circumstances civic actors can engage more effectively with public institutions in the pursuit of development goals (Evans, 1997). Communities with high levels of social capital are seen as more likely to mobilise their collective resources for the common good. In collaborative management schemes, social capital is seen as equally important. Pre-existing social capital can make these regimes more efficient and effective. Where networks and norms of reciprocity exist, these social relationships and trust can provide for effective monitoring and rule compliance. It is also thought that networks of civic engagement may be a recipe for the robust collective life necessary to demand and ensure responsive leadership and governance (Dasgupta and Serageldin, 2000).

Ghai and Vivian (1992) also consider how social capital built in support of one issue is often harnessed or redirected to support another type of initiative. Putnam (1993: 169) seems to support this assertion, '...working together is easier in a community blessed with a substantial stock of social capital'. Examples where communities have strong (horizontal) networks and informal or formal institutions which bind them together, whether or not these institutions are directly related to resource management, may

create an environment where the community will have a stronger propensity to participate in natural resource management initiatives even if they are introduced from the outside.

Ostrom also identifies the degree of trust and sense of shared identity within a group as important ingredients for successful community resource management (Ostrom, 1990). Local level social capital facilitates common property management by providing the social relationships and trust upon which rules and monitoring can be based (World Bank, 1997a). Understanding the institutional dynamics within communities could be very relevant to understanding the potential for community contributions to the design and management of projects aimed at sustainable use of the local environment. High levels of social capital and strong local institutions can also provide an avenue for the agendas of otherwise excluded groups to be heard. This does not, however, take into account those individuals who are not 'networked' and are excluded from these groups and processes.

The 'dark side' of social capital

The literature on social capital rarely specifies which aspects of this co-operative history are more useful than others. Putnam (1993) does make a distinction between bonding and bridging social capital. Here, he defends the promotion of the type of social capital that creates bridges to link otherwise separated groups. The creation of bonding social capital, which promotes group membership of like people, may on the other hand reinforce community differences. Whatever the case, social networks will have consequences for both those groups and individuals who may or may not be involved. The literature in this area also tends to over romanticise some of the characteristics of these communities and does not effectively deal with intra-community inequalities. Social capital is often as unequally distributed as other forms of capital. While it most certainly cannot be ignored, care must be taken in order to avoid reinforcing these inequalities.

State intervention can erode social capital by creating individualistic incentives (Hanna, 1995). In fisheries management, examples abound of cases where the assumptions of individualistic behaviour, as in the Hardin model, lead to self-fulfilling expectations. Management based on individual allocations and incentives granted by government can erode the collective identity and interests which exist in fishing and other resource user communities. According to the logic of social capital, governments should avoid creating these types of entirely individual incentives and adopt designs which would restore or reinforce solidarity among user groups (Jentoft, 1999). Such systems could encourage co-operation, build networks and improve trust within and among communities.

Critics cite the 'dark side' of social capital as an essential element forgotten in the social capital literature. Putzel (1997) criticises the social capitalists for not recognising the negative aspects that often go hand in hand with groups and associations. He reminds us that not all groups and associations have such benevolent ends as the bowling leagues described by Putnam (1993). Mafias and drug cartels are examples of tightly bonded associations built on trust (and fear) that influence development processes. While these may be extreme examples, these negative elements can be found in almost any community where control over resources is concentrated in the hands of a few. Evans (1997) regards corruption as an inherent possibility in increased embeddedness (depth of interactions between communities and government).

Community-based resource management offers a more democratic option compared with traditional top-down strategies. Often though, internal power structures and differences in age, class, race and gender effect the distribution of the benefits of development projects and projects may also be adversely affected by the lack of participation of a particular group (Leach et al., 1997). Whether it is community-based natural resource management,

or community participation or even the descriptions of grassroots environmental action, the literature rarely refer to *who* is participating or perhaps more importantly, *who isn't*? Overlooking existing power structures before implementing projects could result in reinforcing these structures (Guijt, 1998).

Social exclusion is used to describe poverty as a process whereby the poor are excluded from the benefits of development (Bhalla, 1995). Access to the benefits of group organisations and associations is often denied to already marginalized groups in communities. Individuals or groups within societies with little power can be sidelined by more powerful groups. Identifying who benefits from these initiatives is also a serious issue in determining which kind of incentives are being provided and whether these incentives create positive linkages with conservation goals. In other words, who ultimately takes part in decisions regarding project design and implementation will probably benefit as a result. Therefore, care must be taken to understand what the characteristics are of participants to understand their own incentives and relationship to the resource base to understand what the implications of this might be. 'Without attention to the analysis of resource use decisions, and the way these are influenced by structures of power and social relations at the community level within the South, we are unlikely to be able to influence the behaviour of people who cut down primary forests in order to make a living' (in Ghai and Vivian, 1992: 12). The following section will discuss the notion of participation in resource management.

3.4 Participation

Post-war strategies of modernisation and growth ignored the role of people's participation in directly addressing poverty. Alternative strategies were conceived based on a more people-centred approach to development. One of the central tenets of the Basic Human Needs approach that emerged in the 1970s was the need for peoples' participation in decisions that affect their

lives (Brohman, 1996). In other words, 'social development goals can best be attained if ordinary people are mobilised to establish projects that serve their local communities and if they are actively involved in these projects' (Midgely, 1995: 60). Policy makers were beginning to embrace the idea that individuals and communities in developing countries can (and should) contribute directly to the development process.

Given the shortcomings of top-down development strategies, participation has come to be recognised as an absolute imperative in both alternative and mainstream development strategies. While widely accepted in theory, it has remained an elusive concept in practice with multiple meanings and methods of implementation associated with it. The process of participation is often questioned in terms of *who* participates (elite groups or broad based), *what* they participate in (limited or broad range decision-making), *how* they participate (passive or active), *when* they participate (in project identification or evaluation) and *why* they participate (Brohman, 1996).

Participation is a multidimensional concept and must be disaggregated in order to be clearly understood and effectively employed. This section will provide an overview of the different types and dimensions of participation. A solid understanding of the different elements of this concept is essential in the degree to which participation in the collective management of common property resources is a basic assumption as well as a fundamental aspect in the long-term viability of these initiatives. It is also an integral aspect of the analysis framework applied to the case study presented in this thesis.

Concern with community participation in development is not new. Starting with the community development initiatives of the 1940s and 1950s, the types and purposes for local-level participatory approach to development have been in constant flux. The 1992 UN Conference on Environment and Development stressed the importance of community participation for

sustainable development. Agenda 21 highlights the need to decentralise and find local level solutions to environmental problems. As a result, many conservation initiatives now emphasise the importance of community participation. Projects, though, rarely define it or specify *how* community participation is going to create links between local socio-economic development and conservation goals.

The United Nations defined participation in 1981 as, 'The creation of opportunities to enable all members of a community and the larger society to actively contribute to and influence the development process and to share equitably in the fruits of development' (Midgley, 1986: 24). Hall (1986: 99) defines it as 'allowing freedom of decision-making and control over internal activities to those taking part in the development process.' Another definition put forth by the Overseas Development Administration is, 'a process whereby stakeholders - those with rights (and therefore responsibilities) and/or interests - play an active role in decision-making and in the consequent activities which affect them' (ODA, 1995:3).

Most definitions include in some measure the notions of contributing, influencing, sharing, or redistributing power and control of resources, benefits, knowledge and skills to be gained through beneficiary involvement in decision-making (Narayan-Parker, 1996). Other more instrumental reasons for encouraging participation include increasing project effectiveness and reducing project costs. Most would argue that the degree of involvement and control held by communities in this process falls within a spectrum with increased control or empowerment on one end and efficiency issues on the other.

Pretty (1995) widens this spectrum. He puts manipulative participation at one end of the spectrum, referring to a process in which participation is simply pretence where 'people's' representatives have no power. At the opposite end of the spectrum he puts self-mobilisation, a process whereby

communities participate independently of external institutions or influences (See Table 3.3). This category goes beyond the scope of participation in most development projects and programmes and involves actions initiated by communities themselves, as in the case of many social movements.

Table 3.3 Dimensions and intensities of community participation

Objectives	Strength	Timing	Typology
Empowerment	Proactive	Early involvement	Self mobilisation
Capacity building			
Increased effectiveness			
Increased equity			
Efficiency			
Cost sharing	Passive	Late involvement	Manipulative participation

Source: adapted from Hall (1997b:26) and Pretty (1995:5)

The literature often cites a distinction between *passive* and *proactive* participation (Hall, 1997b; Paul, 1987; Wells and Brandon, 1992; Chambers, 1994). The difference between the two lies largely in the degree to which outcomes are predetermined by ‘outsiders’, and also to what degree local people have the power to change the direction of interventions once they are underway (Hall, 1997b). Where external agents predefine project goals and design, the potential for participation to be 'empowering' is diminished. Ready-made, top down designs, where they include participation, normally do so for more instrumental reasons such as cost-sharing or in order to increase project efficiency or effectiveness.

As many funding agencies require participation to be an element in project design, participation may be given an important place in initial proposals but not in practice. More often than not, it is this form of token participation that is prevalent in current development practice. For example, in their 1992 evaluation of over twenty Integrated Conservation and Development Projects, Wells and Brandon (1992) state that although all

of the cases reviewed were committed to participation in principle, most have treated local people as passive beneficiaries of project activities and have failed to involve people in the process of change and their own development. None of the projects based on this beneficiary approach have demonstrated significant progress.

Proactive participation involves a much stronger role for communities throughout the project cycle. At best, beneficiaries are involved from the early stages of project identification through to project evaluation. Proactive participation in development initiatives entails a real commitment by external agents to involve people in the development process. In many cases it involves changing development workers' attitudes about the communities in which they work. This approach calls for outside 'experts' to respect local people and the knowledge they hold and be willing to learn from them (Chambers, 1994). For the success of conservation initiatives in Brazil and elsewhere, the proactive involvement of local communities in this process is essential. This is so in terms long term sustainability as well as in terms of building a foundation for initiatives to be 'scaled up' in support of small-scale producers or gathers regionally. Local people must be able to sustain and support the strategies developed for the conservation of resources upon which their livelihoods depend. While it will not ensure the long-term success of these initiatives, it will help build an important foundation upon which these strategies are based. This is true not only in terms of creating systems which are relevant and appropriate for local users but also involves building up the self confidence and other capabilities needed to develop and maintain them.

Categorising participation as either passive or proactive is highly dependent on the timing of community involvement. Early involvement can provide communities with a greater chance of influencing objectives and outcomes as opposed to their being entirely predetermined by outsiders. Early and continued participation is often more proactive. Late involvement limits the

depth and quality of the participatory process. Involvement at later stages usually means that project identification and design issues have been decided from the outside and the involvement of local people is limited to implementation issues. Later involvement is usually associated with passive participation as well as the more instrumental objectives (i.e.: efficiency or effectiveness).

Table 3.4 Typology of Participation in development programmes and projects

Typology	Characteristics of Each
1. Manipulative Participation	Participation is simply a pretence, whereby local people may have token representation but no decision making power.
2. Passive Participation	People participate by being told what has been decided or has already happened. It involves unilateral announcements by an administration or project management without listening to peoples responses. The information being shared belongs only to external professionals.
3. Participation by Consultation	People participate by being consulted or by answering questions. External agents define problems and information gathering processes, and so control analysis. Such a consultative process does not concede a share in decision-making, and professionals are under no obligation to take on board people's views.
4. Participation for Material Incentives	People participate by contributing resources, for example labour, in return for food, cash or other material incentives. Farmers may provide the fields and labour, but are involved in neither experimentation nor the process of learning. It is very common to see this called participation, yet people have no stake in prolonging technologies or practices when the incentives end.
5. Functional Participation	Participation seen by external agencies as a means to achieve project goals, especially reduced costs. People may participate by forming groups to meet predetermined objectives related to the project. Such involvement may be interactive and involve shared decision-making, but tends to arise only after major decisions have already been made by external agents. At worst, local people may still only be co-opted to serve external goals.

6. Interactive Participation	People participate in joint analysis, development of action plans and formation of strengthening of local institutions. Participation is seen as a right, not just the means to achieve project goals. The process involves interdisciplinary methodologies that seek multiple perspectives and make use of systemic and structured learning processes. As groups take control of local decisions and determine how available resources are used, so they have a stake in maintaining structures or practices.
7. Self-Mobilisation	People participate by taking initiatives independently of external institutions to change systems. They develop contacts with external institutions for resource and technical advice they need, but retain control over how resources are used. Self-mobilisation can spread if governments and NGO's provide an enabling framework of support. Such self-initiated mobilisation may or may not challenge existing distributions of wealth and power.

Source: Pretty (1995)

The reasons why a participatory approach is employed in a development project or programme is often related to the type of participation achieved. Paul (1987) identifies five main areas in which local people can participate in rural development projects:

- ❖ Information-gathering: information exchange between stakeholders (can be one way or two way).
- ❖ Consultation: local resource users have the opportunity to intervene and effect the direction of project design and implementation.
- ❖ Decision-making: implies a greater degree of control and responsibility than the passive acceptance of possibly unwanted benefits.
- ❖ Initiating action: If groups see gaps between project design and their needs, they have the potential to respond to these needs by taking action themselves.
- ❖ Evaluation: Participatory evaluation by beneficiaries can provide valuable insights and lessons for project design and implementation,

information that otherwise may have been overlooked or unnoticed. Evaluation often occurs only at the end of the project cycle, too late for lessons learned to be reintegrated into the project.

Paul helps us characterise these different purposes by separating them into five main groupings which can be placed on the passive - proactive continuum: a) empowerment, b) building beneficiary capacity, c) increasing project effectiveness, d) improving project efficiency, and e) project cost sharing. Narayan-Parker (1996) cites one more objective, that of increased equity. All these objectives are seen to contribute to project sustainability. They are not necessarily cumulative or sequential. For example, efficiency can be achieved without community empowerment. While they have been presented as distinct categories, these objectives often overlap or occur simultaneously. These objectives are detailed below:

Empowerment - The notion of power, its use and its distribution is central to any understanding of social transformation. Power is, in most contexts, the basis of wealth, while powerlessness is the basis of poverty (Chambers, 1994). Both the 'powerful' and the 'powerless' are categories of actors fundamental to understanding the dynamics of any development process. Power can be seen as an asset controlled by the State or by elite groups. Power operates on many different levels and is manifested in the conflicting interests of different groups within any particular context. Empowerment is essentially a political concept that means more equitable sharing (or redistribution) of power and resources with those who previously lacked power. It is the empowerment objective which has been the most controversial element of participatory development but also perhaps the most important. Empowerment is often seen as the goal of 'real' participation.

As an element in proactive participation, participation that is empowering involves the transfer of decision-making to local people and implies that

they will have more control over the design and implementation of local development strategies. It does not specifically indicate how, but it implies that power should be transferred to those whose voices were not traditionally heard. Friedmann (1992: 20) offers insight into some of the goals of empowerment. '...alternative development involves a process of social and political empowerment whose long term objective is to rebalance the structure of power within society by making state action more accountable, strengthening the powers of civil society in the management of their own affairs.'

Although widely accepted as an important goal in social development, empowerment is difficult to measure. Recently though, the concept of empowerment has been translated into observable and measurable actions. INTRAC (1999) identifies three broad areas in which people's empowerment can manifest itself.

- ❖ Power through greater confidence in one's ability to successfully undertake some form of action.
- ❖ Power in terms of increasing relations which people establish with other organisations.
- ❖ Power as a result of increasing (or securing) access to economic resources.

Another key indicator of increased power is the ability of local actors to influence the wider policy process, beyond the project level in order to bring about more fundamental changes.

The literature on empowerment often neglects the complexities and difficulties of not further empowering the already powerful but rather incorporating a more democratic or equitable distribution of power. There is always a danger that the use of empowerment in the context of development interventions may be based on a superficial understanding of local relations

of power. It is the marginalized that should be targeted by these initiatives. This is certainly an element in Paulo Freire's 'conscientization' of the poor. Poverty and underdevelopment have been said to be exacerbated by a state of mind, defined by Freire (1972), with no voice, no access, and no participation which perpetuates people's powerlessness, isolation or lack of involvement in the development process. In this sense, participation seeks to reverse barriers to development (Oakley and Marsden, 1990).

Capacity building - Capacity-building involves a learning process in which individuals who participate gain a greater understanding of the process by which goals were reached. This is particularly true when community involvement starts early. Early involvement will not only increase management capacity but also lead to a feeling of confidence and ownership of the process. Like many of the other objectives, it is related to long-term project success. This is especially so for natural resource management initiatives where sustainability is dependent on a communities management capacity and their ability to continue the initiative even after external support has diminished.

Increasing project efficiency - Project efficiency is closely related to project effectiveness. While an effective project will ultimately achieve its goals, an efficient project will do so in less time with fewer resources. Participation can contribute to project efficiency in the sense that, by being more locally appropriate, they can avoid costly errors. This would also fall under Pretty's 'functional participation' category (See Table 4). Although critics would argue that this objective is a manipulative one, there can also be community benefits that result from it. An example of these benefits is the more timely provision of goods and services to communities.

Increasing equity - It is well established that development gains are often sequestered by local elites or others who are relatively better off (Chambers 1997, Narayan-Parker, 1996). One of the results of community

participation can be the more equitable distribution of the benefits of development interventions. Participation can promote greater transparency in decision-making as well as increased accountability. It is believed that these factors can contribute to more equitable access to resources. This is a controversial objective since participatory processes can also be 'hijacked' by the local elite. Who participates often mirrors internal power structures and divisions unless explicit efforts are made to include marginalized community members. For example, women and the elderly (or children) may not even be included or encouraged to participate in these processes. Collective efforts require collective support and this is much more likely to come from a group that feels that the benefits (whether from increased power over or access to resources) are equitably distributed. Rules and regulatory instruments developed collectively are also much more likely to be equitable in that they will better reflect the needs of diverse resource users and therefore enjoy broader support.

Improving project effectiveness- Project effectiveness can be defined as the degree to which stated project objectives are in fact achieved. Participation can lead to greater project effectiveness in a number of ways. Community involvement in initiatives can encourage more appropriate designs based on local realities, local resources and knowledge. While participatory approaches generally lead to more time-consuming interventions and perhaps higher costs, in the long run more appropriate projects should be more sustainable and therefore worth the initial increased time investment. This is particularly true for resource management projects where sustainability is ultimately dependent on community acceptance and ownership of interventions.

Cost-sharing - Cost sharing specifically refers to cash or in kind (such as labour, materials) contributions by individuals or communities which help support conservation initiatives. These in kind contributions can be towards immediate project needs or for long-term project support. In

Pretty's categories, cost sharing would be associated with 'functional participation' whereby participation is seen as a 'means of achieving project goals to meet predetermined objectives related to the project' (See Table 3.4).

At first, it may appear that this objective is an inherently manipulative one with the community a passive actor. However, this is not necessarily true since cost sharing may have positive benefits for all parties involved. Benefits of cost-sharing in development initiatives can include an increased sense of ownership of the process and outcome of the initiative. It is also a way of obtaining a serious commitment to the development process by communities as opposed to more paternalistic relationships where communities are 'recipients' or 'beneficiaries'. In kind cost-sharing can also encourage complementarity between communities and external agents whereby communities carry out functions that would be highly inefficient for outsiders to attempt.

3.5 Summary and Conclusion

This chapter has described the theories upon which conventional approaches have been based. It then presented a critique of these approaches by describing the limited applicability of models to real life situations. This argument was illustrated through a series of examples of groups that have over time forgone individual short-term benefit for the sake of long-term collective gain. This chapter then presented an alternative view to past approaches to conservation that depends on the active participation of local resource users for its success. Common property resource theory places resource users at the centre of the conservation debate. It also reinforces the social nature of conservation where it has largely been seen as the domain of natural scientists. Examples of successful common property resource regimes can be drawn from both developed and developing countries although it is in the latter that these regimes often contribute substantially to local livelihood maintenance. This

fact makes support for these regimes where they exist all the more important.

This chapter went on to describe some of the key elements of successful or robust common property regimes. An in-depth discussion was presented about some of the key theoretical factors which are essential to the success of these regimes. The existence of a shared identity and sense of community, stocks of social capital in facilitating collective efforts and making them more effective were also discussed along with the different dimensions and degrees of local participation in these regimes which often dictate their success. This discussion is relevant here as it will help identify the social characteristics of the fishing community in Arraial do Cabo, RJ that will provide both potential and challenges for collective action in designing and sustaining an extractive marine reserve.

Although the alternatives discussed are still being documented and the theory developed, this area of research has had important policy implications. Analysis of common property resource regimes has helped put local resource users at the centre of the conservation debate. It has highlighted the potential and the relevance of building management regimes from the bottom up. Another implication of this line of research is its contribution to a growing field of policy approaches that involve the collaborative management of resources between communities and government. Co-management approaches are currently being developed on a variety of scales and contexts world-wide. The following chapter on Collaborative Management and Extractive Reserves will discuss how communities and governments can work together to support the development or maintenance of common property resource regimes. Where this chapter aimed to show that alternatives exist and should be pursued, the following chapter attempts to operationalize the concept and show how governments and communities can share responsibility for conservation at the local level.

Chapter 4 Collaborative Management and Extractive Reserves

This chapter will discuss attempts to operationalize collective resource management. It will discuss a hybrid approach to the management of common property resources in which rural communities work in partnership with government, a process often referred to as collaborative or co-management. This chapter will begin with a general discussion on collaborative management regimes including the different definitions, types and dimensions of these regimes. It will also present the design principals identified in the literature which are relevant to creating co-management arrangements with the goal of enhancing long-term community participation. Afterwards, this chapter will review collaborative management efforts in Brazil through a discussion of the Extractive Reserve conservation category. This section will briefly describe the factors that led to the creation of this collectively managed conservation unit. Then, it will review some of the characteristics of this type of reserve including the process of establishment and other legislative aspects.

4.1 Collaborative Management

The recognition of the value of local resource users in the process of resource conservation and management has led to formalised policy initiatives which are based on shared responsibility over resources between communities and government. Participatory management, community based management, collaborative management or co-management are all terms used to describe these arrangements.

In the collaborative management model, the focus is no longer placed on the need for a 'Leviathan' or centralised control. Instead, new approaches stress the importance of decentralised governance and user participation in the management process. In these arrangements, local resource users play a pivotal role in decision-making, implementation and enforcement. Jentoft (1998: 425) notes that this approach is supported by two main premises. First, the knowledge accumulated over time by resource users is often complementary to more formal scientific knowledge producing more 'enlightened, effective and equitable remedies and solutions to management challenges.' Second, the participation of resource users in the various management stages legitimises these arrangements, thereby contributing to their compliance and resulting in more effective conservation strategies.

Co-management is often described as a middle course between pure State management and pure communal property regimes. It involves the recognition and legitimisation of traditional or informal local-level management systems. Authors warn that experiences in co-management are still at an incipient stage and, due to this, along with a variety of contextual factors identified as necessary for their success, these innovative approaches should not be regarded as a panacea for halting resource depletion.

4.2 Definitions of co-management

Definitions of co-management vary but, as we can see through some of the most accepted definitions, there are important common features. Sen and Nielson (1996: 406) define co-management as 'an arrangement where responsibility for resource management is shared between the government and user groups.' As much of the experience to date in co-management is emerging from the field of fisheries, one of the most useful definitions of this concept is offered by the International Centre for Living Aquatic Resources Management. They define collaborative management as 'a dynamic partnership where the capacities and interests of local resource users and communities are complemented by the ability of the State to provide enabling policies and legislation as well as enforcement and other assistance' (ICLARM, 1998: 2).

Berkes and Pomeroy (1997: 446) relate co-management directly to fisheries development where co-management entails the 'sharing of responsibility and authority between the government and the community of local fishers to manage a fishery.' Jentoft (1989: 144) defines it as 'placing management part way between government regulation and community self-management.' West and Brechin (1991:25) see co-management as 'the substantial sharing of protected areas management responsibility and authority among government officials and local people.' Probably the most comprehensive definition of these types of regimes came from the October 1996 World Conservation Congress in Montreal which defined co-management as 'a partnership in which government agencies, local communities and resource users, non governmental organisations and other stakeholders share, as appropriate to each context, the authority and responsibility for the management of a specific territory or a set of resources' (McNeeley 1996: 96). Although many of the experiences in co-management have taken place in fisheries development, these arrangements are not limited to this field and can be applied to a diversity of contexts. They are often developed within

the framework of protected area management but are not limited to these areas as demonstrated by experiences in Norwegian and Japanese fisheries (see Baland and Platteau, 1996).

Common to most definitions is the sharing of power between governments and communities. The benefits sought by all actors in co-management consist of more appropriate, more efficient and more equitable management. These experiences are often evaluated in terms of increased equity, reduced administrative and enforcement costs, a change in the sense of ownership by appropriators, a higher degree of acceptability and rule compliance, improved information about the resource, improved social cohesion in the community, and more participation (Pomeroy and Williams, 1994). The processes by which these goals are achieved through co-management include economic and social development, the decentralisation of resource management decisions as well as using co-management as a mechanism for reducing conflict through a process of participatory democracy. In co-management, resource users benefit from participating in management decisions that affect their welfare; government has the benefit of a reduced challenge to its authority. In the Brazilian context, these arrangements are also being sought as a method of protecting traditional societies, such as artisanal fishers or gatherers, from the growing pressures arising from unsustainable development practices.

Types of co-management

Sen and Neilson (1996) argue that a broad spectrum of co-management arrangements exists, varying significantly in terms of the balance between community and government involvement. What dictates the balance of power between the two groups should be their comparative advantage in offering different elements essential to any collaborative management regime. Baland and Platteau (1996) disaggregate what governments and communities can offer to this process. The author argues that local resource

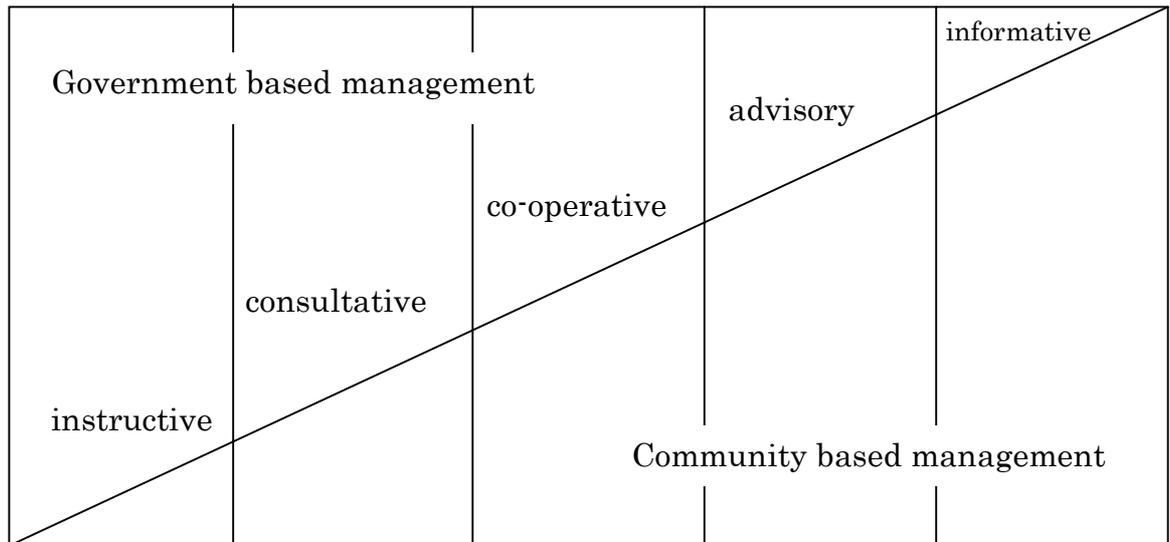
users can offer local ecological knowledge as well as an insider understanding of the socio-cultural context. Often, local groups have self-monitoring systems that can be significantly less costly than centralised control. Conflict resolution mechanisms through traditional techniques to minimise the incidence of interpersonal conflicts are also often available.

Baland and Platteau (1996) argue that while communities have much to offer the collaborative management process, government can and should support communities in areas that complement capabilities at the local level. Such areas include providing a legal framework which legitimises local identity and rights over certain resources. The State can provide technical assistance or guidance to user groups or communities. Where relevant, the State can also provide (or help attract external agents that can provide) economic incentives for participation and rule compliance. Finally, the State can play an important role in monitoring functions where decentralised monitoring needs external support. Although the relationship between the State and resource users or community in collaborative management should be based on the concept of complementarity, there are often other factors that influence the distribution of responsibility. For example, the State may not be willing to decentralise decision-making power to the community. The following section presents the different variations of collaborative management followed by examples.

Collaborative management arrangements include a wide range of combinations of community self-management and centralised control. At one end of the range is the 'instructive' version, where the State creates mechanisms for dialogue with users and informs them of government management decisions. At the other end are 'informative' arrangements, where the user group informs government of decisions made at the local level. Where co-management is 'informative' the role of the State is reduced.

Sen and Nielson offer five generalised types of arrangements in their classification of twenty-two co-management case studies. Building on earlier work by McCay and Jentoft (1995), they establish the classifications presented graphically below:

Figure 4.1 Spectrum of co-management arrangements



(Source: Sen and Neilson, 1996:405)

Spectrum of co-management arrangements

Where co-management is *instructive*, there is only a minimal exchange of information between government and users. This type of co-management regime is only different from centralised management in the sense that the mechanisms exist for dialogue with users, but the process itself tends to comprise government informing users on the decisions they plan to make.

Consultative co-management is characterised by the existence of mechanisms for governments to consult with users, although under these arrangements all final decisions are taken by government. *Co-operative* co-management is the variation that exemplifies best the goals of co-management. Ideally, under these arrangements, government and users cooperate together as equal partners in decision-making. It is often referred to as the 'truest' form of co-management. Another variation of the co-

management concept is characterised by the advisory role that governments play in management decisions. Under these arrangements, local communities have the primary responsibility for management. Only under *informative* arrangements do local communities shoulder more responsibility in management decisions, implementation and enforcement. Under these arrangements, the government has delegated and decentralised decision-making to user groups who, in return, inform government of decisions made at this level. In their review of co-management case studies, Sen and Nielson (1996:410) categorise twenty-two cases in terms of the balance of power between communities and the State. Examples drawn from this document are presented in Figure 4.2.

Figure 4.2 Examples of different types of co-management

Instructional

Inland waters, Bangladesh. In 1986, the government of Bangladesh initiated a New Fisheries management Policy aimed at improving and sustaining open inland water fisheries as well as promoting greater equity in the distribution of benefits of the fishery. The main policy instrument was to discontinue the leasing of public water bodies to middlemen and replace this system with direct access rights to fishermen. The government hoped for a partnership between themselves and fisher communities. One of the most notable features of the new fisheries management regimes that came into operation following the introduction of this new policy was the active participation of NGOs as intermediaries between fisheries and government. One NGO took over the management of over 800 water-bodies, obtaining long term leases and entering into a co-operative arrangement with landless people to fish the water-bodies. However, the NGO made all financial and management decisions and group members (fishers) are only responsible for labour inputs. Limited input by fishermen in the process makes the classification of these arrangements as instructional.

Co-operative

Customary Fishing Rights Areas, Fiji. The fisheries co-management regime in the fishing rights areas of Fiji is, in general, a co-operative effort between national government and resource users. The fishing rights areas (qoliqoli), officially termed Customary Fishing Rights Areas, are under the control of clan chiefs and recognised by government. Management of the subsistence fishery is decided upon and controlled by the traditional authorities but responsibility for the management of the small scale commercial fishery is

shared between the traditional clan chiefs and government in a complex arrangement. Licenses for commercial fishing are issued by the fisheries Division but before applying, fishermen must first obtain a permit from the social unit in whose area he intends to operate. This is issued by the District Commissioner, if the tribal group consents. Thus, the traditional authority determines whether commercial fishing can occur and the conditions on the license concerning target species, permitted gear, areas of exclusion and conservation rules. As management control is equally shared by the community and national government, this case is classified as co-operative management.

Informative

Mechanised beach seine fishery, Mozambique. In 1981, the beach seine fishermen were organised into a Fishermen's Association. This enabled the District Administrator to discuss and negotiate with one group. The Association regulates fishing activities, calls meetings which local government officials attend and makes decisions concerning the opening and closure of the fishery. The government officials do not interfere in the decisions that are taken. A letter (also signed by the District Administration) is then sent to Provincial authorities informing them of the decisions taken. This is submitted in proposal form to central government for authorisation. As the administrative approval process takes a long time, many of the decisions proceed without formal government authorisation. In effect, the authorisation procedure informs government of the decisions taken by the Association.

Source: (Sen and Nielson, 1996: 410)

The degree of responsibility and/or authority that government and local resource users command differ between cases and depends upon country and site specific conditions (ICLARM, 1998). The categories presented above are clearly a simplification of how co-management arrangements function in practice. Most of these arrangements are combinations of these five types and it is not uncommon for the balance of power and involvement to change over time. Some would argue that the *instructive* type presented above represents a top-down model which should not be considered a valid type of co-management due to the lack of partnership between government and the community. For this same reason the *informative* type is often associated with self-governance and as the balance of power is unequal, this category also falls short of ideal forms of co-management (ICLARM, 1998). While there is little agreement on which of these is most effective, most would

agree that the success of each approach is dependent on a series of contextual factors.

4.3 Conditions for successful co-management

The analysis of thriving co-management case studies has resulted in a wide consensus that these arrangements may only work effectively under a limited range of conditions. Baland and Platteau (1996) warn of the danger of putting too much reliance on co-management and user involvement as *the* solution to management problems. After a review of the classic co-management case studies they note that,

'Unfortunately, there is presently no conclusive evidence that user communities can be 'the solution' to problems of resource depletion and ecological destruction, even within a co-management framework, and that the best documented case illustrating such an approach, that of Japanese fisheries, only shows that user communities can be made effective partners for resource management in certain circumstances' (Baland and Platteau, 1996:351).

Using the key principals and conditions for successful CPRs initially developed by Ostrom, ICLARM (1998) has developed an expanded list based in their review of co-management experiences in Asia. From their work, certain pre-conditions are emerging which appear to be central to the chances of developing and sustaining successful co-management arrangements. These conditions should not be taken as complete since continued research is needed to reveal more about co-management arrangements and the factors leading to successful performance.

Apart from those put forward by Ostrom (1990, 1992) as key principals for long enduring and robust CPRs, ICLARM (1998), has contributed a number of new and innovative factors relevant to collaborative management regimes.

Their study highlights the importance of participation since successful co-management cases were characterised by the fact that most of the individuals affected by the management arrangements were included in the group (through membership and voting rights) responsible for making and changing the rules. Early and continuous participation of partners in planning and implementation of co-management was also related to their success (Pomeroy and Katon, nd). Participation is related to other key factors that this study identified. For example, a sense of ownership of the process is identified as important. Active participation of partners is directly related to their sense of ownership and commitment to the co-management process.

Another key factor identified is the importance of congruence between the co-management structure and existing traditional social and cultural institutions. When a co-management approach is being implemented where common property resource regimes already exist, these traditional institutions should be respected (Pomeroy and Katon, nd). Co-management should strengthen and revitalise these structures where they exist. As discussed in the previous section, these traditional systems have often worked well at meeting community management objectives along with ecological sustainability, social equity and economic efficiency.

Another factor the Pomeroy study expanded on is how the scale of co-management initiatives can dictate their effectiveness. Scale is fundamental in most co-management initiatives (ICLARM, 1998). Appropriate scale depends on the area's ecology, people and level of management. In terms of its members, Pomeroy, like Ostrom, observes that smaller groups are more manageable than larger groups. Where a large number of people are involved, they suggest sub-dividing them into smaller groups in order to facilitate supervision, control and management.

An interesting factor not mentioned by Ostrom is the need for a process of social preparation and value formation to take place prior to the planning and implementation of a co-management process. This process may involve a variety of elements including building or strengthening the institutions that will later take on management responsibilities. Recommendations from a recent study of CARICOM¹⁹ fisheries highlight the importance of this. 'Fishers will need to be organised and existing organisations strengthened to participate in and undertake management. Fishers will also need training on resource planning and management, participation and leadership, among other topics' (Pomeroy and Brown, 1999:567). The inability to sustain co-management may be partly linked to insufficient time dedicated to this process. An indicator of 'good social preparation' for this type of initiative can be demonstrated by positive attitudes towards collective action and the readiness for community members to take on responsibility for resource management and decision-making.

Because collaborative management approaches are new to both communities and government, changes in attitudes must accompany decentralised policy approaches to fisheries management. Brown stresses that the effectiveness of co-management is largely dependent on the ability of government structures to adapt to these changing approaches. He states that 'the building and strengthening of institutional structures [at the local and State level] are essential ingredients for the operation of co-management regimes' (Brown, undated: 10). Drawing from his experience reviewing the opportunities and constraints for co-management in the CARICOM region he warns that 'Old attitudes which cling to the fishing effort expansion and the transfer of technology mode, will take sometime to give way to the order of the day' (Brown, undated: 10). Public awareness and education programmes for resource user groups as well as for fisheries

¹⁹Caribbean Community

department staff can be important in preparing all parties for effective participation in fisheries resource management.

In the framework from Oakerson (1992) to analyse the key factors in the success (or failure) of co-management regimes, ICLARM identifies a series of contextual variables that require consideration in order to understand the positive or negative outcomes of co-management regimes (ICLARM, 1998:10) or, to put in other words, to understand why, under certain conditions communities are willing to engage and participate in co-management regimes. Not every design principle is relevant or applicable to every case study. The contextual factors presented below are of differing importance depending on the ecological and social context. These factors are organised into four categories with three of the four occurring at the community (fisher) level and the fourth external to the community. A discussion of these variables follows.

Contextual variables

It is often the recognition of resource depletion by a community that provides the necessary incentive for collective action to protect this resource. This depletion could be the result of an increase or change in technology within the user community itself, natural changes in stock or depredation of local resources by outside users (industrial fishers, pollution, etc.). The fact that communities mobilise in self-defence against threats to their resource base does not ensure that they will maintain these efforts over time. The likelihood of this taking place rests on other qualities. Jentoft (1999:53) asserts that not only do viable fishing communities require viable fish stocks but the reverse is also true, 'viable fish stocks require viable communities.' He states that communities with robust local institutions for resource management along with a strong community are an important factor in the appropriate management of fisheries and therefore in the maintenance of viable stocks.

According to Oakerson's (1992) framework, the market attributes of a community fishery are also an important factor influencing the behaviour of fishers. Resource problems are often market-based. Market attributes can affect the incentives for resource use and effort levels along with rule compliance. Depending on whether fisheries are commercial, recreational or subsistence, user groups will be affected differently by market changes. These attributes also include those related to the operation and function of the market along with the characteristics of the relationships between fishers and fish traders or middlemen. There are often power relations between buyers and suppliers that constrain fishers' participation. Important factors related to the local market context can also include variables such as the availability of credit for investment purposes.

Socio-economic and socio-cultural variables are often the source of positive and negative incentives for communities to engage in collaborative management. These variables include religious beliefs and practices, traditions and customs, a shared historical legacy, economic heterogeneity or homogeneity, race and others. These factors can result in a strong community identity or they can often divide communities, complicating the process of co-management.

As discussed in the previous chapter, communities are usually seen from the outside as homogenous entities. ICLARM (1998) reinforces the importance of understanding difference and diversity in these settings as they can create both challenges and opportunities for the resource management process. Some authors suggest another key socio-cultural attribute that often leads to incentives to co-operate (Ostrom, 1990; Runge 1986). Homogeneity within a community is viewed as a key design principle in both CPR regimes and co-management arrangements. The more a community exhibits a high degree of social, cultural and economic homogeneity in terms of kinship, ethnicity, religion, livelihood strategies etc. the higher the likelihood of co-operation. This discussion of homogeneity is

often associated with that of social capital or social cohesion within the community. Heterogeneity within the community can often be the source of conflict and disunion.

The degree to which fishers or other resource users have developed an understanding over time of the ecological systems upon which they depend is also seen as important. Often communities have developed an insider's understanding of these resources such as the location of certain plants and animals, and their habitats. Sensitivity to these biological systems can strengthen the understanding of the need for conservation. There is a generally accepted assumption that the higher the degree of dependence (or at least perceived dependence) on a particular resource the more likely it is for resource appropriators to engage in activities to protect these resources. This is especially true if alternative sources of livelihood within the community are scarce.

The institutional and organisational arrangements at the community level are also important in creating a viable environment for successful co-management. Institutional arrangements involve the rights and rules which regulate the use of the resources in question. The existence of traditional institutions often provides an important building block for successful co-management regimes. Long-term experience in managing common property can make the transition to collaborative management more efficient and effective. How community members participate in these regimes is also relevant since a history of collective action and mobilisation in the administration of these resources can contribute to the social cohesion and sense of individual responsibility necessary for the success of collaborative management regimes.

Organisational arrangements refer to the characteristics of these institutions such as issues of representation and decision-making procedures. They also refer to who participates in these structures and who

does not. An analysis of these arrangements also involves the identification of community power structures, both traditional and new, within the community. Essential to the success of both organisational and institutional arrangements is their legitimacy and the degree to which resource appropriators comply with management rules.

External Variables

Institutional and organisational arrangements external to the community can also affect the degree to which user groups co-operate in co-management. The effectiveness of the national institutions which will support these arrangements such as environmental ministries or fisheries agencies can be an important factor in determining the success of these regimes. Although embarking on co-management as an alternative to past policies, the agencies may not yet be ready to pursue such initiatives. Co-management requires government agencies to deal with local communities as partners. This approach is relatively new and many agencies and their representatives are often still stuck in their top-down legacy.

Requirements and objectives at the national level may be incongruent with those at the local level. National organisations may not respect local communities in terms of their potential to be effective partners in the conservation process. The legitimacy and effectiveness of these organisations is also essential. They will provide the anchor for co-management arrangements especially when the idea for creating these arrangements comes from them and not from the community itself. This is especially important for developing countries where co-management is seen to be attractive for its cost saving characteristics. For co-management to work, government must hold to its promises.

Factors exogenous to the resource-base and local community level can also influence the outcomes of co-management regimes. These factors are usually beyond the control of local resource users but may nevertheless have

important impacts. These factors include policy changes at the national level or political and macro-economic changes. They may also include changes in the natural environment (hurricanes, natural stock fluctuations) which can effect decisions made at the local level. These types of changes effect the broader environment within which these exist. For this reason, it is important that any analysis of these regimes takes a historical and dynamic perspective.

The environment that the combination of these contextual factors creates influences the likelihood that fishers (or other resource users) will cooperate and contribute to the co-management process. The degree to which appropriators participate is an essential element in measuring regime success. The outcomes of these initiatives will be dependent on these factors as well as the interaction between user groups and other partners such as government in the co-management process. According to ICLARM (1998), the performance of co-management can be evaluated at two levels. The first is whether the process is advantageous in comparison with other types of management arrangements. These advantages include equity, greater cost effectiveness, an increased sense of ownership by resource users, a higher degree of acceptability and rule compliance, improved social cohesion in the community and more participation (Pomeroy and Williams, 1994). The second level of evaluation is related to the meeting of specific management objectives. This level of evaluation centres on performance as well as measuring the impacts of these activities on both the human and biophysical environment.

As we have seen in this section, there are many variations of co-management arrangements. Their classification is in part dependent on the balance of responsibility between government and resource user communities. They are also dependent on certain endowments or characteristics that influence the type of co-management as well as their potential for success. These include both internal factors such as the socio-

economic characteristics of the community as well as characteristics of the resource itself. Internal factors include the size and make-up of the resource user group as well as their connection and traditional knowledge of the resource in question. External factors involve the readiness and willingness of government to get involved in co-management. Both sets of factors influence the relationship between resource users and their environment which provides the basis for building co-management arrangements.

The following section will review a relatively new approach to resource management adopted as a policy instrument by the Brazilian Government in 1990 in response to deforestation and pressures on traditional resource user groups in Amazonia. It is a type of collaborative management arrangement called an Extractive Reserve. This section will describe some of the events which led to the creation of this innovative conservation category as well as some of its major features.

4.4 Extractive Reserves

There is growing official recognition in Brazil of the role of traditional resource users and their management systems in environmental conservation. Extractive Reserves are being used as an increasingly important policy instrument by the Brazilian Government, particularly through the Centre for Traditional Populations (CNPT) within IBAMA. Since their introduction in 1990, Extractive Reserves have focused on protecting terrestrial and other inland ecological systems and populations. From 1989 to 1996 there were only two reserves created which focused on aquatic resources; Pirajubae in Santa Catarina and the case study for this thesis, Arraial do Cabo in the state of Rio de Janeiro (See Table 4.1.)

A list made available by CNPT indicates an increasing trend towards the establishment of Marine reserves. Of 22 reserves currently being set up, 18 focus on water resources with the majority (13) encompassing open water

marine environments in coastal areas (See Table 4.2). This policy trend is significant in that it represents the first government-sponsored effort to protect the common property resources upon which small-scale fishers depend. Interestingly, these developments have been initiated not through a department of fisheries but through the CNPT, a branch of the Brazilian environmental control agency (IBAMA) that focuses on the sustainable development of traditional populations.

Table 4.1 Extractive Reserves in Brazil

Name	State	Decree #	Area (ha)	Pop.	Activities Practised
Alto Jurua	Acre	98,863/90	506,186	5,821	Rubber tapping
Chico Mendes	Acre	99,144/90	970,570	12,017	Brazil nuts, copaiba, rubber tapping
Rio Cajari	Amapá	99,145/90	481,650	3,639	Brazil nuts, copaiba, rubber tapping, acai
Rio Ouro Preto	Rondônia	533/92	204,583	775	Brazil nuts, copaiba, rubber tapping
Pirajubae	S. Catarina	534/92	1,444	690	shell fish gathering
Cfiriaco	Maranhão	535/92	7,050	844	Babassu, subsistence agriculture
Norte de Tocantins	Tocantins	532/92	9,280	320	Babassu, subsistence agriculture
Quilombo do Freixal	Maranhão	536/92	9,542	1,080	Babassu, subsistence agriculture, fishing
Mata Grande	Maranhão	92	10,450	776	Babassu, subsistence agriculture
Arraial do Cabo	Rio de Janeiro	96	56,769	1,500	Fishing, shell collecting

(Source: Rueda and Murrieta, 1995; Hall, 1997b: 104; Cardoso, 1999:153)

Table 4.2 Plans for Future Extractive Reserves

Name	State	Disrict	Area (ha)	# of Families
RESEX Auati-Parana	AM	Fonte Boa/Japuri	90,000	178
RESEX do Baizo Jurui	AM	Jurui/Uarini	188.000	
RESEX do Lago do Tucuru	PA	Tucuru/Breu Branco/Novo Repartimento	290,000	1000
RESEX do Rio Jutas	AM	Jutas	250,630	116
RESEX do Riozinho da Liberdade	AC	Cruzeiro do Sul	400,000	178
RESEX do Lago do Catui	AM	Tefe		
RESEX Marinha do Batoque	CE	Aquiraz	6,678	135
RESEX Marinha do Delta do Parnaiba	PI/MA	Ilha Grande (PI)/ Araisoses (MA)	27,560	3600
RESEX Marinha do Soure	PA	Soure	128,000	278
RESEX Marinha de Itacare	BA	Itacare		
RESEX Marinha da Mata Norte	PE	Igarassu/Goiana		420
RESEX de Arumanduba	PA	Arumanduba/Almeirim		100
RESEX Marinha do Sucuriju	AP	Amapa	10,400	68
RESEX Marinha de Alcobaca	BA	Alcobaca		
RESEX do Pimental	PA	Curralinho		
RESEX do Lago do Capananzinho	AM	Manicore		
RESEX Marinha de Augusto Correia	PA	Augusto Correia		
RESEX Marinha de Braganca	PA	Braganca		
RESEX Marinha de Curuci	PA	Curuci		
RESEX Marinha de Maracani	PA	Maracani		
RESEX Marinha de Santarem Novo	PA			
RESEX Marinha de Sao Joao da Ponta	PA	Sao Joao da Ponta		

(Source: www.ibama.org.br)

Brazilian fisheries management, discussed in depth in Chapter 2, has largely consisted of the transfer of approaches used in developed countries (such as quotas and licensing) to an ecological and social context which is radically different. Efforts have also focused primarily on large-scale fishing activities by offering generous financial incentives along with tax concessions and cheap credit. Recently though, environmental concerns such as marine and coastal zone degradation along with social concerns such as employment generation and food security, have led policy makers to seek alternatives to the status quo.

Extractive reserves are a type of collaborative management regime where government works in partnership with local communities towards the sustainable use of resources. Until the establishment of the Extractive Reserve in Arraial do Cabo, RJ, the concept and discussion surrounding their creation was always associated with inland or terrestrial resources. This is apparent in the definition presented in Decree no. 98.897 that created the extractive reserve (RESEX) conservation category on January 30, 1990. Article I of this decree states that, 'Extractive reserves are *territorial* spaces designated for the self-sustaining use and conservation of renewable natural resources by extractivist populations' (author's emphasis) (Rueda and Murrieta, 1995). It is likely that this land bias exists because the struggles that led to the creation of these categories took place far from the Brazilian coastline. In fact, the earliest reserves established were located in the north of the country and only later applied to areas outside of Amazonia (See Table 4.2).

History of Extractive Reserves

It was largely the years of struggle and collective action of the rubber tappers in Amazonia that provided the historical underpinning for the creation Extractive Reserves. As previously mentioned, until the 1960s Amazonia was seen by the Brazilian military regime as a vast and empty

territory in need of conquest and integration. Developing Amazonia was considered the missing link for achieving Brazil's economic potential. During this period, significant financial incentives were put in place which supported environmentally destructive activities such as mining, commercial logging, cattle ranching and poorly planned resettlement projects. Political and economic goals behind these programmes resulted in major changes in practices in rural areas previously used primarily by traditional extractivist populations. As approximately half of the rural population of this region is at least partially dependent on terrestrial and aquatic extractive activities in order to meet their basic livelihood needs, these land use changes have had important livelihood impacts (Hall, 1997b).

The rubber boom in the second half of the 19th century, propelled by the invention of the pneumatic tire in 1888 brought workers from the drought-prone Northeast of the country to work on rubber estates (*seringais*) in Amazonia. These estates were managed by a system of debt bondage in which workers unable to accumulate the necessary resources to leave the seringal were effectively slaves. With the crash of international prices after 1912, many large plantation owners abandoned their estates leaving many *seringueiros* to fend for themselves. But although relieved of the oppressive system imposed by the rubber estates, they still face many challenges. Living in remote areas and largely isolated, they are still heavily dependant on middlemen who control their access to the market place. Also, pressures on their lands resulting from encroaching cattle ranchers and loggers created an environment of growing conflict and tension during the 1970s.

Allegretti (1994:22) identifies four periods that define the process that led to the creation of Extractive Reserves. The first period (1973-1976) is characterised by the *empates* or stand-offs that the rubber tappers employed to defend their territory in the face of encroachment from Paulista cattle ranchers and loggers benefiting from Sudam tax incentives. These stand-offs often involved men, women and children who would physically

block deforestation activities. The first *empate* took place in the municipality of Brasileia in Acre in 1973. By 1988, some 40 had taken place throughout the region. Using this strategy, the rubber tappers made significant strides in their fight against these groups. Led by Chico Mendes and Wilson Pinheiro, both rural union leaders who were eventually murdered as a result of their involvement, the rubber tappers' movement gained momentum. Support for the rubber tappers movement also came from interested academics and international NGOs such as OXFAM.

The second period (1976-1980) in this process was characterised by the recognition by the State that the rubber tappers had legal rights over their areas. This implied that compensation would have to be paid to those tappers that were forced to leave their plots. Also, some of the rubber tappers, represented by the National Confederation of Agricultural Workers (Contag), managed to make agreements with the *fazendeiro* or large land owner whereby tappers would be allotted small plots and the *fazendeiro* would be left with a larger one which could be used for taking advantage of the cattle ranching subsidies available. During this period, while some rubber tappers left with minimal monetary compensation, others remained farming small plots allocated to them.

During the third period (1980-1985) the federal government encouraged colonisation programmes for both small farmers from the South as well as for the rubber tappers of the region. Each family was allocated up to 100 hectares. It was thought that by resettling the rubber tappers, they could be transformed into more conventional types of agricultural production. The result, often, was the opposite. Where small farmers faced problems with agricultural production, they often learned from the tappers how to benefit from forest resources (Anderson and Allegretti, 1994).

The final period (1985-1990) saw the culmination of a process that led up to the legislation creating Extractive Reserves. The effects of the changing

Brazilian political climate, with the hand over to civilian leadership in 1985, only served to further strengthen the rubber tappers resolve to protect their livelihoods. This was manifested in part by scaling up the struggle to the national level with the formation of lobbying groups, notably the National Council for Rubber tappers (CNS) in 1985. Regional organisation helped to bring the struggle of the rubber tappers to international media attention which portrayed the movement as a critical defender of the environment in Amazonia (Hall, 1991). Other factors that drew attention toward Amazonia during this period were increasing criticisms of World Bank-sponsored resettlement programmes, such as POLONORESTE. Another key occurrence was the death in 1988 of Chico Mendes, the father of the rubber tappers' movement, who was murdered by a local rancher. His death attracted world-wide attention and highlighted the rubber-tappers' struggle. With the worlds' attention focused on environmental problems in Amazonia, the country's new constitution, ratified in 1988, was pressured to provide for increased environmental protection.

In 1989, the concept of the Extractive Reserves was formally included as one of the direct use conservation categories in Brazilian conservation legislation. Since 1990, ten federal extractive reserves have been created and many more are at early stages of development (See Tables 4.1 and 4.2).

4.5 Creation and Development

There are three phases in the establishment of both terrestrial and aquatic Extractive Reserves. The first entails a formal request developed by the traditional extractivists in a given area that describes the (socio-economic, demographic, etc.) setting in which the reserve will function along with arguments in support of their proposal. If approved (by IBAMA/CNPT and then signed by the President of the Republic), the implementation stage follows. This stage involves the development of a utilisation plan which defines who, when and how resources can be used, in essence the social contract between users. This plan must then approved by IBAMA/CNPT

thereby defining and codifying the rights and responsibilities of government, the representative resource user association as well as those of the resource users themselves.

The third stage begins with the successful termination of the second and is by far the longest and most challenging stage. During this phase the Utilization Plan is operationalized and strengthened to increase its long-term resilience. In the following section, these phases will be explored in more detail. They are included here for the reader to have a clearer idea of the relationship between the theory surrounding common property regimes and the links between this theory and environmental management practices in Brazil.

Article 1 of Decree no. 98.897 created the Extractive Reserve (RESEX) conservation category on January 30, 1990. This document defines them as, '...territorial spaces destined for the purpose of sustainable use and the conservation of natural renewable resources, by extractive populations (Felippe, nd: 16 author's translation).'20 Article 2 of the same document declares that 'The State will create extractive reserves in territorial spaces of social and ecological interest. Areas considered of ecological and social interest are those that have natural characteristics which enable their sustainable use without jeopardising its conservation' (ibid: 26).

IBAMA's internal decree, the Manual for the Creation and Legalisation of Extractive Reserves outlines three main phases in establishing extractive reserves. The decree specifies the process by which extractive reserves are approved and legally created (Initial Request and Legal Creation Phase). It defines the procedures for the development of a Utilisation Plan which will outline the collaborative management arrangements created amongst the

²⁰ Art 1 - As Reservas Extrativistas são espaços territoriais destinados a exploração auto-sustentável e conservação dos recursos naturais renováveis pôr população extrativista.
Art 2 - O Poder Executivo criara reservas extrativistas em espaços territoriais considerados de interesse ecológico e social.

State, resources users and wider community (Implementation Phase). It also describes the support that should be provided by IBAMA over the long term to ensure sustainability of the initiative (Consolidation and Development Phase).

Phase 1 - Initial Request and Legal Creation

An Extractive Reserve is created when a presidential decree declaring the reserve is published. In order to reach this point, extractivists in collaboration with NGOs, local universities or IBAMA itself, submit a proposal requesting its creation to CNPT/IBAMA which, once approved, is forwarded to the President of the Republic. This proposal must include arguments supporting the creation of the reserve (*Exposição de Motivos*) (Allegretti, 1994). It must also include a technical report (*Relatório Técnico*) summarising the social, environmental, economic, and any land tenure issues concerning the site in question.

There are three components which must be present in order for the initial application to be approved. These relate to the physical area, the economic activities in which local populations engage and the characteristics of the population itself. In terms of physical characteristics, extractive reserves were initially conceptualised as terrestrial spaces. With the creation of the Pirajudae reserve (located in a closed estuary) in the state of Santa Catarina and now the Arraial do Cabo RESEX, representing the first open water RESEX, the definition of extractive reserves is broadening. Despite these changes, the essence remains the same. For an extractive reserve to be set up, the resource in question (whether terrestrial or aquatic) must be able to be sustainably used.

If the first factor is that a renewable resource exists, the second factor demands that these resources are being used in a way that does not threaten the resource base. Although the rubber tappers do not live from

rubber alone and also practice small-scale agriculture, this is done at a scale that is considered sustainable. For the fishers in Pirajudae, molluscs provide the renewable resource upon which their livelihoods depend and in Arraial do Cabo it is the fish that guarantee their livelihoods. Although there is no specific mention of common property regimes per se, the application should provide proof that historically, the resources in question have been managed sustainably. The third element is related to who is using these resources, the resident population. Those individuals living off the resources must be traditional users of those resources, such as seringueiros (rubber tappers), castanheiros (nut gatherers), jangadeiros (raft fishers) etc. What is and is not considered traditional is not clearly defined and varies from case to case. For the extractivists of Arraial do Cabo, as will be discussed later in this thesis, defining who are and who are not traditional users of the areas renewable resources drew out deeply rooted feelings about local identity and culture.

Having fulfilled the three fundamental prerequisites does not guarantee that an Extractive Reserve will be created. The government agency responsible for these initiatives, IBAMA, must be able to respond to these demands. Conservation priorities at the national level are also a factor in determining where scarce resources will be allocated (Anderson and Allegretti, 1994).

Phase II - Implementation

Once a project is approved and the presidential decree published in the federal public registry (*Diário Oficial*), a number of steps need to be taken in order to begin the implementation process of the reserve. First, the land tenure situation needs to be legalised. Where land is privately owned this means expropriation by the State. Where the area is already under State control, this process is considerably easier and consists of merely changing the area's legal status. In the case of marine reserves, beaches and aquatic

areas in Brazil are already controlled by the federal government, which simplifies this process. As we will see later, even though aquatic areas are not owned by individuals, they are used by groups that may or may not live near these areas and excluding some users inevitably causes conflict. In the case of Arraial do Cabo, RJ, there were many small-scale fishers from nearby municipalities whose access to these resources was threatened by the creation of the RESEX A.C.

One of the requirements at the implementation stage is that the community be organised in an association which will act as the intermediary between the State (IBAMA) and resource users. In most cases, these associations do not already exist and must be created. Once an officially registered association has been established, a contract is signed between IBAMA and the Association giving usufruct rights (*Concessão de Direito Real de Uso*) for a minimum of sixty years (Hall, 1997b; Anderson and Allegretti, 1994). This process of ownership distribution and/or recognition effectively creates a legalised unit of collective private property or common property. This lengthy commitment is included so as to secure user rights over the long-term and avoid incentives for degrading them in the short-term. Both the distribution of ownership rights and access to resources along with the creation of an association to manage the RESEX are all measures taken to create incentives for long term participation as well as to ensure the feasibility of collective management.

It is also at this stage that a Utilisation Plan (*Plano de Utilização*) is developed to determine who can use the resources in question and how they will be used. In essence this is the social contract, binding the resource users to a mutually agreed set of operating rules. Examples of such rules could include such issues as required catch size or technology used or they could restrict access to important breeding grounds. It is essential that these rules are case-specific and reflect the different environmental and social scenarios peculiar to each reserve. Decisions over what the rules

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

The Utilisation Plan, along with the process leading to its creation, is also important for resolving (or at least revealing) conflicts amongst resource users as well as conflicts between resource users and the wider community. It also presents the monitoring mechanisms which will be employed to ensure conservation of the resource base. Generally speaking, monitoring is the combined responsibility of the resource users themselves along with the association representing the inhabitants of the reserve and at a higher and more formal level, of IBAMA (Anderson and Allegretti, 1994). In the RESEX at Arraial do Cabo, there is a fourth component, the voluntary environmental monitors (*fiscais colaboradores*), which has been added. These voluntary monitors are trained by IBAMA, may or may not be resource users themselves but have agreed to take on a broader set of responsibilities and greater powers related to monitoring.

This utilisation plan must be approved by IBAMA/CNPT. Once the rules are established, co-owners can change them but the minimum number of inhabitants required to propose a change should also be stated in the management plan (Rueda and Murrieta, 1995). Although the State maintains ownership of the physical area, individuals granted usufruct rights by the management plan will be issued *Titulos de Autorizacao de Uso*, a document which formalises this relationship. Rights to access of reserve resources may not be traded or sold between living people (*intervivos*) and can only be passed on through inheritance (Hall, 1997b). This measure could also provide increased incentive for sustainable resource use. If activities deviate from the Utilisation Plan in a way that causes

environmental degradation, and therefore unsustainable use, the contract can be cancelled (Cardoso, 1999).

In essence, what this process does is create a common property resource regime, whether or not it existed previously on an informal basis. The *Titulos de Autorizacao de Uso* codify the fact that each of the resource users is a co-owner of the resources in question. The association, in collaboration with IBAMA, serves as the conflict resolution and monitoring mechanism in order to manage the day-to-day activities and changes that take place within the RESEX. It also serves as a centralising force which brings resource users together for meetings on rule changes or even as a source of information. Allegretti (in Anderson and Allegretti, 1994:41) aptly notes that the creation an Extractive Reserve is not neutral and can abruptly interrupt existing traditional management systems as well as economic and social relations thereby leaving the community in an extremely fragile and vulnerable state.

Phase III - Consolidation and Development

The sustainability of any Extractive Reserve is indicated by its performance in phase three. Phase three of the process involves the consolidation and development of the RESEX. It is not enough just to plant the seed. That seed will need to be nurtured over time in order to ensure its long-term viability. Phases one and two are just the very beginning of this process. Given the long-term nature of these initiatives and the limited experience of sustaining these over time, it is still unclear whether economic, social and ecological sustainability can be achieved in the long run.

What is clear is that, at the local level, successful outcomes are dependent on the long-term participation of resource users in the planning and management of the resources upon which their livelihoods depend. Resource users must feel that it is in their interest to participate in and

support these systems over time. This will depend on having incentives in place to encourage participation. These can take a variety of forms such as financial incentives coming from increasing stocks resulting from better conservation measures. Incentives can also emerge from a sense of ownership over resources or a strong sense of collective identity.

The ability of collaborative management arrangements, including Extractive Reserves, to achieve long-term goals is dependent on many factors which were reviewed in the co-management section of this chapter and in the preceding chapter on common property resource regimes. These factors include internal variables such as the history, culture and shared experience of the local community. External factors are also relevant for promoting social and economic sustainability without degrading the resource base. These regimes are also susceptible to outside market fluctuations and environmental change, factors beyond the control of resource users. In Arraial for example, deep-sea drilling platforms are still being serviced within the reserve limits and recently the largest type of off shore rig sank just outside of the reserves limits, giving rise to serious concerns about pollution dangers.

The process which led to the creation of this conservation category has influenced the direction of future conservation initiatives. The introduction of the Extractive Reserves conservation and development category provided an important impetus for the development of a new National System of Conservation Units (SNUC). SNUC provides for much greater civic participation in the creation and management of these and other units. It also puts a stronger emphasis on the social dimensions of biodiversity conservation. After eight years of debate, this law was finally passed in July, 2000. If successful over the long term, given the large areas already under these regimes, extractive reserves could have a significant nation-wide impact in terms of meeting sustainable development goals. As Hall (1997b) notes, lessons learned from Brazil's experience in creating,

developing and sustaining these initiatives could have an even broader relevance in terms of addressing environmental problems in other parts of the developing world.

The G 7 - Pilot Program to Conserve the Brazilian Rainforests (PPG7)

Since 1990, a multilateral fund supported by the G 7 countries has been developed to support sustainable development in Brazil's Amazon and Atlantic rainforests. It aims to conserve the environment through development without destroying the natural resource base. Although initially earmarked to provide over a billion dollars towards environmental initiatives in Brazil, the final budget stood at \$350 million (Hall, 1997b). Its funding lines are divided into four main areas: Natural resource policy, creation and support for conservation and natural resource management units, natural resource management and demonstration projects (Cardoso, 1999). Within the objectives of the second category, creation and support for conservation and natural resource management units, Extractive Reserves are an important element. Even though total funds were not as much as was originally expected, these funds have been important for supporting the creation and development of the four main federal Extractive Reserves in Amazonia and will probably play a similar role in future Extractive Reserve development. In fact, Extractive Reserves which have benefited from this fund remain heavily dependent on this external funding. This brings to question the financial sustainability of these initiatives. Although this funding is important during incipient stages of creation and development it raises concern over the long-term feasibility of these initiatives.

4.6 Summary & Conclusion

The aim of this chapter has been to provide the reader with an understanding of how new approaches to environmental management are

operationalizing common property resource management. In the past, State control and private ownership were the only policy guidelines for conservation strategies. The recognition of the important role that resource users and local communities can play in conservation has broadened the options available to policy makers. Collaborative management is a process whereby the State and local communities or resource users share in varying degrees responsibility for the management of natural resources. Although the idea is relatively new, there are some key preconditions for success that are already apparent. Some of these conditions are drawn from experiences with common property resources and others have been added as they refer to the dynamic relationship between community and the State throughout this process as well as to the role of the State.

Key conditions internal to the community include small group size, a history of collective action, and respected local leadership with a commitment to the process amongst others. Important characteristics at the State level include a willingness to decentralise control to the community as well as positive attitudes towards the partnership. Other factors external to the community that can affect the success of collaborative management arrangements include natural changes in resource stocks and flows as well as market fluctuations that may influence resource user attitudes and behaviour. A fundamental precondition for successful co-management is the active participation of the resource users involved.

The second half of this chapter reviewed the concept of Extractive Reserves, an approach to conservation and development in Brazil that involves a partnership between the State and resource users. Until recently, approaches to conservation in Brazil have not involved the participation of local resource users in their design or management. In the developing model, these populations are at the centre of the process. It presented a brief history of how the struggle of the rubber tapper's in Amazonia influenced the creation of this conservation category. It also reviewed the three phases

involved in the creation and development of Extractive Reserves: Initial Request and Legal Creation, Implementation and Consolidation and Development. Lastly, this chapter explained how in recent years this model, initially developed for the protection of livelihoods and resources in terrestrial areas, has been applied to the protection of aquatic resources.

Chapter 5 Methodological Approach

This chapter is divided into four sub-sections. The first section defines the aims of the study and the framework for analysis that was utilised. It also presents the main research question along with subquestions. The second presents the general methodological approach to the fieldwork and resulting data including the decision to follow a case study design as well as a mixture qualitative and quantitative approaches. The third section explains why certain methodological tools were selected over others and this section also describes how these tools were employed to gather the necessary data. The final section presents some of the opportunities and constraints encountered during the process of data collection.

5.1 Aims of the study

In order to analyse the potential for Extractive Reserves to encourage resource user participation in long-term collective resource conservation in Arraial do Cabo, it was necessary to focus on different aspects of the local context. This study concentrated on the relationship between the traditional resource governing institutions and the newly created Extractive Reserve. The aims of this study were to:

1. Investigate the resource governing institutions which have traditionally governed beach seining activities and determine the state of these institutions (weak/robust).
2. Explore the levels of participation in the newly created reserve and perception of the reserve by this resource user group.
3. Analyse the community level factors that constrain or provide potential for long-term participatory conservation.

Overall Research Question/Goal

Are the Maritime Extractive Reserves socially sustainable?

Research Sub - Questions

The following sub-questions were used as a general guide for collecting data in the four main areas associated with the analysis framework: Nature/Ecosystem, Resource Governing Institutions, Politics and Policy, People Technology & Culture (See Figure 5.1). The analysis framework was adapted from Oakerson (1992) and Berkes and Folke (1994).

Nature/Ecosystem

1. What terrestrial and aquatic resources are utilised to support local livelihoods?
2. What are the characteristics of these systems?
3. What is the current condition of the natural resources utilised by fishers?
4. What are the threats to the resource stock and flow?
5. How has the use of natural resources changed over time?

6. How do fishers perceive and relate/interact with their environment?

Traditional Resource Governing Institutions

1. What informal/formal institutions exist to govern local resources?
2. How do canoe fishers participate in these institutions? (level/type)
3. How have these institutions changed over time?
4. What state are they in now? That is, are they robust? Weakened?

Extractive Reserve

1. What is the relationship between the RESEX and traditional resource governing institutions?
2. How do canoe fishers participate in this organisation?
3. How do fishers perceive this organisation?
4. What sanctions exist for users to comply with the rules of these organisations?
5. What monitoring arrangements exist (on paper/ in practice)?
6. What are the sources of conflict in this organisation?

People/Technology/Culture

1. How are fishers grouped? By gear group? Ethnicity? Physical location?
2. What are the cultural and social qualities that exist in this community and strengthen or create obstacles for collective action and co-operation?
3. What are the sources of conflict that exist within among groups?
4. What changes have taken place that have impacted the local social structure?
5. What new technology if any has changed their lives in the recent past?

Politics and Policy

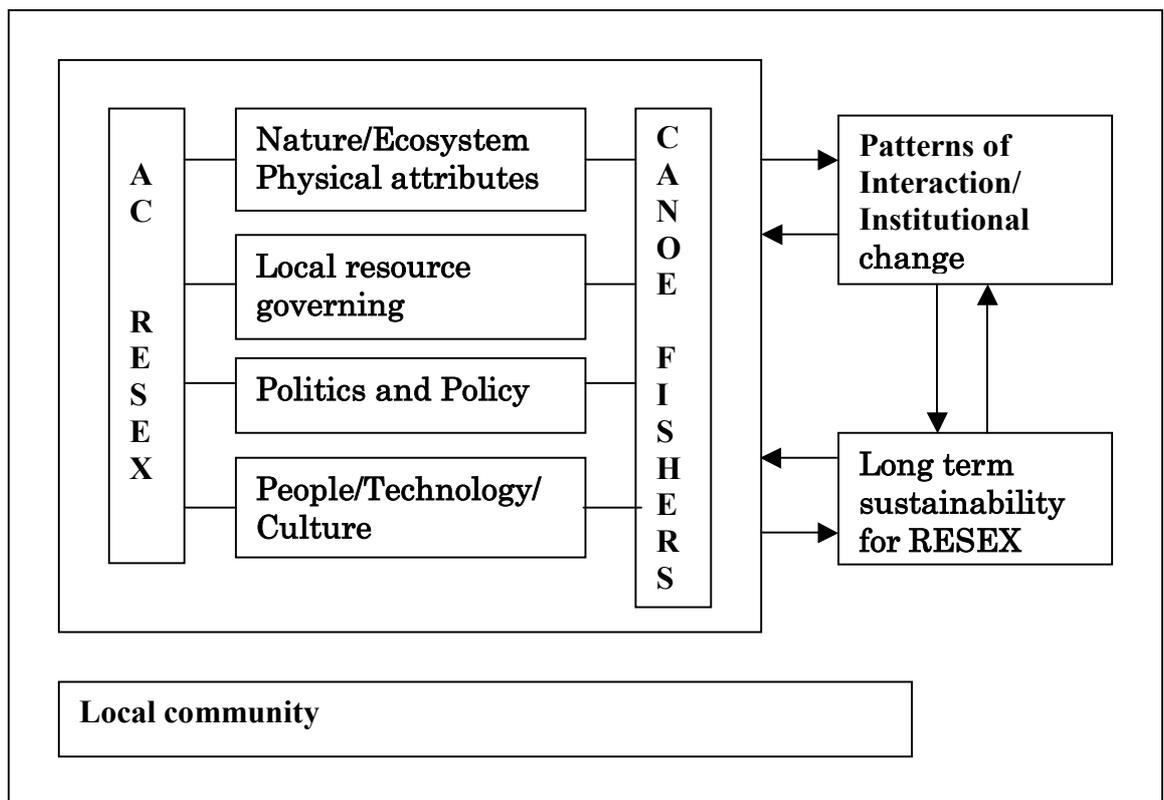
1. Historically, what role has artisanal fishing played in national level fishing policies?
2. What are the objectives of the extractive reserve policy?
3. How did it evolve to include coastal fishing communities?

Patterns of interaction

1. How do these factors interact to create obstacles to and opportunities for the long-term collaborative management of local marine resources?

Figure 5.1 Framework for Analysis

Regional National and Global Influences



(Adapted from Oakerson (1992) and Berkes and Folke (1998))

5.2 Research Methods

Qualitative vs. Quantitative tools

The nature of the research questions guided the researcher in the direction of a combination of qualitative and quantitative research methods. This hybrid research approach allows for the contextual exploration where qualitative methods are essential, but firmly grounded in the quantitative methods employed. This methodological integration also ensures a higher degree of accuracy and reliability than either in isolation could offer (Miles and Huberman, 1994). Another advantage to this approach is that it helps capture existing variability within a given community.

Creswell (1994) states that the choice of a qualitative research design rests on the lack of theory and previous research on the area in general, the need to explore a new area (community perspectives in Brazilian fishery co-management), and the focus on the process and not only the outcomes. Qualitative research is understood as being more concerned with describing the characteristics and properties of a process like participation over a period of time, than with interpreting the data and information available in order to make statements concerning the nature and extent of the process which has occurred (Oakley and Marsden, 1990).

Precisely because it is the experience of those people in the field that was of relevance to this research, daily interaction was fundamental in gathering the necessary data. Gilbert (2001) argues that human behaviour is significantly influenced by the setting in which it occurs, and one must study that behaviour in situations. The author goes on to say that research should be conducted in the setting where all the contextual variables are operating. 'Qualitative evaluation, by its very nature, implies a continuous *and close contact with the participants of a programme* in their own

environment. The qualitative approach emphasises the importance of getting close to project participants in order to understand more authentically their realities and the details of their everyday lives (Oakley and Marsden, 1990).

The context and setting are of great value especially in terms of understanding how the sample community has been affected by the creation of the Extractive Reserve and how they in turn affect it. This is especially so in terms of the research selected as the lessons learned at this early stage of Extractive Marine Reserve establishment along the Brazilian coastline can contribute to the creation of future reserves involved in co-operative conservation where informal institutions for managing common property resources are already in place. Qualitative methods according to Marshall and Rossman (1995) can offer the quality, richness and depth of analysis which is often absent in quantitative approaches. These indicators guided the selection of a hybrid approach to the empirical element of this thesis. Where at all possible and appropriate, qualitative methods were complemented by quantitative ones. The next section will review the type of research design selected.

5.3 Case study research

'If your main concern is understanding what is happening in a specific context, and if you can get access to and co-operation from the people involved – then do a case study' (Robson, 1993: 143 emphasis omitted). Each research strategy has its advantages and disadvantages. Strategies should be chosen in terms of their applicability to one's research (Yin, 1994). The case study is a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence (Robson, 1993). Yin's (1994) book

on case studies suggests that they are the most relevant form of research strategy when the investigator has little control over events, when the focus is on a contemporary phenomenon in a real-life context and when the research is exploratory in nature. Also, unlike other methodological strategies, case studies embrace methodological integration and do not limit the researcher to specific methodological tools.

Validity, reliability

The multi-method approach used in this research is also known as triangulation. Limitations of one method can be compensated for by the strengths of a complementary one (Marshall and Rossman, 1995). Yin notes that the unique strength of case studies is their ability to deal with a full variety of evidence – documents, interviews, questionnaires and observations, both qualitative and quantitative. The information gathered was cross-checked to provide a triangulation of methods and to strengthen the validity and reliability of the data collected.

An illustration of this method is the way that the total number of fishers in Arraial do Cabo was calculated. As no single source of reliable data existed, multiple sources were gathered and compared. These sources included documents from the fishing guild, membership cards from other fisher's organizations, census data as well as information available from the Port Authority and IBAMA.

Tool selection

An important element of the research was the need to understand the historical and current processes lying at the root of the dynamic socio-economic context that surrounds the reserve today. Initially, a review of reserve documents and informal interviews with reserve management were

used to identify the goals of the reserve, project objectives and major local and outside threats to these objectives. These interviews, along with continuous participant observation contributed to an initial rudimentary identification of stakeholder groups within the community and elsewhere. It is through this process that the sample group was identified.

Sample group selection

Stakeholders are those individuals/groups who have an interest in reserve activities/projects and programmes. Primary stakeholders are those directly affected, either positively or negatively by these activities. The process used to identify the sample group is called a purposive sampling process. This is a process often used in case studies where the researcher uses their judgement as to typicality or interest (Robson, 1993). The sample was selected in terms of the groups' degree of impact on and interest in project goals, with those groups/individuals with the highest impact and interest being at the core of the sample group along with those with high interest and little influence. Those groups with low interest and low impact being less and relevant to the research.

An example of an indicator for a group falling in the high interest-low impact category might be a group or individual with a high degree of dependence on natural resources for livelihood development but little influence or power over decisions which influence their access. It was through this process that the canoe fishers or beach seiners were selected as the sample group for this research. Their importance as stakeholders and the removed position they held in the past in terms of decision-making made their relevance as the sample group immediately apparent. They were also presented as the core target group by the manager of the A.C. Extractive Reserve (RESEX) and referred to in this respect by the project document (IBAMA, 1998).

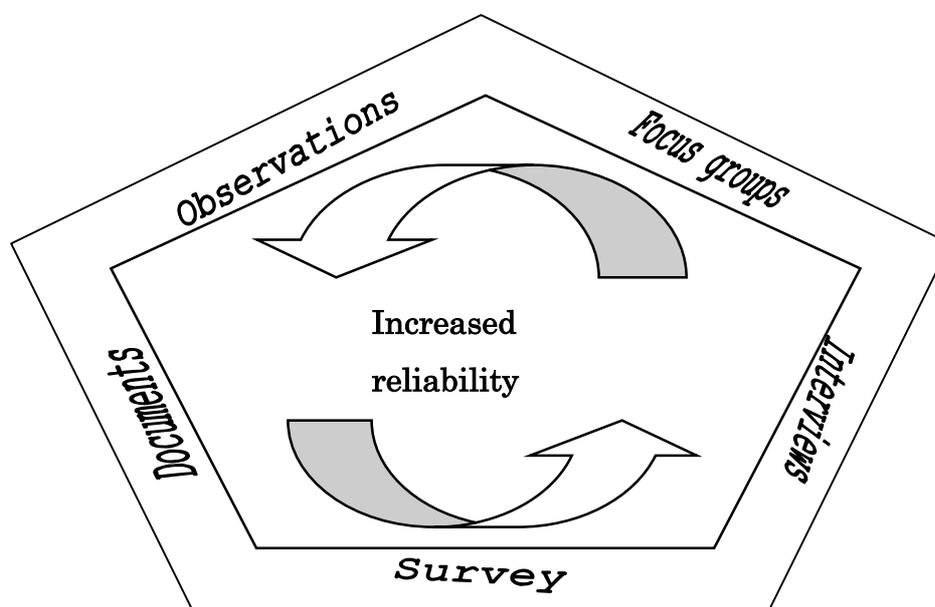
Once the sample group was selected, a more in-depth approach was taken. This involved the collection of data through semi-structured interviews, a survey questionnaire of approximately 30 percent of the estimated sample group, focus groups with fishers, and participant observation of fisher interactions. This enabled the researcher to begin mapping out the interests, incentives, and political and socio-economic geography of this group. Document collection and review and interviews with relevant secondary and tertiary stakeholders were on-going processes.

The following section describes how each tool was used along with the opportunities and constraints provided by each of the strategies. Although the fieldwork process can be divided into three main phases (See Table 5.1) many of the tools selected for data collection were used throughout. Moreover, each of the data collection strategies, both quantitative and qualitative was ultimately inter-linked. Document collection led to the identification of key informants (and more documents), observations contributed to appropriate interview and questionnaire design, participation increased access for the interviews as well as the questionnaire, interviews led to more documents, etc. Characteristics of the three phases are disaggregated below. Figure 5.2 illustrates how the use of multiple tools increases reliability and validity.

Table 5.1 Phases of Research

Phase 1	Phase 2	Phase 3
<ul style="list-style-type: none"> • Informal interviews begin • Observations begin • Stakeholder analysis • Design semi-structured interview • Document collection 	<ul style="list-style-type: none"> • Semi structured interview implementation • Questionnaire design • Continued observations • Continue informal interviews • Document collection 	<ul style="list-style-type: none"> • Apply questionnaire • Continue interviews • Continue document collection • Continue observation

Figure 5.2 Multi-method research process



Source: Author

Document Review

Throughout the fieldwork a wide range of documents was collected, summarised and subsequently analysed. These included project-related documents such as the original project proposal, minutes from meetings, and membership cards. Also included were newspaper/magazine articles covering different aspects of the reserve, historical documents, local government documents including catch statistics and reports, and academic papers written about the site concerned. Visits to regional university libraries and research institutes provided important texts written by Brazilian authors on themes relating to the current situation of artisanal or *caicara* fishing communities throughout Brazil. These texts provided important background information about Brazil's fishing communities and

past policies related to them that would have been otherwise unavailable in the United Kingdom.

Although the research concentrates on present-day events, the long tradition of beach seining and its development required a review of historical documents from which comparisons could be made concerning the degree to which local institutions governing fishing resources have changed over time. Because of Arraial's rich history and because of the presence of a fishing community with such unique characteristics, the Cape has been a popular site for academic study since the 1960s. Recently published papers by anthropologists and other social scientists provided a strong foundation for this study (Prado, 2000; Britto, 1999).

Participant Observation

Participant observation was a fundamental part of this research. Exploring the lives of the beach seiners and other fishers could not have taken place without participating in the daily rituals around which their lives are structured. This participation played a crucial role in gaining access to the fishers as well as in building a reputation in the area and building trust between the researcher and different fisher groups and local institutions. This participation not only contributed to the formation of important contacts and sources but also made the researcher available to those interested in discussing related matters. In this way, as much as the researcher selected key informants, she too was selected by fishers who learned of her presence and wanted to exchange ideas or share an experience or perspective.

Participant observation took place in a number of physical locations and settings. Meetings at the RESEX headquarters were attended, along with day to day activities at the reserve headquarters located on Praia Grande.

Other meetings among fishers outside of the reserve were also attended, some of which were informal, held in local bars or near the beaches where seining takes place. Observations of fishing activities and interactions occurred on all beaches as well as in the huts where beach seiners wait for a sign from the lookout. Because some beaches where these activities take place are located at some distance from the mainland, it was often necessary to accompany crews for the full day, beginning at 4 am and only returning to the mainland at sunset.

Because of the size of the large net used by the canoe fishers, the assistance of non-fishers is needed in order to efficiently pull in the weight. Although it is mainly men who help with the nets, it is not uncommon to see women and children involved as well. It was extremely advantageous to me that the canoe fisher activities actually *required* the participation of non-fishers thereby providing the researcher with an open invitation for continuous contact with the sample group. As a result, the researcher not only gathered information but also actively contributed to the daily rituals that constitute an important part of the beach seiners' livelihoods. This also meant that the canoe fishers were accustomed to having contact with non-fishers and used to explaining their activities and organisation to laymen. While fishers are often characterised as a particularly timid group, for the most part these fishers were very accessible and willing to share their experiences.

This process of daily participation in fishing activities also provided a less formal initial contact with the beach seiners as well as contact with other relevant members of the community. Elderly beach seiners often participate in pulling in the nets or stand in groups nearby observing the activities and commenting on them. These informal group meetings created excellent opportunities to explore the intergenerational differences between the fishers and how the informal institutions that govern them have changed over time. By definition, traditional populations give their culture

continuity orally, through their repertoire of stories and experiences. Contact with elder fishers was invaluable to the research.

Besides providing a wealth of pertinent information in its own right, this process of participation also established the building blocks upon which later stages of the research were based. For example, these processes proved valuable when realising the interview portion as well as the questionnaire. Not only did the researcher know the majority of the fishers by the time she undertook this part of the research but previous months of experience with them helped immensely in designing appropriate interview questions and the questionnaire. This continued interaction projected a level of commitment and interest that was crucial in gaining the trust and subsequently the access to the more personal attitudes and experiences of these fishers.

Where possible, notes of these observations were taken on site and then elaborated upon at home. At other times, this was impractical due to the physical activity involved or because of the apprehension a notebook would have caused on site. In either case, observations were compiled into an on going field diary and later analysed for content.

Interviews

Approximately twenty semi-structured interviews were carried out during the course of the fieldwork. Apart from these, numerous informal interviews were also realised. The semi-structured interviews were conducted with leaders of local fishing organisations, government agencies and other relevant organisations along with canoe fishers and representatives from other fishing modalities (See Annex II). Where possible, the interviews were taped and later transcribed. For the most part, interviews with fishers were only taped after a number of informal

interviews had taken place. This allowed the fisher to feel informed about the type of questions that would be asked and how they would be presented.

An initial round of informational interviews was carried out with representatives of local fishing organisations. These had the dual purpose of introducing the researcher at the field site to local leaders as well as gathering information to assist in the design of the semi-structured interviews that followed.

All second round interviews were taped and transcribed either by the researcher or by an assistant.²¹ I was fortunate that my assistant was interested in the project itself and this reflected in his enthusiasm and precision in carrying out the transcription. Nevertheless, all transcriptions were then double-checked for errors. The tapes were then loaded on to the Atlas qualitative data analysis programme which allowed the content to be coded and analysed.

No respondents showed any concern over the presence of the tape recorder. Because Portuguese is a second language to me, I often explained that the use of the tape recorder was helpful because it allowed me to focus more on the content of the conversation instead of having to take copious amounts of notes. On one occasion, as a result of technical problems with the recording machinery, an interviewee was kind enough to do the entire interview twice.

Survey/Questionnaire

A questionnaire was applied during the later stages of the research in order to gather quantitative data related to the participation in and attitudes of fishers towards the newly established reserve. The timing was chosen in

²¹ My assistant was Flavio Costa, a resident of a nearby town with a degree in marine biology and experience with working with fishers in the region.

order to capitalise on previous data gathered as well as to create an appropriate and well worded questionnaire. There was some concern as to how fishers would react to such a regimented research approach but a pilot questionnaire revealed a non-threatened response (Bulmer and Warwick, 1993). In fact, as the following section on focus groups shows, the questionnaire was so well received that its implementation often evolved into focus groups with the questionnaire serving as a guide for debate and discussion.

Each canoe participating in beach seining is manned by a crew of nine to twelve men. Twelve are used when the canoes are required to travel longer distances and need to bring food for the day and a cook along. Canoes using a smaller work team or *companha* are usually those who fish on beaches nearer to the town centre where they can go home for lunch. Three *companhas* were chosen from Praia Grande, two from Praia dos Anjos and one from Prainha and Pontal respectively to participate in the survey. In almost every case, the entire *companha* was included in the hope that later they could be compared to each other. The approach to sampling is often called purposeful sampling (Gilbert, 2001). Depending on the approximate number of canoe fishers on each beach a related number of *companhas* were selected for interviews. An attempt was made to include a mixture of different *companha* groups, not only from the different beaches but also in terms of age of members and type of ownership arrangements (multiple or single).

Partly because of the distances involved, at least one full day (and usually many more) was spent with each group of fishers in and around their huts in order to complete one set of surveys. All surveys were applied by the researcher one-on-one with each fisher. During the pilot test, it was clear that this was the only way to keep responses unaffected by the comments of

fisher peers as well as allowing the fisher to feel at ease in portraying his own views of the questions.

Although the questionnaire was relatively short (approximately 10 minutes long), sessions with fishers tended to take much longer than this as fishers were reluctant to provide purely quantitative responses. Instead, they would frequently offer an explanation to their perspective or even an anecdote illustrating their views. Notes of these conversations were taken on the back of each questionnaire and then written up at the end of each workday, they were later analysed along with other field notes and qualitative data.

Another advantage of spending the full day with each group was its relation to the quality of the questionnaires. Extra time meant time to check each questionnaire on site and refer back to fishers if information was missing or unclear. As a result, no data was lost due to missing information.

Out of the entire sample questioned, there were two fishers from Praia dos Anjos who refused to participate. It was never clear why they made this decision but it was nevertheless duly respected.

Outings with fishers were constantly affected by weather conditions and were often repeatedly postponed. Because this type of fishing is so dependent on a range of climatic circumstances, it is not uncommon for canoes not to 'go out' because of 'bad weather' or improper *munções*²². This often caused delays in observations and in implementing the questionnaires but created other opportunities for document collection and other non-weather contingent research tools.

²² A word endemic to the Cape which signifies the combination of climatic and oceanographic conditions which present favourable or unfavourable conditions for beach seining.

The survey was coded before implementation. These codes along with the data collected was then transferred to SPSS quantitative data analysis software and subsequently analysed. Although the sample selected attempted to be as representative as possible, it was not a probability sample from which precise inferences could be made about the characteristics of the population from which it was drawn (Gilbert, 2001). For this reason, non-parametric tests which do not make assumptions about the shape of a population were used. SPSS offered the use of mainly descriptive statistics and Chi-square tests.

Focus Groups

Focus groups complemented the questionnaires by bringing the topics covered into a group setting and creating a flexible and open forum in which these areas of interest could be developed further as a group. This was extremely helpful when trying to understand why certain actors felt the way they did; things that independently the questionnaire or other one on one methods would not have revealed.

Focus groups were always informal and at times even spontaneous. They took place in three specific settings: with fishers after the questionnaire had been implemented, with fishers and representatives of the reserve at reserve headquarters, with elderly fishers at strategic locations where they often congregate to watch the beach seining. Focus groups were successful because the issues that were covered were of high interest to those involved. Questions revolved around group organisation, group history, and participation in fishing organisations including the newly created reserve. An example of one of these focus groups follows.

After the survey was implemented with everyone on the *companha* selected, members often gathered around to discuss issues covered. Because there were often hours of waiting without pulling in the net, these discussions had time to develop and proved useful in providing the thoughts and arguments behind some of the questions presented. Because the huts where fishers wait are located at a distance from other activities, they created excellent environments, free from distractions, for these sorts of discussions to take place. They were often frank and open and extremely relevant to the ongoing research because the questionnaire was used as a guide for their discussions.

5.4 Opportunities and constraints

Apart from the above-described methodological tools, other factors relating to the fieldwork created both obstacles to and opportunities for the success of the research. These include circumstantial factors in terms of the social atmosphere in which the research took place such as learning the local 'dialect', living arrangements and the overall climate of conflict between fishers and organisations in Arraial.

Language

Upon arrival, I rented a room in the home of a retired fisher couple on Praia dos Anjos. After my first attempt to explain my purpose for being there, the couples' daughter said, 'You're going to have to learn how the canoe fishers speak before they will speak with you.' It became immediately clear what she was referring to. Although I arrived as a fluent Portuguese speaker, there was a wealth of local terminology that I was not familiar with. This was especially relevant in the vocabulary used by canoe fishers who represent the most traditional group in the community and much of these

local terms are related to their fishing activities. Reinaldo Fialho, a local historian, has compiled a dictionary of over 300 words which are 'endemic' to the Cape. Unfortunately, I only discovered this dictionary towards the end of the research and long hours were spent learning the many local terms used amongst these fishers. These terms are used and defined throughout the text and are deeply related to the relationship between the canoe fishers and their natural environment. They are also a reflection of the historical development of the Cape as well its insular experience.

Living Arrangements

Because of the large numbers of tourists who visit Arraial during the holidays, there exists a variety of temporary housing options. After careful consideration, though, it was decided that living in the home of fishers would provide a depth of contact and experience otherwise unattainable. Therefore, during the research period, I rented a room in the home of a retired fisher couple, 'Seu' Binho and 'Dona' Estella.

Apart from Seu Binho and Dona Estella being Cabista or native to the Cape and eager to share their lifetime of experience and stories related to fishing and the community in Arraial, their children and grandchildren with whom I also became close, provided important insight into the generation differences and change which has occurred in the municipality. I accompanied them to social functions such as weddings, funerals, local festivals and the like. Seu Binho introduced me to some of the local fishing leaders and of course his friends and relatives who were also fishers. We frequently went line fishing and observed canoe fishing activities together and by the end, I felt very much a part of their family.

This relationship also provided me with a degree of respectability and position within the community that I would not have had otherwise had I

chosen to seek accommodation outside the family sphere. My residence at Seu Binho and Dona Estellas house provided a much-needed point of reference for others trying to understand who I was and why I was there. It was thought that if Seu Binho and Dona Estella trusted me - then so should others. I also benefited from the 'grapevine' system (or clog radio as they called it) of communication in place in A.C. Luckily, not only did my hosts like me but they told absolutely everyone they knew about me, thereby increasing my 'respectability'.

Access can be described not only as physical but also as social. Physical access, as described earlier in the methodology, was gained through initial meetings with reserve representatives as well as through participation in fishing activities throughout the cape. Social access, on the other hand, took longer and was gained through the processes of building respectability, reputation and trust amongst my sample group and wider community. They are closely linked and the ease of social access was to a large degree a result of on-going physical access.

Research Environment

Although much of the approach to the daily aspects of the research had been predetermined, there were some aspects that could not have been foreseen. Specifically, the level of inter-neighbourhood and inter-modality tension (caused in part by the creation of the extractive reserve) provided a somewhat 'touchy' environment in which to work. Canoe fishers are not just canoe fishers; they are Praia Grande canoe fishers or Praia dos Anjos canoe fishers. The self-categorisation of fishers as Praia Grande fishers or Praia dos Anjos fishers became immediately clear along with conflict between owners, middlemen and fishers. As a result, it became apparent that I should avoid being seen frequently with any one group or even any one person. Associating myself with certain groups, individuals or even the

reserve itself would increase my access to some and decrease it to others. Perceived neutrality was essential.

In this respect, it was sheer luck that placed me in a somewhat neutral location in terms of my living arrangements. Although I lived in the Praia dos Anjos neighbourhood and therefore could have become associated solely with the fishers from this location, it turned out that although Seu Binho had been a fisher all his life, he was one of the very few who had done so mainly on larger trawlers based in Rio de Janeiro or other surrounding ports. Because of this, he managed to stay out, to some degree, of the neighbourhood feuding and was associated more with the fact that he fished outside of A.C. as opposed to his residence in Praia dos Anjos²³. To what degree this affected my relationship with other fishers I cannot be sure but I constantly felt that this was a positive product of my living arrangements.

Female Researcher

Being a foreign female researcher in a 'mens' world also had certain implications. As a female, I believe fishers were less threatened by my presence. In terms of language, I was told that fishers in general were timid to speak because of the different vocabulary and accent they had. Fortunately, I too had an awkward vocabulary and accent and at times was shy to speak. In this respect, we worked together. I learned their words and they spoke slowly and often repeated things for my benefit.

5.5 Conclusion

This study focuses on the actions and perceptions of local resources users. Among resource users, beach seiners were selected as the specific focus of

²³ In fact, his nick name is 'Cabo Frio' after a nearby town where the ship on which he worked for most of his life was docked.

the study. Given the importance of this group to the success of the extractive reserve as well as their manageable size for such a study, this choice was considered both relevant and appropriate. Although other groups in the community were contemplated, they were not included as vigorously as the primary sample group. Also, given time and scope limitations, this study concentrated on the community level and less on the government institutions that support extractive reserves.

Chapter 6 Gear Groups, Organisations and Institutions and the Creation and Development of the RESEX A.C.

This chapter will build on the background given on the social and environmental context of Arraial do Cabo, RJ, presented at the beginning of this thesis and provide a more specific breakdown of the characteristics of the fishing community itself. This will be done initially by describing the different gear type groupings that exist among the fishers in the municipality. It will then describe the organisations which have represented fishers over the years, first in a Colónia (fishermen's guild) and then with the onset of democracy and the opportunity for greater individual and collective expression into a number of 'free' associations. It will also describe some of the informal institutions which govern the beach seiners in Arraial do Cabo. The last section of this chapter will describe the process that led up to the establishment of Brazil's first open water Extractive Reserve established in the locale as well as the Utilisation Plan that governs it.

6.1 Stratification and Productive Technology

There are five main types of fishing or extractive practices in Arraial. Because the Cape extends so far into the ocean and because the area is so rich in marine life, there is no need to travel far to fish and almost all fishers stay around the Cape and around nearby islands.²⁴ The first, and most important type of fishing practised in terms of the number of people involved is **hook and line** fishing from open-mouthed motorised boats and from rocks around the area. A second type of fishing strategy, involving approximately 100 members of the fishing community utilises the largest boats in the municipality (trawlers) along with a **purse seine**. The third type, professional **sub-aquatic fishing** or SCUBA fishing, has developed over recent years and its use of modern technologies has made it the most controversial fishing activity in the municipality. The fourth type is not so much a fishing modality but an extractive practice. **Mollusc gathering** has a long tradition in Arraial but only in the last thirty years has it become a commercial activity. These categories are explained in detail below.

The fifth type, **beach seining**²⁵ is the focus of this thesis. Beach seiners are not the most numerous, nor necessarily the most vulnerable. But because of their cultural and traditional significance, their practices have attracted the attention of the Brazilian Government and it is their presence, the presence of a 'traditional' community that warranted the creation of Brazil's first maritime extractive reserve. Apart from these, and within each of these categories, variations of these strategies and other forms of semi-subsistence fishing are usually practised in the shallow waters off the beach.

²⁴ The Southeast of Brazil differs greatly from the Northeast in this respect. In the Northeast, the continental shelf extends far out to sea, requiring fishers to travel great distances to reach fishing spots.

²⁵ Type of large pocket seine (approximately 600 metres long) used very close to sandy shores and manoeuvred by boat or canoe and subsequently pulled onto shore. For the purposes of this thesis, fishers who participate in this activity are referred to as beach seiners or canoe fishers.

One of the most remarkable types encountered takes place with a north-easterly wind and involves attaching a line with multiple hooks onto a plastic handmade kite. The kite, along with the line, is then carried out to sea by the wind.

A description of the five primary fishing types is included in the following section in order for the reader to become familiar with some of the dynamics of the fishing community in the Municipality of Arraial do Cabo. Specific attention will be paid to the beach seiners.

Boat and Hook and Line Fishers

Boat and line fishers are often grouped together in the same category in fishing discussions on the Cape. This happens for a number of reasons. First, boat fishers or fishers that hunt the coastal areas of the Cape by motorised boat are often the same fishers that hike the hills surrounding Arraial searching for fishing points from which to cast their lines. Second, both types of fishers are really line fishers in the sense that they are often after the same species and use the same techniques to lure them.

Discussions with local fishers reveal that it is these modalities that are preferred by the *caringos* or recent immigrants to the cape. Often, these groups have come from other fishing villages in the region, bringing along with them their own techniques. Land line fishing is also considered a type of fishing available to everyone. As opposed to beach seining²⁶ or ocean seining where one would need to join a *companha* (work team) in order to participate, the low cost of the technology used (nylon line and hook) as well as its ability to be performed outside of a group makes land line fishing one

of the most widely available types of fishing practised on the Cape. It is also a much more individualistic type of fishing and some fishers prefer it because of this characteristic. It is a type of fishing that can be done with the minimum of participation in the politics and discussions that surrounds the beaches and the local marina.

Both line and boat fishing have experienced significant changes over recent years largely due to the abundance of squid in the area as well as the introduction of new fishing technologies with which to catch them. Specifically, it was the introduction of the *squid jig* by a Japanese visitor that transformed how and when squid is fished along with who has access to these resources. Previously, it was thought that squid could only be caught during the summer months in the icy waters off Praia Grande using a beach seine. With the introduction of the squid jig, access to this resource became available to everyone. With a simple, inexpensive, multi-pronged hook and a nylon line, thousands of kilos of squid have been caught each year since the introduction of this new technology. Since beach seining is a somewhat closed profession, this has allowed for wider access to this valuable resource. Access to squid in Arraial is often said to 'pay the rent' of the fishers. This expression refers to the fact that while other species have become scarce, this new activity has become a safety net.

Purse Seiners (Treineiras)

Seiners represent the fishing modality capable of netting the largest quantity of fish in one cast. They utilise the highest technological investment of any type due to size of the craft, the use of motors to reel in the net and the sheer size of the net itself. In some ways, they are similar to the beach seiners in their use of a huge net and the fact that they also require a spotter in order to visually locate shoals of fish. Apart from those elements though, there is little in common between the two modalities.

There are approximately ten seiners in Arraial with a maximum length of eight metres.²⁷ They use a crew of ten men each including a skipper, spotter, a man to run the motor and a number of deck hands. They fish in two shifts, one during the day, the other at night. Night fishing takes place only when the moon is not full as the spotter depends on the darkness to observe the luminescent features of passing shoals.

After shoals are spotted, a large net is released and forms a semi-circle in the water. This creates a curtain in the water, suspended by the *cork-line* and weighted down by the *lead-line*. When the shoal enters the semi-circle, the *running line* is pulled tight to close the circle. The *purse-line*, which closes off the bottom of the net and preventing the fish from falling through it, is then shut. Afterwards, using winches, the net is then brought on board and the fish sorted and stored below deck.

SCUBA fishing (Mergulho Profissional)

Sub-aquatic fishing or SCUBA fishing utilises a relatively new type of technology and is not seen as a 'traditional' type of fishing by the local community. In fact, there are numerous problems related to the admittance of these fishers into the newly established extractive reserve. Many consider this type of fishing as *predatory* in nature as the fish, octopuses, and crustaceans they hunt have little chance of escape. There are approximately twelve boats which engage in this type of fishing with a number of them coming in from neighbouring towns (another factor which discourages local support for this gear group).

In principal, SCUBA fishing takes place on the deep-water rocky faces outside of the Boqueirão on the north-eastern sides of both the Ilha de Cabo

²⁷ This size limit for seiners was created through the management plan of the RESEX.

Frio and the Pontal de Atalaia (see Map C). Divers go out in boats with crews of only two per boat. One being the diver and the other controlling the air compressor and hose which provides air to the submerged diver. There must be a high level of trust between the diver and his partner. At depths of over fifty metres in freezing cold waters (approximately ten degrees centigrade), the fisher that stays on board provides the life line to his underwater counterpart. Also, because the boat must stay close to the diver and because the best possibilities for catch lie adjacent to the cliff face, it requires great skill in open water to maintain a safe distance from the coast while simultaneously keeping an eye on the diver. The mariner is also responsible for the maintenance of the motor, the boat and the diving equipment. For these reasons, this is not the type of fishing where either party is easily replaceable. The skills and trust needed require a long term commitment and partnership between the two.

The *caça submarina* or underwater hunt is usually for octopus, lobster (this is illegal but often practised) and large fish which can be speared. The diver therefore dives with his scuba suit, gloves, a bag, spear gun and a hooked iron. He hooks the octopi with the iron and places them in the bag until the end of his dive (usually lasting about a half hour) and then brings them up where his partner kills them and prepares them for the middleman who will be waiting for them at the marina. Octopus per kilo is one of the most valuable species available and divers can make good money. On a decent day, divers catch fifty kilos of octopus that they sell for approximately five reais a kilo, totalling 250 reais (£80). It is not a type of fishing that can be carried out day after day due to the dangers associated with it. Nevertheless, divers often engage in multiple deep-water dives a day and many depend on injections to counteract the negative effects to their systems.

Just as for other gear groups, success is dependent on a number of climatic factors. Specifically, water clarity is essential for the diver to be able to identify and capture his catch. Also, the north easterly winds create major difficulties for any fisher leaving the Baía dos Anjos (Angel Bay) through the Boqueirão. These winds make large waves that meet with the currents pushing the water out of the bay through the Boqueirão, creating dangerous currents and huge waves making it impossible to leave the bay. A *cabeça de água do leste* or waters brought by the eastern winds are bad news for all fishers dependent on fishing grounds outside the bay. But interestingly, it is not enough for a sub-aquatic diver to hear in the marina that there are eastern waters; each must go to the Boqueirão itself to see for himself.

Mollusc Gatherers (Coletores de Marisco)

Although often not considered fishers, mollusc gatherers are extractivists and do participate in the Extractive Reserve. They differ significantly from other fishing modalities in terms of their representation and work group organisation. One of the most significant differences is that the mollusc gatherers of Arraial work as a family unit. In contrast with other fishing groups, these gatherers utilise the efforts of both women and children directly in their gathering and processing activities. Their days start early as they have to walk for hours at times to sites where the molluscs are mature enough for gathering. They often spend entire days at a selected site, harvesting, cleaning, cooking and packing the molluscs. Wood and other materials must be brought for these purposes as in most places it is unavailable on site.

Generally, it is the male head of the family who is responsible for removing the molluscs from the submerged rocks. Once removed, they are then cooked over an open fire, opened and the mollusc removed from the shell and stored in bags. Women are responsible for the cooking and the children for shell

opening and mollusc removal. Processing takes place on site because of the weight that bringing back the shells would entail. For example, twenty-five kilos of muscles with the shell is only equal to five kilos without.

As a group they have been organised through the Association for Shellfish Collectors of Arraial do Cabo (ACRIMAC) since 1997. More than half of all shell collectors are paying and participating members of the Association. Unlike many of the other traditional fishing organisations, ACRIMAC is led by a former shell collector and someone who understands the livelihoods of the people he represents well. It is also the only fishers organisation encountered during the research that was directly attempting to address social issues within its community such as access to education and the eventual elimination of child labour from this precarious line of work.

Beach Seining/Canoe Fishing (*Pesca de Canoa*)

The fifth type of fishing gear group is the beach seining community, the focus of this study. Throughout the text, fishers participating in this activity will be referred to as either beach seiners or canoe fishers (*pescadores de canoa*). Seining refers to the large nets employed in this practice and the canoe fishing title comes from the dug out canoes required (both for practical purposes²⁸ and by customary law) for carrying out the activity. This gear type, while not the oldest (mollusc gatherers have inhabited the coastline for thousands of years), has developed an organisational structure to which any fisher wishing to engage in this modality has to adhere. Customary laws deciding who can fish, when they

²⁸ Beach seining occurs in other areas on the Brazilian coastline and around the world. Although canoes are used in Arraial, beach seiners in other areas utilise other crafts such as row boats and in some cases they involve motorised crafts. In Arraial, this process, by customary law, requires the use of large dugout canoes. Practically speaking, their length enables both the crew and the large net to fit in the craft. The relative scarcity of trees large enough to make these canoes out of, along with the associated costs make access to these resources difficult thereby limiting the possibilities for the entrance of more canoes into the system.

can fish and exactly how they can fish have developed over time and still apply to this practice on the Cape today.

Beach seining, using the traditional methods employed in Arraial do Cabo, can only be practised where the Cape's transparent waters meet sandy coves with hills nearby. There are only a handful of sites on the Cape that fit these requirements. Each cove can sustain a maximum of two *companhas* or work teams at a time, thereby limiting the number of fishers who can engage in this practice. This space limitation most likely influenced the creation of collective arrangements for managing these fishing grounds.

This traditional fishing type has shaped the identity of the Cape's residents. To be considered *Cabista*, many would argue that one would have to come from a family that engaged or engages in this type of fishing practice. Canoe fishing has a long history on the Cape. It is the main point of reference for many of its residents and has influenced their identity and social structure. The following section will describe some of the formal institutions that have governed this activity for over a century. The intricate set of traditional institutions that govern these fishers will be the focus of Chapter 7.

6.2 The Colônia Z-22 de Nossa Senhora dos Remedios

Colônia Z-22, Arraial's local chapter, as it functions today, is testimony to the continued failure of these organisations to meet their stated objectives²⁹. Although it prides itself on the fact that it has 900 fishers on its membership roster, only a tiny fraction of these actually participates in any

²⁹ As stated earlier stated, the objectives were of 'uniting fishers through fraternal solidarity promoting instruction, mutual aid and the prosperity of their associates and their families' (Menezes, nd).

form in the organisation. When they do, this participation usually takes the passive form of paying monthly dues and the three percent charge on gross catch that the Colônia is entitled to charge its members. The Colônia does not hold open meetings nor does it offer services such as access to lines of credit or medical care to its members. Opportunities for loans or other credit schemes through the Colony are non-existent. In fact, over the last fourteen years no credit of any kind has been offered to member fishers through the Colony.

The effectiveness and legitimacy of the Colônia is to a large degree dependent on who is president of the organisation. Speaking with local fishers, it was difficult to talk about the Colônia as a fishers' organisation without personalising it to this level. In the past, the Colônia has gone through periods of widespread support. During these 'golden' periods the Colônia erratically offered access to a dentist for its members and their families. It was also through the local Colônia that fishers could track their working years and apply for social security later in life (although very few took advantage of this opportunity).

In the 'good ole days' the Colônia also facilitated fishers' access to the documentation needed by the Capitania dos Portos or Port Authority. As a result, many of the older members are registered as professional fishers without ever having taken the required courses or exams. One of the reasons for paying dues at the Colony that I frequently heard is that it is known to have the fairest scale in town. 'Middlemen have two sets of scales, one for buying and one for selling, they never lose', I was often told. These sorts of handouts and favours mirror the '*assistencialismo*' or patron-client approach which is a general feature of Brazilian society and is often adopted by the Brazilian Government, especially at the local level.

The Colônia Z-22 de Nossa Senhora dos Remédios in Arraial was one of the earliest chapters established in the country with its code of conduct dating back to 1921. Initially, beach seining was the main fishing strategy and the only one which involved the co-ordination and co-operation of participants. As the income being generated by this modality far outweighed that coming from the other fishing strategies practised, protecting this modality became the primary objective of this newly established organisation. The following quote from the first printed code of conduct handbook illustrates this objective:

'As it is the beach seines that most contribute to the fishing industry [in Arraial], not only for the betterment of this Colony but also for the wider community, promoting in this way support for all fishers, let it be expressly prohibited, when any shoal of fish comes near that could be captured by the beach seiners, that [other fishers] keep a sufficient distance so as not to disrupt the biggest source of riches in this community which is the canoes and their seines' (Teixeira de Mello, 1921 authors translation).

This quote reaffirms the roots of the initial structure of the Colônia and reinforces the degree to which canoe fishing was valued in the past. It also illustrates the centrality and interrelationship between canoe fishing and other fishing activities. This excerpt also helps us understand why this activity is still ingrained in local culture today.

As an organisation, the Colônia was often criticised for being out of touch with fishers' needs. One reason for this commonly cited is because, for the most part, its representatives were not fishers themselves. It is not uncommon for them to be politicians or other members of the local elite. Its current board of directors includes middlemen and boat owners, not fishers themselves. In Arraial, for example, this was one of the most common

criticisms heard, 'How can someone who has never depended on fishing for his livelihood preside over the Colônia?'³⁰ The profile of the current president of this organisation illustrates the web of corruption that has left the organisation with little to offer local fishers.

'Seu' Manuel has been in office for over fourteen years. Despite the fact that elections are meant to be held periodically, he has held on to control of this organisation. Although the salary he receives from the guild is not substantial, he benefits financially from his affiliation in numerous other ways. The organisation itself is located on the ground floor of his home. In return for using this space, he receives rental payments from the state level or through monthly contributions from fishers. His secretary, who also receives a salary, is his wife and his assistant is his daughter.

Unfortunately, hopes that independent fisher organisations would fill the gap left by the ineffectual colony were unfounded. Although many have emerged over the last twenty years, none has managed to garner any significant amount of support and they have generally been unsustainable. The following section describes the Cape's experiences in developing these organisations.

6.3 Free Association

With the introduction of the new Brazilian constitution in 1988 and the end of dictatorial rule, a political and ideological context was created in which citizens had much greater freedom of expression. Local fisher's associations without formal affiliations to the government began to emerge with differing

³⁰ This is actually a bone of contention that fishers have about fishing organisations in general. They resent the fact that so many different people from different organisations and institutions try to regulate their activity when the vast majority of them have never fished professionally.

degrees of success in terms of their ability to mobilise fisher support. Problems in most of them were related to the legacy left behind by the Colônias which continued to exist, although they lost much of their power during this period. People did not expect much from their new organisations and often control over these fell into the hands of the same local bigwigs which had formerly manipulated the Colônias for their own benefit.

For the most part, until the recent establishment of the Extractive Reserve (RESEX), no fisher's organisation had managed to mobilise wide spread support among the fishers in Arraial do Cabo. Generally speaking these 'free' associations were limited to representing fishers from specific areas and modalities, particularly beach seiners from Praia Grande. Other than ACRIMAC, the Association for Mollusc Collectors, the only free association still active on the Cape is APAC, the Fishers Association of Arraial do Cabo and then only marginally so. The following section reviews the evolution of formal local organisations in the municipality.

ALPAC

The Associação Livre dos Pescadores de Arraial do Cabo (ALPAC) was the first 'free association' for fishers of the municipality. Established in 1985, its founders, mainly young idealist seiners, jumped at the opportunity to create a fishers' organisation run by the fishers themselves. While legally they had been given this opportunity, locally the association ran into many of the same problems that corrupted the Colônia. After the first election, larger canoe owners and middlemen managed to gain power and votes and the organisation soon fell into the hands of the local elite. This was one of the negative impacts of the consolidation of power over the means of production (canoes and nets) and access to this production through the informal *direito do dia* or user access system.

Like the Colony, membership of ALPAC required a three percent payment to the association. Because the leaders of the association were the owners of the canoes themselves, they would take three percent of the entire catch, from each canoe and then redistribute it to themselves in the form of salary payments. Needless to say, fishers soon questioned the organisation's legitimacy and it inevitably lost local support.

APAC

The Associação dos Pescadores or Fishers Association (APAC) was established soon after the ALPAC was taken over by local 'bigwigs'. Although there are over a thousand fishers, divided into at least five different modalities, it is around the Praia Grande canoe fishers that most of these formal organisations have evolved. Starting with the Colônia, then the ALPAC and continuing on to APAC, canoe fishers provided the basis or foundation of all these organisations. (In fact, the RESEX, although its headquarters are physically located on Praia Grande just above this beaches seining grounds, has proved to be one of the first organisations which tries, with varying success, to bring together fishers from different modalities).

APAC as an organisation never really got off the ground. Its purpose (as described by its current president) was to 'provide legal support to fishers and to deal with issues related to depleting fish stocks in the area.' It was always dependent on the support of fishers from Praia Grande where the vast majority of its membership base is/was. The one achievement that is attributed to this organisation is the resolution of the 'surf wars' between canoe fishers and surfers on this beach. It is widely recognised among canoe fishers that surfers 'startle' the schools of fish before they arrive in the corner where the fishermen can fence them in with their nets. There is a huge area that needs to be obstacle-free, according to canoe fishers, in order

for their seining to be successful. After many years of arguments, threats, broken boards, etc. the two groups finally came to an agreement: when a red flag is up, it means that fishing is being conducted and no surfing is allowed, when a green flag is up, surfers can surf as they please. This agreement was registered with the local government and is still in use. Today, APAC is all but defunct, with only a handful of members still contributing. Its headquarters are located on Praia Grande and has since been donated by APAC to the new RESEX to provide space for their operations.

At one point, there was an attempt by a couple from the United States to set up a co-operative in the municipality. It was never fully operative and within a year the Americans were gone and the co-operative closed. People mention it from time to time as a good idea that was never realised.

6.4 Reserva Extrativista Marítima, Arraial do Cabo

On January 3, 1997 a fishing 'belt' was created around the municipality of Arraial do Cabo, Rio de Janeiro stretching three nautical miles from shore. The objective of this reserve is to 'guarantee the sustainable use and conservation of the natural renewable resources traditionally used in artisanal fishing by the extractivist population of Arraial do Cabo' (IBAMA, 1998: 3). This section will present a summary of the history of the reserve and describe its operating structure. This first half of this section will review the factors that enabled the creation of the reserve (such as community support and the availability of local leadership). The second half will describe the different dimensions of the reserve. These include the reserve's structure, decision-making and conflict resolution mechanisms, monitoring and enforcement arrangements among others.

Enabling Factors

A range of factors contributed to the creation of Brazil's first Maritime Extractive Reserve. First, at the policy level, the existence of the Extractive Reserve conservation category codified in federal decree 98.897/90 after a lengthy and arduous struggle by extractive communities in Amazonia, described in the previous chapter, provided the legal framework for the creation of the reserve. Apart from this, there were other essential factors in Arraial do Cabo that facilitated its creation. Among these was the presence of a marine environment of biological significance (due to the upwelling phenomenon) as well as the presence of a 'traditional population' (the canoe fishers and other artisanal fishers previously described) with a strong connection to the resource base that included a system of local governance over these resources. Although these were cited in the Project Document as well as by the Regional Representative of CNPT as fundamental prerequisites for the creation of the Arraial do Cabo RESEX, there were other factors that played a significant role in the process.

At the local level, several important features were present which facilitated the creation of the RESEX A.C. The recognition of depleting fish stocks and the momentum created by the perceived success against industrial fishers were important unifying and empowering factors for the traditional fishing population. Also important at the local level was the presence of strong local leadership which provided needs articulation. Timely support for the creation of the reserve by both the mayor of the municipality and head of the Z-22 fishing Colony were also important. Each of these will be described in more detail in the following paragraphs.

Table 6.1 Events leading up to the creation of the RESEX A.C.

Date	Action
1993	FIPAC/IBAMA and fishers fight together against invading industrial fishers
1994-1995	Discussions begin between IBAMA/CNPT and local government about the possibilities of creating the RESEX.
1996	IBAMA/CNPT meet with local fishers to discuss the possibility of creating the RESEX.
1996	Project document sent to Brasilia for approval.
Jan 1997	RESEX A.C. created by presidential decree.
Early 1998	Implementation plan developed and approved
1999-2000	Period of fieldwork

Local factors

Depleting fish stocks - At the local level, there was a clear perception that fish stocks were being depleted and that this was primarily the result of unsustainable fishing practices employed by industrial fishers. This awareness was an important unifying factor supporting reserve creation. Another unifying factor was the success of struggles against these forces by the local government, IBAMA and local fishers. As reviewed in the introduction to this thesis, there are many threats to small-scale fishing activities in Arraial do Cabo. The source of these threats can be divided into two groupings: external and internal. While the internal threats are many (tourism expansion, marginal local government support for fishing activities, conflict between resource users, etc.), it was the external threats from industrial fishers that united fishers around the idea of creation a RESEX. Struggles against predatory fishing were a much needed unifying factor for the socially fragmented fishing community in Arraial do Cabo.

Industrial fishing fleets, mainly from southern states such as São Paulo, Santa Catarina and Paraná, attracted by the fish stocks resulting from the up-welling phenomenon, particularly drag net shrimp trawlers and gill nets, were and continue to be spotted in the waters surrounding the Cape. These large boats rarely respect the legal limits.³¹ Illegal activities often take place during the night to avoid being spotted, though it is not uncommon to see drag nets in operation from shore even during the day. Given that the only representative of IBAMA on site was a biologist and not a legal monitor with the power to sanction intruders, the battle against these predatory activities was a losing one.

In the years leading up to the establishment of the reserve, some local fishers, in conjunction with the local IBAMA representative as well as representatives of the local governments fishing support office, the Foundation Institute for Fishing in Arraial do Cabo (FIPAC), worked together to try to halt some of these degrading processes which compromise the livelihoods of local fishers and their families. On a number of occasions, these individuals and representatives confiscated gill nets placed illegally in coastal waters and either apprehended or destroyed them. From 1993 to 1996, sixteen dragnet trawlers were seized within the two nautical mile limit. Approximately R\$25,000 (£8,000) worth of fines (IBAMA estimate) were given and twenty tons of fish confiscated. Also during this period, seventeen gill nets were apprehended and destroyed (Boletim Informativo, 1996).

Data from FIPAC show a total yearly catch for 1995 as 3,171,306 kilos. This figure represents an increase of 70 percent over the 1994 figures and an

³¹ Portaria Normativa No 43, 1993 started in Arraial and was later applied to the whole coast of the state of Rio de Janeiro. Specifically it states that : Drag net fishing and crafts over ten tons are prohibited in coastal areas of the state of Rio de Janeiro less than two miles from shore (Boletim Informativo, 1996).

increase of 146 percent over 1993 statistics (IBAMA, 1998). Although this increase could be attributed to a number of factors (as stocks increased regionally during this period), locally, this increase was perceived as being directly linked to the action taken against invading industrial fishers as well as to the success of the directive (Portaria Normativa No. 43) which made trawling within two nautical miles from shore illegal. These events played an important role in building a sense of collective efficacy among fishers and, to some degree, among the organisations that participated as well. In this way, these developments created an appropriate foundation upon which later developments were built.

Local Leadership - The local IBAMA representative, a progressive biologist, member of the workers party (PT) and resident of the municipality for over twenty years, was pivotal in identifying the need for the reserve as well as for garnering support for its creation. He is also credited with bringing the idea of implementing extractive reserves in an open-water marine environment. Although not a fisher himself, Fabio Fabiano was often referred to as the 'Chico Mendes' of the RESEX A.C. Through his work with IBAMA as well as because of his own personal/political interests, he was aware of the terrestrial examples of extractive reserves and felt strongly about the need for and viability of applying this concept to Arraial do Cabo. Not only was his role critical in terms of articulating the needs and concerns of local fishers at the federal level, but Fabio Fabiano was also well placed to explain the process and procedures and answer questions the fishers had about extractive reserves. He is now the manager of the RESEX A.C. as well as the regional representative for CNPT. He has since become a very controversial character in Arraial with fishers having a love/hate relationship with him. His position as a local leader is complicated by his employment with IBAMA - an organisation viewed with much scepticism, particularly by resource users. Locally, fishers commonly perceive IBAMA

as a corrupt organization and feel that this organization was created to restrict rather than support their activities.

Political will - Support from local leaders such as the mayor and president of the fishing colony were also important in legitimising the proposal to IBAMA/CNPT for the creation of the RESEX. The then mayor David Dutra de Oliveira, was considered one of Arraial's more progressive leaders and supported the creation of the RESEX A.C. along with other initiatives which encouraged local fishing activities. It was under his leadership that local planning laws (Plano Diretor) were passed which included measures for the protection of fishing activities (Titulo III, Capitulo I Dos Recursos do Mar e da Pesca). Also achieved under his leadership was the establishment of FIPAC, the municipal fisheries department.

These achievements were an aberration in Arraial's political environment and garnering support for such an activity during the leadership of other mayors would have been difficult. Most see fishing activities as part of the municipality's past and not its future. In fact, succeeding mayors have not shared their support for the RESEX and see it as more of a threat to their power rather than an opportunity for local sustainable development. During the period of fieldwork, the vice mayor clearly expressed his disdain about the establishment of the RESEX A.C. He owns one of the two icehouses in the municipality as well as many motorised boats. He is not only one of the biggest middlemen but also the largest supplier of ice and other essentials to industrial boats which unload in the city's docks. Needless to say, he has a huge stake in the success of industrial fishing activities in the area.

Colônia approval - The project document submitted to IBAMA/CNPT would not have been complete without the signature of the president of the local fishing colony (Z-22). As the head of by far the largest fishers' organisation,

it was essential that he support the proposal. Although he was not sure what the creation of the reserve would mean for local fishers, during an interview with him he declared that he did not want to stand in the way of something that could potentially benefit them and therefore signed the project document, showing his support. This support was quickly retracted and, since the creation of the reserve, the Colony has refused to participate in any of the activities of the RESEX.

6.5 Other factors

Co-operation of Academic Institutions - Prior experience in the field and proximity of the Universidade Federal Fluminense (UFF) in facilitating the process was also important. With a long history of sociological and anthropological research carried out in fishing communities in the state, the head of the Anthropology Department (Dr. Roberto Kant de Lima) along with his postgraduate students³² provided technical support and guidance for the development of the RESEX Project document which was subsequently sent to Brasilia for approval.

Timing and chance: Lastly, timing and chance were important elements. The success of the on-going struggle against industrial fishers coupled with a natural increase in catch size (catch of main species more than doubled from 1993 - 1995) created an environment in which, if only for a short period, fishers were drawn together in support of a common goal, protecting their fish stocks and their livelihoods. All of the factors mentioned above were important in building the foundation for successful proposal for the reserve.

³² This department has since housed a number of post graduate students studying different aspects of the A.C. reserve along with other proposed marine extractive reserves on the Fluminense coastline (ie. Itaipu, Gargau).

With support from the Municipal government and the anthropology department of the nearby federal university (UFF) a proposal to the federal government was researched, developed and submitted. The Project Document was approved by CNPT/IBAMA and the Arraial do Cabo RESEX was finally established on January 3, 1997 by Presidential decree, marking the successful completion of phase one of the extractive reserve creation and development as outlined in the previous chapter.

Over the following year, the Utilisation Plan (*plano de utilização*) was developed and finally approved by IBAMA/CNPT on Feb 18, 1999 - Portaria no. 17. This marked the termination of phase two of the creation and development of the reserve. The following section will briefly describe this phase including organisational and operational aspects of the RESEX A.C.

6.6 RESEX A.C. Organisational Structure and Operations

AREMAC

As in all collaborative management regimes, responsibility over the management of resources is shared between government and resource users. In the case of the RESEX A.C. administration and operations of the reserve are shared by IBAMA (representing the federal government) and AREMAC, representing the fishers.

As mentioned in the previous chapter, according to the regulations stipulated by the federal government for the creation of Extractive Reserves, a local institution must exist which acts as an intermediary between the local population and the federal government. It is through this association that the use rights to resource users are distributed (*Títulos de Autorização*) and through which decisions will be made regarding what those rights entail. In principal, this organisation is one in which anyone can participate

and is not a class-based group or syndicate which responds solely to the users themselves. This association can take many forms. In some reserves it is called the Residents Association (Associação de Moradores) encouraging all members of the community to participate.

In the case of Arraial do Cabo, it was felt that a new organisation needed to be created to serve this purpose. Existing fisher organisations were considered either too restricted in their membership or questionable in terms of their ability to adapt to a more open and participatory management style. The mission statements of these organisations were also inappropriate as they did not include certain elements such as, the ability to receive donations of apprehended fish and to be able to auction this fish and keep the proceeds.

The two other fishing organisations in existence at the time of the creation of the RESEX were APAC and the fishing colony. Neither of these was deemed suitable to fulfill this role. APAC's limited membership and relative inactivity rendered it undesirable for this purpose. Fishers along with Fabio Fabiano and others were sceptical about empowering the local Colony with the administration of the reserve. This concern was due largely to its undemocratic history and lack of experience with fisher participation in management as well as the fact that public support for this organisation was dwindling.

The organisation created to represent fishers in the reserve is the generically named Associação da Reserva Extrativista Marinha do Arraial do Cabo (AREMAC). AREMAC is run by a board of directors with a president, vice president, treasurer, first and second secretaries. The first board was appointed as a temporary measure to be replaced later by individuals elected at the general assembly. Efforts were made to put one representative of every modality (besides shell collecting) on the board in

order to present a unified management approach as well as to encourage fishers from all backgrounds to participate. It was agreed that no board member can be on the board of any other fishing organisation and that every board member must be a fisher himself.

These rules were enacted in order to prevent non-fishers from hijacking the reserve power structure as well as to mitigate against the possibilities of the concentration of power over local organisations. As was previously mentioned, past leaders of fishing organisations have been (and continue to be) non-fishers. Also this measure was taken to prevent secondary stakeholders such as middlemen, ice house owners etc. from controlling the process.

At the time fieldwork was carried out (99/00), there were approximately 120 voting members of AREMAC and this number has grown since the development of the Utilisation Plan. All aspects of this plan were voted on in general assemblies and any changes to them in the future must also be voted on through this process. In principal, it is the voting members of this organisation that have management decision-making power in the reserve. In order for fishers to be able to vote, their monthly dues must be paid in full by the day of the general assembly. They must also be registered with the Port Authority as well as with IBAMA.

IBAMA – IBAMA, Brazil's federal environmental control agency, is responsible for the overall administration of the RESEX A.C. IBAMA also has primary responsibility for monitoring the activities within the RESEX. It is also responsible for supporting the development and implementation of the Utilisation Plan. In this respect, IBAMA has a supervisory and mediating role in the process. IBAMA's involvement in the RESEX is intended to be front-loaded. During the initial phases (initial request, reserve creation and the development and implementation of the utilisation

plan), IBAMA's role is meant to be greater than during later stages of consolidation and development, when responsibility for many reserve functions is to be handed over to AREMAC. There is no exact timing stipulated for this hand-over, although the local representative of IBAMA said that, 'neither IBAMA nor AREMAC are ready for this yet. As the concept for extractive reserves is still a new one to both resource users as well as to IBAMA both sides need time to mature' (P5: 1177 - 1178).

IBAMA is also responsible for accessing technical information (such as biological studies) related to the reserve's activities. This is done primarily through the Scientific and Technical Counsel of the RESEX that is called upon to discuss technical issues needing further research or information. As later sections will detail, IBAMA is also primarily responsible for monitoring activities within the reserve.

Utilisation Plan

The utilisation plan was developed through a series of meetings attended by fishers along with other interested members of the community. These meetings were facilitated by the local IBAMA representative and at times with the assistance of representatives from CNPT/IBAMA from Brasilia. Although meetings are open to everyone, it is only the fishers who have voting rights on the decisions made which affect the utilisation plan. Interested parties are free to present their arguments for or against different measures but do not have the right to vote. Changes to this plan are made using the same method. Proposed changes or additions to the utilisation plan are voted on in general assemblies. Results are subsequently sent to Brasilia for approval and published in the federal public registry.

Only fishers have the right to vote but not all fishers do. As the reserve was created to protect traditional populations, there was much debate about who

would and would not be allowed to participate. As defined at the general assembly of July, 1997,

'Traditional fishers are those citizens who live from artisanal fishing (be it line fishing, beach seining, diving or trawling). There are two other stipulations that have to be met: s/he will have to live in the city (for over ten years) and vote in the city (for over five). Meeting these stipulations guarantees, according to the unanimous consensus of the fishers present, the right to use the Extractive Reserve as well as to vote and be voted for in its Assemblies' (Prado, 2000:137 author's translation).³³

Monitoring

In theory, the monitoring responsibilities of the reserve involve a four-pronged strategy. IBAMA, AREMAC and the individual fishers themselves as well as the *fiscais colaboradores* or voluntary monitors all play a role in this process.

As Article 5 of Federal Decree 98.897/90 states, monitoring is primarily the responsibility of IBAMA. 'It is the responsibility of IBAMA to supervise extractive areas and to accompany the fulfilment of the conditions stipulated in the [utilisation plan]' (Felippe (nd): 24 author's translation).³⁴ Resource users share this responsibility in the sense that their actions should 'defend and preserve the environment' (ibid). Actions contrary to

³³ 'pescador tradicional de Arraial do Cabo e o cidadão que efetivamente vive da pesca artesanal (seja de linha, rede de lanço, traineira ou mergulho). Ele ainda deve cumprir duas exigências: morar na cidade (no mínimo a 10 anos) e votar na cidade (no mínimo a 5 anos). O cumprimento destas (exigências) garante, segundo consenso unanime dos pescadores presentes, o direito de fazer uso da Reserva Extrativista, de votar e ser votado em suas Assembléias.'

³⁴ 'Caberá ao IBAMA supervisionar as áreas extrativas e acompanhar o cumprimento das condições estipuladas no contrato de que trata o artigo anterior.'

this objective, with the creation of the extractive reserve, become criminal offences, making it the responsibility of citizens living off these resources to protect and preserve them. Article 14 of the RESEX A.C. Utilisation Plan states that 'each extrativist is a monitor of the reserve. Therefore, it is their responsibility to denounce irregularities to IBAMA or AREMAC' (IBAMA, 1998: 2).

Taking advantage of paragraph 2 of Article 70 of the Environmental Crimes Law (Lei de Crimes Ambientais), Article 17 of the plan describes how some individuals are to be trained to become *fiscais colaboradores*. Article 70 along with a Resolution of the National Council for the Environment (CONAMA No 003/88) provides the framework within which IBAMA can train civilian entities or individuals to be more effective monitors. So far, thirty-three of these monitors have been trained. While many of them are resource users themselves, the voluntary monitors can be members of the wider community not directly involved in the reserve.

Financial Resources

Possibilities for the RESEX A.C. to become financially self-sustaining seem to be much greater than for other extractive reserves created in more distant and isolated locations. To date, there has been no funding made available though the G-7 Pilot Project for maritime extractive reserves. In fact, funding from external agents has been extremely limited. There are no non governmental organisations involved in this reserve. The RESEX A.C., though, has other sources of income that can be drawn upon. Potential sources of income include charging an 'environmental tax' for tourists who use the aquatic space by motorised boat (this would include scuba divers as well as day-trippers). Other sources of income involve charging the industrial users of the reserve (such as the container ships which cater to the Alkalis plant, as well as for the oil drilling platforms which are serviced within the reserve boundaries). There has also been some discussion about

whether the RESEX can receive cruise liners which would also provide substantial financial benefits for the reserve. All of these sources of finance are questionable in terms of their environmental (and social) impact. Furthermore, the local government might react unfavorably to the growing power that the RESEX A.C. acquires through these measures and it is clearly uncomfortable with the level of power the reserve currently has.

Currently, however, although many of these options are being explored by IBAMA and AREMAC they are still possibilities and immediate financial needs are not being met. One project supported by the state fisheries extension agency (FIPERJ) for the purposes of setting up a small aquaculture project was unsuccessful. Other than promises from Brasilia of much-needed funds, AREMAC is forced to rely on donations from local businesses (such as Alkalis) and membership dues to support its activities. The largest donation AREMAC has received was from an individual. A tourist from the region donated a small yacht to AREMAC which it uses for monitoring missions. Upkeep is expensive though, and the lack of funds for repairs means it is often grounded for long periods.

One of the more controversial elements related to the finances of the RESEX A.C. is the fact that the local government is paying a monthly salary (ranging from 200 - 600 Reais approximately £65 –195 to each member on the board of directors of AREMAC. Many feel that this payment compromises the legitimacy of the board and of the organisation as well as the organisation's ability to act free of government influence and interference.

Conflict

In theory, marine reserves should be easier to establish since there is no need to buy out owners and resettle populations, which is often necessary in the establishment of their terrestrial counterparts. Unlike other protected

areas, in the case of the RESEX A.C., there was no need to buy out owners to create the reserve. Even given this fact, however, the creation of the reserve did exclude other users and created much conflict as a result.

Apart from the industrial fishers who were intentionally excluded from using the resources within the RESEX A.C., artisanal fishers from near by municipalities were excluded as well. After many meetings, it was finally agreed by the general assembly that a certain number of small-scale fishers from the neighbouring municipality could use the reserve if they paid yearly membership fees. Even with this measure taken, many small-scale fishers were still excluded. In response, there has been some effort by these communities to create their own Extractive Reserves.

According to Fabio Fabiano, the reason for defining the limits of the reserve at three nautical miles is twofold. On the one hand, the distance needed to be great enough to protect migratory stocks upon which fishers depend. On the other, a distance greater than three miles would have reached very deep waters (approximately 60 metres) which are home to the pink shrimp and fertile fishing grounds to Brazil's industrial fishing fleet. These measures were taken, therefore, to protect fishers as well as to minimise the conflict associated with the creation of the RESEX A.C.

6.7 Summary & Conclusion

The purpose of the first half of this chapter was to describe in detail the different dimensions of the fishing community in Arraial do Cabo, RJ focusing on the beach seiners and the informal and formal institutions that govern their activities. There are many different fishing gear groups working in and around the Cape. Each has its own perception of and strategy for using the resources around them. Beach seiners have by far the

longest tradition of organised fishing efforts governed by rules that have gone relatively unchanged for many generations.

The first half of this chapter also described the limited experience that the fishers on the cape have had in forming their own organisations independently of the State. Since the change to democratic rule in 1988, fishers have had greater opportunities to organise themselves. The fisher organisations in Arraial have not been successful in attracting membership and support and for the most part have catered to one or another gear group. The RESEX A.C. managed through AREMAC is the first organisation that attempts to create bridges between groups and consolidate efforts to manage fishers and the fishery in Arraial.

The second half of this chapter focused on the background and structure of the RESEX A.C. and reviewed the enabling factors for its creation. Although some of these are peculiar to this extractive reserve many are relevant to other fishing communities attempting to establish this type of regime in their municipality. The second half of the chapter also provided an overview of the different aspects of the reserve including the management plan, user rights and responsibilities along with the characteristics of the two groups responsible for shared management of the extractive reserve: IBAMA and AREMAC.

The reserve is now in phase three during which its long-term viability will be tied and tested. The following chapters will explore the nature of canoe fishing, the characteristics of canoe fishers as a 'community' and the health of the institutions that have traditionally managed it. They will also look at how the reserve has impacted on this community, exploring the role of canoe fishers in the reserve as well as their attitudes towards and participation in the reserve. This will be done in order to understand the role of maritime extractive reserves in protecting and supporting traditional populations.

Chapter 7 Beach Seiners and their Management Systems

The purpose of this chapter is to evaluate the strength of the common property resource regime which has developed over generations to regulate beach seining on the Cape. The chapter will begin with the presentation of data concerning the physical attributes of the resources involved. It will then describe the decision-making and institutional arrangements that regulate access to and use of these resources. It will then describe some of the key characteristics of the beach-seining community which affect the potential for successful long-term collective action including the presence of deep divisions and conflict. Finally, this chapter will analyse the resilience of this regime using Ostrom's (1990) design principals (presented in Chapter 3) as a guide for evaluation.

The presentation of data is based on the framework used by Ostrom (1990), Oakerson (1992) and Berkes and Folke (1998) in their analysis of common property regimes. The framework is designed to help identify the characteristics of the ecosystem, people, technology, local knowledge, property rights and institutions that characterise the case study as a strong or weak CPR (Berkes and Folke, 1998:14).

7.1 Physical Attributes

Beach seiners depend primarily on the migratory fish that come from the south and stop in the municipality on their way north, providing the mainstay of the livelihood of this community (see Map C). These fish travel in schools, hugging the shore and making beach seining possible.

Stock

There is general agreement by modern scientists, seiners and other local resource users that the fishing grounds in Arraial are being depleted at a rapid rate. Catch statistics, interviews and informal discussions immediately revealed this. All of these sources cite predatory and unregulated fishing activities as the cause of resource depletion. Seiners often say, 'Canoe fishing is a dying tradition, things are so bad we can't survive from this anymore. We used to do more than survive, we used to live from seining' (P14:651).

Another fisher remembers the days when fish was abundant,

'In my time, we buried a lot of fish. One time we caught six tons of xerelete, big ones around a kilo each. We caught them over on Praia do Farol. We sold what we could to the fish salters, but the rest we buried, in the corner by the Marines, you know, the one we call

Baleia (Whale). Back then, there was lots of fish but no way to take advantage of it all. Everything has changed now, before we had plenty of fish and no one to sell it to. Now it has more value but that won't help us when the stocks are gone' (P14: 330).

Flow

Seiners more than any other gear group on the Cape are affected by predatory fishing and unregulated use. As previously mentioned, beach seiners, unlike other gear groups such as the trawlers or motorised boat fishers, do not pursue their catch. Instead, they wait in defined fishing areas for fish to come to them. It is part of deep rooted traditional ecological knowledge that migrating shoals keep a constant trajectory. Shoals approach the Cape from Massambaba in the South³⁵ and work their way around the Cape passing Praia Grande first then through the Boqueirão past the Praia dos Anjos beaches then onto Prainha and finally passing Praia do Pontal (See Map C).

Figure 7.1 Resource Flow and Local Knowledge

'When fishers from Massambaba (in the South) see a good school go by, they give us a call to let us know. Depending on the temperature of the water, we know what time the school will arrive at Praia Grande. For example, if a school of bluefish passes them at 9am and the water is warm, it will arrive here around 1:15pm. Now, if the water is cold, the school will arrive faster.' (fisher from Praia Grande P11:202)

Beach seiners identified the unobstructed flow of migratory fish around the Cape as crucial to the success of their traditional activity. The sources of disturbances to this flow are both internal (caused by the seiners

³⁵ It is not uncommon for fishers from Monte Alto or Figueira to spot shoals passing their beaches and informing fishers from Praia Grande that a shoal of for example bluefish would be arriving at their beach soon.

themselves) or external (caused by outside factors). Interruptions in the flow outside of the control of the canoe fishers have increased in recent years due to the growing number of predatory and small-scale fishers who often invade their fishing grounds. Increasing numbers of surfers, motorised boats and divers have made matters even worse.

Although seiners have little control over the outside pressures on these ecological patterns, they nevertheless have an important role to play in protecting this flow by minimising internal disturbances. Traditional unwritten rules state that when beach seining is practised properly, the entire school of fish should be caught. This rule is rooted in the belief that when fractions of the whole are captured, the remaining fish become frightened and head out to sea taking other shoals along with them.³⁶

The characteristics of the resource flow create a natural hierarchy between the beaches with Praia Grande being the beach with the first opportunity to capture passing shoals (See Map C). If seining is not being practised 'correctly' according to local ecological knowledge and informal rules, this could frustrate the efforts of fishers from other beaches and create a subtractibility problem. One of the most contentious issues among beach seiners is related to this.

Seiners on Praia Grande have begun in recent years to leave their nets in place while they go home for lunch so that passing shoals will be captured and waiting for them when they return from their break. Seiners from other beaches (and even some from Praia Grande) state that it is only certain species that become trapped in the nets and that those that do not get caught become frightened and change their natural course and, like fragmented shoals, are likely to take other schools of fish along with them.

³⁶ One of the characteristics that a lookout uses to describe the 'perfect' shoal is that it is '*bem formada*' meaning that the fish are tightly grouped together.

In this way, neither fishers from Praia Grande nor those from other beaches will have the opportunity to capture these shoals. Fishers from the other beaches are furious that Praia Grande seiners are disrespecting traditional rules in this way.

A retired fisher from Praia Grande sympathises with seiners from the other beaches:

'On Praia Grande, they're not fishing right. A school of 1,000 fish comes around and they only catch 300. As a result, the others not only run away but they take other schools with them. And another thing, the fishers from Praia dos Anjos are right. That net that they [seiners from Praia Grande] leave up is ruining their pescaria (seining activities). That spot on Praia Grande is one of the spots where the schools pass, you know. When they leave that net just sitting there, how are the fish supposed to get past and go to Praia dos Anjos?' (P14: 390)

Another fisher comments on the same issue:

'The waiting net they use [on Praia Grande] is prohibited. They can only fish like that if there is a canoe in the water waiting to capture the fish once they get caught in the net. But they just leave the net and go off someplace. On Prainha they use the same net but it's not as problematic as the one on Praia Grande. Because all the schools of fish [that come to the Cape] pass that beach, either by land or outside.³⁷ You know, that's what we call *desmandar*, when the fish come from the South to the North it's usually to lay their eggs, so these fish normally arrive full of eggs. So anyway, they all pass

³⁷ By land or outside means that the fish either pass close to the coast or farther away. It is a term commonly used by 'cabistas'.

through Praia Grande. Sometimes they come in large numbers and sometimes they don't. Two, three, four, six. They normally put up the waiting net when the water is yellow³⁸ because the lookout can't do his job when the water is like that. Fishers from the other beaches are always complaining about it, but nothing has changed' (P9: 582).

As schools of fish often stay for a period on the Cape, their movements are monitored by the lookouts. Whereas in most fisheries it is difficult to pinpoint subtractibility (instances where one group's use subtracts from the use of others), in Arraial it is often very clear that if one group caught a shoal this means another group will not. This is the case both on the individual beaches and among the different beaches. For example, a shoal of bluefish caught on Praia Grande means one less that fishers from Praia dos Anjos will have the chance to catch. On the other hand, if the fishers from Praia Grande let one pass³⁹, their chance is gone and the Anjos fishers get a try. Often fish (such as dogfish shark) stay on a beach for more than one day creating strife between *companhas* of the same beach. If a *companha* does not catch it on their day then the next day's work teams get a chance to capture it.

In the past, when stocks were more abundant, there was plenty for everyone. Lookouts claim that they would pick and choose only the best shoals as opposed to now where entire days can pass without one shoal being spotted. Lookouts also stated that they do not reveal sightings of shoals that were not captured so as not to give other lookouts an advantage for capturing them the next day. This provides an illustration of how competition between and within beaches is exacerbated by depleting stocks.

³⁸ Yellow water corresponds to murky water or low transparency.

³⁹ Not every shoal that passes is captured. Lookouts may not see them or shoals may pass in areas that make them inaccessible to seiners.

Boundaries

Successful beach seining requires a huge area of undisturbed waters. Fishers often identify disturbances tens of kilometres away as the source of problems. As in any fishery, the physical area where fishing activities are carried out does not represent the full area that requires co-ordination for the activity to be successful. The rules which govern beach seining are specifically related to the traditional fishing spots on each beach and not the entire trajectory needed to be protected for this activity to be successful. This is most likely due to the fact that when these institutions were created there was no need to regulate the larger area as external disturbances were rare.

Changes in technology and number of resource users have increasingly undermined beach seining activities. That is, the boundaries regulated in the regime are not 'congruent with the underlying boundary conditions determined by the physical nature of the resource (Oakerson, 1992:48).' Therefore, no matter how efficiently seiners adhere to the rigid system in place which determines entry and access rules for seining spots, this system cannot single-handedly protect the flow of migratory fish upon which this group depends. This indicates an exclusion problem whereby access to the resource cannot be effectively restricted. This has important implications for the long-term sustainability of this activity. The following section will provide an overview of the institutional arrangements that have traditionally governed this activity.

7.2 Institutional Arrangements

Institutional arrangements are defined by Ostrom (1990: 51) as, 'the sets of working rules that are used to determine who is eligible to make decisions in some arena, what actions are allowed or constrained, what aggregation

rules will be used, what procedures must be followed, what information must or must not be provided, and what payoffs will be assigned to individuals dependent on their actions’.

Operational Rules

Operational rules are those institutions that regulate use of the commons. They include limitations on the type of technology used, the duration of time that each user or group of users can access the common resource. These rules also include the mechanisms with which these rules will be enforced and monitored. This section will describe the various facets of the common property resource regime which governs the activities of the beach seiners of Arraial do Cabo.

Historically, beach seining has been governed by a set of institutions created in order to regulate access and use of common fishing grounds. These complex norms continue to be unique to the beach seining community. In the absence of government support and regulation described in previous chapters, over time these fishers developed an informal system of local management over their common property resources. Other gear groups have not developed their own in the same way nor do they participate in those of the canoe fishers.

Not all of these institutions have survived over the years while others have continued and in some cases become formalized. The seiners’ management system has been partially formalised at different periods over the last century. Earliest documents date back to 1921. The rules defining this activity were codified in the Colónias handbook published at this time. Later, elements of this regime were documented with the local government as well as with the Port Authority. Apart from the Utilisation Plan for the Extractive Reserve (published in 1998) the last formally documented aspect of the beach seiners’ common property regime occurred in 1983 and was

signed by the owners from Praia Grande. This document addressed a number of different aspects of the management regime but focused on limiting access to the Praia Grande seining grounds.

The following sections detail the operational rules associated with the beach seining tradition. These rules are associated with access, decision-making, monitoring and enforcement and benefit distribution of the resources in question.

Work Unit - Companha

Figure 7.2 Photo of elderly work team



The *companha* is the work unit or team associated with each canoe. A full *companha* consists of a minimum nine *camaradas*⁴⁰, each with their own specific role in the beach seining process. Seven of these fishers stay on the boat itself with the other two on land. From the front of the boat to the back the *companha* consists of the following positions:

- *Remadores*: The four rowers, as one might imagine, propel the canoe using two wooden paddles each. They are directed by the *mestre* or skipper.

⁴⁰ Camaradas literally means comrades. Canoe fishers commonly refer to their fellow beach seiners using this term.

- *Corticeiro*: The *corticeiro* or cork-line man along with the *chumbeiro* or lead-line man are responsible for casting the large net into the water. One side of the net is lined with cork to keep it afloat and the other with lead, sinking the net and creating a curtain or suspended wall that traps the fish. While the *corticeiro* throws in the cork line, the *chumbeiro* does the same with the lead line.
- *Mestre*: The *mestre* or skipper, stands at the bow of the canoe facing the rowers. He conducts the manoeuvres of the canoe by interpreting signals from the *vigia* or lookout and translating them into different commands for the net throwers and rowers.

Two following *camaradas* stay on land throughout the process with very different responsibilities:

- *Cabeiro*: The *cabeiro* or lineman stays on the beach and is responsible for initiating the closure of the net by pulling in a line which is attached to one side of the net. He will later be helped by the crew themselves after the entire net is placed in the water.
- *Vigia*: The *vigia* or lookout is the key player in this process. Standing at specific points on the mountainside near the shallow sand bottom coves utilised for beach seining, he is responsible for visually locating incoming shoals and schools of fish and for signalling with hand movements and a bright cloth to those on the canoe, the direction, placement and speed which needs to take place in order for the capture to occur (See Figure 7.4). For the most part, the 'sign language' used by the lookout does not change according to the person's personal style. This is important so that if fishers move from canoe to canoe, they will be able to understand the signals. Also, if a lookout falls ill, his replacement will be aware of the proper signal and will be able to communicate effectively with the *companha*. Currently, there are only six individuals with this capability in Arraial do Cabo.

Figure 7.3 Lookout spotting incoming schools of fish



In the past, each *camarada* held a specific position on the boat throughout his career. For example, he would be a rower, line-man or cork-man. Positions such as *mestre* were earned over time. *Vigias* in the past and even today are often nurtured from a young age to fill this position. Often, today's *vigias* are the sons of former lookouts. This is the only position that is still distinguished and separate from the rest. It would be quite rare to have a fisher who is a rower one day be a lookout the next. This would only occur if a lookout seeks more fishing days and can only find space on canoes that already have a lookout, forcing him to hold a different position.

For the most part, seiners spend their day waiting in the shade or in small huts close to their fishing grounds for a signal from the *vigia*. It is only when the *vigia* identifies incoming shoals and signals to the fishers waiting below, that the rowers, cork-line man, lead-line man, and skipper take to the canoe to position it according to the *vigias* instructions. Once the net is cast, both ends of it are brought to the beach where the process of pulling it in begins.

The net itself is too heavy to be recoiled by the *companha* alone. Also, in order to keep the shoals from escaping, the canoe often stays in the water during this process with members of the crew smacking the waters surface with their oars in order to scare (*espantar*) the fish back into the net. As a result, the *companha* depends on the assistance of people on the beach to pull in their catch. Depending on what the catch is thought to be, and the time of year (tourists often participate during the high seasons) the number of assistants can range from a handful to over a hundred.⁴¹

Well co-ordinated, the entire *cerco* or 'fencing in' process takes place in silence. According to the canoe fishers, fish have differing sensitivity to noise above the surface of the water. One of the most traditionally valued fish of Arraial do Cabo, the *Anchova* or Bluefish (*Pomatomus saltatrix*), is known for its extreme sensitivity. In the past, children and animals were not even allowed to run on the beach so as to not scare these precious shoals away.

Canoes fishing on beaches that lie at a distance from the mainland often require larger work teams. Canoes docked at Praia dos Anjos with fishing rights to the Maramuta, Praia da Ilha, and the Prainhas require the use of a motorized boat to tow the canoe and its *companha* to these fishing grounds. Historically, the work team would use man power and wind power in the form of a small cotton sail to get to these locations. Although many canoes are still equipped with these sails, with the availability of low cost transport, all canoes working these beaches have resorted to motorised assistance.

⁴¹ This high number occurs mainly during cação or dogfish season where each fish can weigh up to 90 kilos. This type of fish comes to the waters edge and often stays for a number of days, giving fishers and the local population fair warning that they'll need to mobilise efforts to bring them in.

Another factor which contributes to the need to use a larger work team is also related to the distance of the beaches. While many canoe fishing spots are located close to the urban centre and therefore close to fisher's homes, those same work teams that require the assistance of a motorised boat must also bring a cook along with them to prepare the *engrosso*⁴² or beans and rice dish commonly eaten on these fishing trips⁴³. Increased fuel costs and the actual time taken out of the work day in order to go back and forth would be extremely inefficient. In the next section, the economic implications of these different needs will be described.

Income distribution - O Quinhão

Although the type of work and the level of responsibility vary significantly among the different positions, this is not reflected in the distribution of earnings within the group. Each *camarada* is entitled to a share of the catch, locally referred to as a *quinhão*.⁴⁴ This share does not increase over time, meaning that a young fisher just learning the trade will earn as much as another with many years experience. Although there are slight variations between beaches and seasons where more or fewer fishers are utilised, for the most part, there are two main scenarios which illustrate the division of catch among the *camaradas* and owners of the canoes and nets. Literally, in Portuguese, a *quinhão* refers to one fifteenth. In practice, shares may vary from one fourteenth to up to one seventeenth but it is still referred to as a

⁴² *Engrossar* literally means thickening. *Engrosso* refers to the thick bean and rice paste commonly prepared by canoe fishers. In the past, the cook used one pan to make both the beans and the rice in the same pan, resulting in a thick paste. Food was prepared over a wood fire and joining the two saved on the amount of fuel used. Today, they bring small camping stoves with them and the food is cooked separately. Out of habit though, it is still referred to as the *engrosso*.

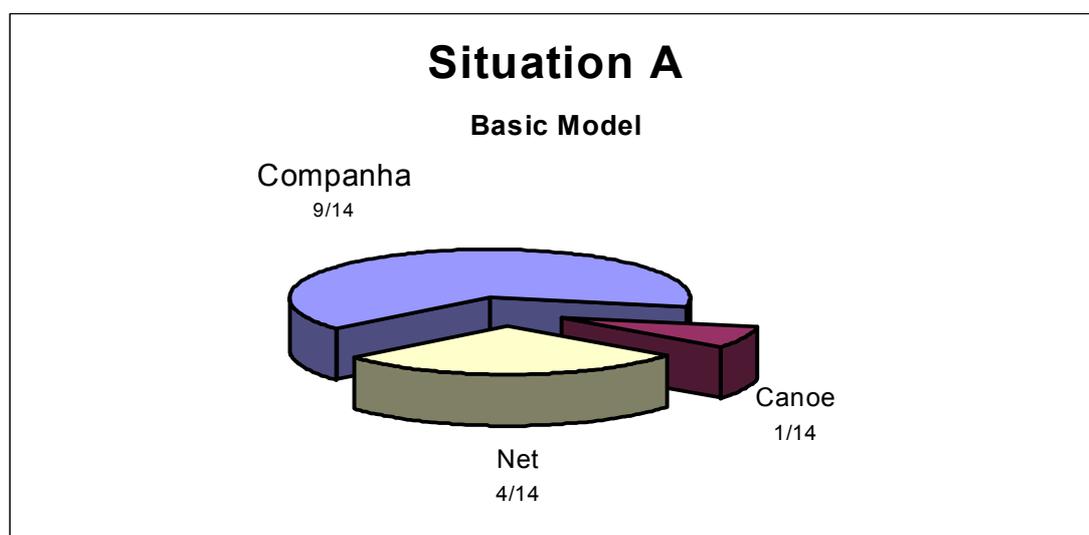
⁴³ Any fish caught during the trip to these distant beaches using a hook and line, are also fried up and included in the meal.

⁴⁴ *Quinhao* literally means portion or quota. The etymology of the term has roots in a distribution done in fifteenths and in Arraial the word is used in this way. I.e.: a *quinhao* is equal to approximately one-fifteenth of the total catch.

quinhão or share. In either scenario, it is the boat and net owners who earn the lion's share of the catch.

The most common distribution is illustrated in by situation A (see Figure 7.4). In this situation there are nine *camaradas*⁴⁵ working with the use of one canoe and one beach seine. The shares of catch in situation A are divided into fourteen parts. In this case, the owner(s) of the canoe is entitled to one share, the owner(s) of the net is entitled to four and the remaining nine parts are distributed amongst the nine *camaradas*.

Figure 7.4 Income distribution for a nine member work team

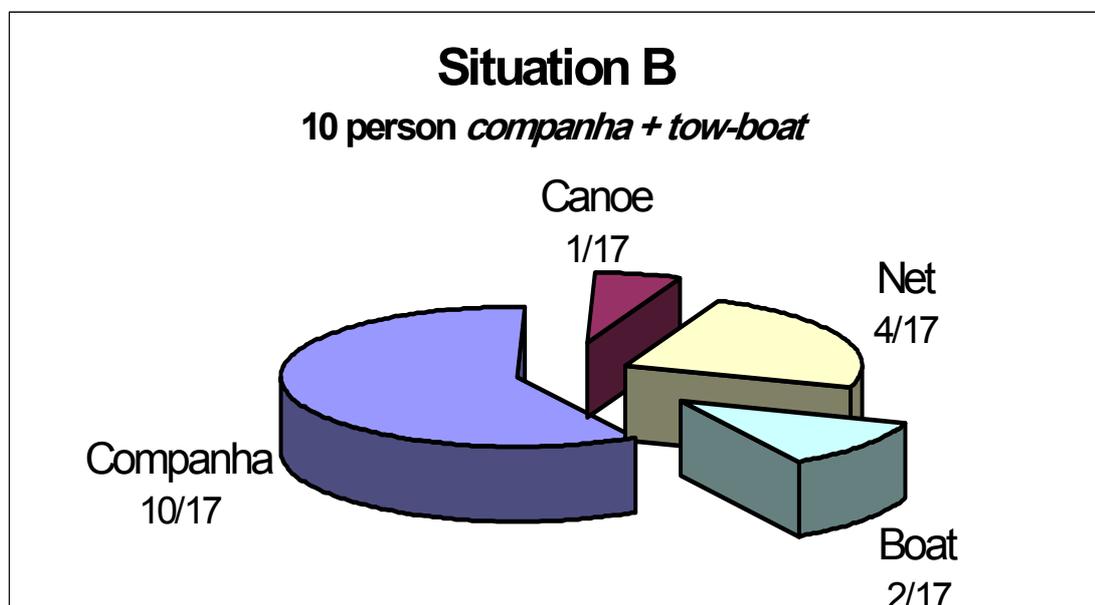


Situation B represents another breakdown of shares common to those canoes that require the assistance of motorised boats to tug them to distant beaches. As stated earlier, it is these canoes that also require a cook to

⁴⁵ Comrades is the word used to describe the individual members of the team

prepare food for the *camaradas*. In situation B, the catch is broken down into seventeen parts (see Figure 7.5). In this case, there are ten *camaradas*; the nine crew members and the cook. The cook receives as much as the other participants in return for his labour. Apart from the crew and cook, two shares are distributed to the owner of the tug boat bringing the total to twelve. As in Situation A, the remaining five shares go to the owner of the canoe (1 share) and the owner of the net (4 shares)⁴⁶.

Figure 7.5 Income distribution for a ten person work team using a tow-boat



⁴⁶There are situations that may alter this breakdown, for instance, in the absence of one fisher. When a long term fisher from a *companha* falls ill, this can lead to an increase in the number of shares to be distributed. Whether as a result of an accident, a temporary illness or if a fisher becomes unfit to fish (due to age or illness) they may receive a *quinhão* or half a *quinhão* until they are ready to come back or indefinitely if the fisher is elderly. Widows of canoe fishers can also be eligible for this type of payment. It is not uncommon for a canoe to have one or two extra *quinhoes* included in its distribution.

7.3 User Access Rights - *Direito do Dia*

When, where and how beach seining takes place and who is involved is determined by a set of rules called the *Direito do Dia* or Right of the Day. Each beach has its own *corrida* or use sequence which defines who has the right of access for each day, but all beaches generally follow the same rules set out in the *Direito do Dia* system. Rules can be changed by agreements made by the owners of the canoes of that beach.

According to this system, under no circumstances are canoes from one beach to be used on another. They cannot be transferred from one beach to another, either for temporary purposes (ie. to fish for the day) or for the long-term (ie. to replace a damaged canoe). ‘Canoes from Praia Grande should never enter the bay through the Boqueirão and canoes from the other beaches should never leave the bay through the same passage’ (Elder fisher).

Table 7.1 Fishing days per beach

Praia Grande	21 Days	42 canoes
Praia dos Anjos	12 Days	12 canoes
Prainha	7 Days	7 canoes
Praia do Pontal	4 Days	4 canoes

There are a certain number of 'days' associated with each of the four beaches (Praia Grande, Praia dos Anjos, Prainha, Praia do Pontal) that determine when each canoe has the right of the day (see Table 7.1). So not only are canoes restricted to specific beaches but they must also wait their turn to fish, as defined by the system. By customary law, each day must have a corresponding canoe and full gear kit (net, paddles, rope and, of

course, *companha*). For example, Praia dos Anjos with twelve 'days' should⁴⁷ have twelve individual canoes and gear sets in working order, one for each 'day'. This does not mean that there are twelve different *companhas* (ie. 120 fishers) on this beach as seiners are allowed to fish on multiple days. In fact, the tendency over the years has been that fewer *companhas* are fishing on an increasing number of days.

Each day has a name (and corresponding canoe) associated with it which is registered at the local fishing colony. As a result, should an old canoe be replaced, it will always be given the same name which is linked to that canoe's fishing day. There are canoes that have been replaced many times, always though, retaining the original name. As the canoes are dug out from huge trunks and repainted every six months (another customary rule), they can last for generations. Bacurau, one of the Praia Grande canoes, is said to be over one hundred years old and many others are over fifty or sixty years old.

On some beaches, more than one canoe fishes on a given day. This is either because there are a number of fishing sites associated with the beach or that two canoes fish the same site. Where canoes work in pairs, locally called '*canoas casadas*' or married canoes, each canoe takes turns casting their net. As the process of recoiling the net is time consuming, the presence of a second canoe avoids the possibility of shoals passing without being caught during this process. On Praia Grande, 'the fishing day should never occur with more or fewer than two canoes' (Britto, 1999:259). A breakdown of the canoe partnerships from Praia Grande are listed in Table 7.2.

⁴⁷ For all beaches except for Praia Grande, these rules are still adhered to. On Praia Grande, as many canoes have fallen in disrepair and most are owned by one individual, canoes and nets are frequently re-used in the sequence.

Table 7.2 Right of Day system on Praia Grande – Day division partnerships

Day	Canoe	Day	Canoe	Day	Canoe
Day 1	1 - 2	Day 8	15 - 16	Day 15	29 – 30
Day 2	3 - 4	Day 9	17 - 18	Day 16	31 – 32
Day 3	5 - 6	Day 10	19 - 20	Day 17	33 - 34
Day 4	7 - 8	Day 11	21 - 22	Day 18	35- 36
Day 5	9 - 10	Day 12	23 - 24	Day 19	37 - 38
Day 6	11 - 12	Day 13	25 - 26	Day 20	39- 40
Day 7	13 – 14	Day 14	27 - 28	Day 21	41 – 42

After day 21 the user access system starts again from day 1

On other beaches, such as Praia dos Anjos, there are two fishing spots but only one canoe per spot so that two canoes⁴⁸ go out each day. For example, the first in line goes to 'the island' and the second goes to a fishing spot called 'Maramuta'. The following day, the second in line would go to 'the island' and the third would go to 'Maramuta' and so on. When each *corrida* or sequence is completed, it starts over with the first canoe in the run.

Figure 7.6 Picture of Canoe on Praia Grande



⁴⁸ During mullet season in the winter months, there are three fishing spots associated with this beach.

7.4 Monitoring & Enforcement

Ostrom's design principals refer to monitoring and enforcing common property management regimes. For these measures to be effective, 'monitors should be accountable to the appropriators or are the appropriators' (Ostrom, 1990: 98). This principal could have held true in Arraial do Cabo in the past but, since then, many changes such as the concentration of ownership have significantly altered the reliability of the monitoring system of this regime.

Actions are held in check by a variety of monitoring mechanisms. Some of these are no longer practiced at all while others are still used on some beaches and not on others. Traditionally, each *companha* was required to have a monitor among the crew who was responsible for observing the activities, and reporting irregularities and infractions to the Colonia (Teixeira de Mello, 1921). This meant that the Colony itself was involved in sanctioning canoes or owners who did not comply (in a way that it is no longer involved). Sanctions were gradual, but severe, and initial infractions were fined with subsequent ones leading to the exclusion of that canoe from the sequence. Fines were then (supposed to be) invested in education and medical services in support of fishers and their families.

The most effective tool for monitoring access is still in use by all beaches and is inherent in the sequence itself. Because each *companha* has an interest in and incentive to protect its 'day' and right to fish, the group will naturally be making sure that other canoes are complying with the system. For example, if a *companha* arrives on the beach on their fishing day and there is a canoe out of sequence already there, the *companha* which has the customary right to fish will fight to protect and maintain it.

It is not just the sequence, though, that provides these sorts of incentives. For the most part, unlike other fishing types, seining takes place in very accessible and public spaces. Because it is such a participatory type of fishing as well as because it is such an intrinsic part of the local culture generally, it is not just the fishers who know the rules. Canoe fishing is a spectacle that locals like to watch and participate in. These observers consist of fishers and non-fishers alike and they too play a role in supporting the system. It has been that system that has supported the community for so many years and therefore, these informal monitors (through the 'clog radio') create an awareness of who is and who is not upholding the rules.

Nevertheless, there are a number of major infractions occurring, particularly on Praia Grande, that are not being addressed. Powerful individuals with vested interest in the regime have pursued a policy of selective rule enforcement which protects their control over the system and minimises their investment. For example, there are significantly fewer gear sets than there are days (i.e., there are approximately fifteen canoes/nets when there should be forty-two). In the past, this would not have been possible as each day was owned by a different set of individuals. Owners without fishing gear would not be able to participate. Because today, one or two individuals own most of the canoes and access days, they have the power to decide that they will not invest in multiple gear sets in order to take advantage of their days. Instead, they own a couple of canoes/nets but fish on multiple days with each set.

Another significant infraction occurring on Praia Grande and impacting all the seining beaches is the practice of leaving the seine in the water unattended. This net disrupts the flow of fish upon which all beaches depend. This was described in more detail above. Finally, it has not been at all uncommon for canoes to be brought from Praia Grande to fish on the other beaches. In fact, the 'big sharks', as these powerful owners are locally

referred to, not only control access to the Praia Grande seining area but they also have a growing presence on the other beaches. This will be examined in the following section.

7.5 Decision-making Arrangements

Ostrom (1990) defines collective choice arrangements as those where most individuals affected by operational rules can participate in modifying them. In the past, when most fishers were also owners of at least part of either the canoe or net, they had the right to participate in decisions affecting the management of their common resources. Each gear set had many owners associated with it, the net being the most valuable item with the most corresponding owners. Today, concentration of ownership of the means of production along with the marketing of catch has created a situation in which most fishers are 'employees' of the gear owners. These fishers have little say in how decisions are made and in deciding which rules are enforced.

Decisions about the rules are traditionally made by the owners of the nets and canoes of each beach. Generally speaking, the rules of the beaches are almost the same, with slight variations reflecting the different social and environmental setting of each beach. As previously illustrated, seining on Praia Grande must take place with two canoes working in partnership. On Prainha, canoes can be invited to help should there be a large shoal that one canoe alone could not bring in, but otherwise canoes fish independently of each other. This relative independence allows for beaches to take care of their minor issues such as, for example, how the rest houses should be managed. The *camaradas* or the fishers themselves are rarely involved in this decision-making process. This makes the owners of these resources

that more powerful and the concentration of this ownership, that much more significant.

One of the strongest powers of the owners of these resources is deciding who, if anyone will be allowed into the sequence. Traditionally, anyone who had the standard materials⁴⁹ (large dug out canoe and net approximately 270 metres long and 16 metres wide), would be eligible. In 1983, the owners from Praia Grande passed a ruling (registered at the local colony), that no new canoes would be allowed entrance to the sequence on 'their' beach. The only way new owners are permitted is if they purchase existing materials and the days linked to them. Although this ruling only applied directly to Praia Grande, the fact that the same owners have veto power on the other beaches sent a clear message; no new canoes.

As previously mentioned, although it was not uncommon in the past for fishers to be part owners, today it is only a small minority of seiners who are owners. Of those who are owners, ownership has been acquired in the past and not recently gained. Small owners are slowly becoming the exception to the rule. There are approximately three owners (who are all part of the same family - father son and cousin) who make decisions which affect the livelihoods of all canoe fishers. These same individuals are also owners of many of the motorised boats operating on the Cape along with one of the few icehouses and fishmongers. These owners are revered, feared and hated by canoe fishers. Because of their influence, they have veto power on decisions made on all of the beaches. Fishers and non-fishers alike refer to the current seining management system as a 'Mafia', in which the canoes/nets, refrigeration, and marketing systems are controlled by a tightly knit group. The following section looks more closely at these imbalances.

⁴⁹ Only materials meeting these standards would be considered acceptable.

Ownership patterns - Os Proprietários

Ironically, the horizontal structure of the *companha* is not reflected in the ownership patterns of the days, nets, canoes and other means of production. In the past, because of the expense of the materials used in this type of activity, principally the net and canoe, groups of individuals would collectively own these items. Fifty years ago it would have been very common for a canoe to have three or four owners. As the nets are significantly more expensive than the canoes, they often had even more owners. These owners were most often fishers working on the canoe itself. Also, owners of canoes from each beach were typically residents of that beach. Praia Grande canoes were owned by people from Praia Grande, Praia dos Anjos canoes were owned by people from the Praia dos Anjos neighbourhood and so on.

Local statistics show that only 12 percent⁵⁰ of fishers in Arraial are owners or part owners of the boats they use to fish. Within canoe fishers this statistic is even lower and, in comparison to other modalities, concentration of ownership is even more marked. In recent years, a few individuals have come to own the vast majority of the canoes and nets, thereby controlling the associated 'days' and access to the fishing grounds.⁵¹ The vast majority of fishers are not owners and many owners (particularly those that own multiple canoes) are not fishers themselves. The breakdown of ownership on Praia dos Anjos is a good illustration of these trends. It also shows

⁵⁰ This can be compared with statistics from three other towns in Rio de Janeiro which have been examined for eligibility for Extractive Reserve creation (Itaipu/Itacoatiara/Piratininga). In these locations, over 56% of fishers have their own boats/canoes.

⁵¹ Ironically, the individual who owns the most canoes, nets managed to buy them with a subsidised loan from the government. In one go, he bought 10 sets of gear and the associated days.

another interesting trend, that owners from Praia Grande are increasingly buying out owners from the other beaches.⁵² A (non-owner) seiner explains:

'I could never have the means of getting my own canoe on Praia Grande, even if they would let me. They used to be much cheaper. Now, in order to get a canoe on that beach it's going to cost a fortune and for what? In order to fish once every 21 days? You'll never get your money back, you'll need at least 4 or 5 days to do that. If not, months could go by without you earning anything on your investment (bad weather etc....)' (P10: 245).

Praia dos Anjos

Ten individuals own parts of the twelve canoes on Praia dos Anjos along with access to these fishing grounds. Of these, five are residents of Praia dos Anjos and the other five are residents of Praia Grande. The five owners from Praia dos Anjos own 37.5 percent (4 1/2 canoes) of the means of production (and, therefore the access to that production) on this beach while owners from Praia Grande own the lion's share at 62.5 percent (7 1/2 Canoes). A single family (father and son) from Praia Grande owns 50 percent of total access to the Praia dos Anjos fishing grounds. Of the 37.5 percent owned by people from Praia dos Anjos, 16.6 percent of them are owned by widows⁵³ who inherited them from their husbands.

⁵² Conveniently, each owner paints their canoe (s) a certain colour so a quick glance at the canoes lined up on the beach make it easy to distinguish the distribution of ownership on that beach.

⁵³ When a canoe is not being looked after properly, needs painting or has fallen in disrepair, it is common to hear people calling them canoa de viuva or widow's canoe.

Table 7.3 Breakdown of gear/access ownership on Praia dos Anjos

Total # of owners on P. dos Anjos	10
# of owners who are P. dos Anjos residents	5
# of owners who are P. Grande residents	5
Percentage of total owned by P. dos Anjos residents	37.5
Percentage of total owned by P. Grande residents	62.5
Percentage of total owned by one family (from P. Grande)	50
Percentage of total owned by women (widows)	16.6

Fishers from other beaches commonly expressed that they felt that their seining activities were being overrun by these powerful owners. Not only are access days on all beaches owned and controlled by these individuals but, generally, these owners choose crews from their own beaches to work on their canoes, thereby limiting the access of residents to seining opportunities on their own beaches. This trend has increased the tension between beaches.

'Since [Praia Grande seiners] started fishing on our beach they built a little hut for themselves to use. On this beach there are two; one for seiners from Praia Grande and the others for Seinners from Praia dos Anjos. They built it because they are full of themselves. They don't want to share anything with anybody. Its because of attitudes like that that [canoe fishers] can't improve our lot together. No one wants to help but everyone wants to benefit (P15:281).'

Another important change that has taken place in recent years is how the catch from this modality is processed and marketed. In the past, the day's catch was publicly auctioned on the beach where multiple buyers would

present their bids. This guaranteed a fair price for owners and fishers alike. This practice no longer exists and now fish is sold to a handful of buyers who own the *peixarias* or fishmongers along with either of the two icehouses on the Cape. Increasingly, those individuals that own the greatest share of access to the fishing grounds have become the owners of these processing and marketing centres. This example further illustrates the increasingly centralised nature of this common property regime.

The following is a quote from a young seiner who fishes on Edilea, a Praia dos Anjos canoe whose owner has only one canoe:

'Everyone wants to fish on Edilea, because it's the only canoe that sells its catch to the highest bidder. That makes it the best. It sells its catch for a better price than the others because the owners of the others are also the middlemen. I used to work for them. I had to leave because I didn't want to sell my share for such a low price. Because the owner was the buyer, he thought he could pay whatever he wanted and I would take it. But I didn't. I took my fish and sold it to another buyer. Most people are afraid of them. Most of the people that work on those canoes are elderly. So they can't run that sort of risk. And since those owners own almost everything, they would have no place to go. I took my fish and left the canoe. I had to leave (P15: 534).'

There is a significant gap in the beach seiners CPR between the rules of the game and the actual behaviour of the resource users. Social transformation within this group has contributed to this situation. Over the last fifty years, most seiners have become the employees of a handful of powerful owners. These owners now determine how seining is practised on the Cape. Other characteristics of this 'community' such as the pre-existing conflict and divisions between beaches have eroded reciprocity and contributed to

mutually subtractive use of common resources. These divisions will be explored in the following section.

7.6 Patterns of interaction

Divisions and Conflict

Size is often cited as a factor which determines the success of communities in organising themselves for collective action (Ostrom, 1990; Bromely and Cernea, 1989; Baland and Plateau, 1996). It is commonly thought that the smaller the group, the easier it is to motivate individuals to work towards a common goal. Yet, Baland and Plateau (1996) aptly point out that it is often among these small communities that rivalries and internal strife are pervasive. This view is extremely relevant to this particular case study where although the group is small⁵⁴ there are deep divides that constrain collective efforts.

As described in earlier chapters, divisions among the residents of Arraial do Cabo run deep. They are as much the result of the historical and colonial development of the Cape as they are of the effects of modernisation and social change which has occurred during the last fifty years. The process of colonisation on the Cape lasted from approximately 1503 when Amerigo Vespucci arrived in the Baia dos Anjos until Brazilian independence in 1822. During this period, Portuguese settlers, French pirates and other northern Europeans along with African slaves made, willingly and unwillingly, the Cape their home. Although they adopted the skills and techniques used by the Sambaquis Indians before them, these traditions are all that is left of these indigenous communities.

⁵⁴ Size is determined not only by number of people but in terms of their visibility to each other (Ostrom, 1990).

Today, the distinctions between the remaining groups are still clear and the separations still relevant. The miscegenation Brazil is so famous for did not occur in any significant form on the Cape. This has left the community scarred and less able to act collectively in response to problems which affect them as a community. Neighbourhoods are divided among these lines. Relationships are dictated by these divisions. Although significant changes have taken place, seiners more than any other group in Arraial have held on to these separations. Throughout this chapter there have been references to growing inequalities and hierarchies along with increased competition and subtractive behaviour between seining beaches. This section will explore the roots and current manifestations of these processes.

The presentation of findings related to social interactions among beach seiners on the Cape must include a description of the divisions and conflict which exist within this group. Seiners from Arraial cannot be characterised as an 'organic whole' as seen from the outside, nor do seiners characterise themselves in this way. Any attempt to approach this group as a cohesive community would be misguided. The divisions are not new and as mentioned earlier are rooted in the post-colonial history of the Cape. Although non-fishing residents feel that these divisions have become less pronounced in recent years, the relations between beach seiners as the most traditional group are a tribute to the Capes' divided past. A seiner from Praia Grande explains:

"Before⁵⁵, here in Arraial it was three tribes, Praia Grande, Prainha and Praia dos Anjos. Who was from Praia dos Anjos did not come to Praia Grande. They just didn't come. It was like Iraq and Iran. There was a fisher from Praia dos Anjosthat said, 'They say the world turns, if it turns and brings me to Praia Grande, then I'll go,

⁵⁵ Cabistas often use 'before' to refer to the time before the arrival of the CNA - Alkalis. Likewise, after commonly refers to the years following the establishment of this company.

but if it doesn't I won't go, ever!" This lasted many decades, many decades, it is an important part of our history as well as our present (P14: 390)."

Although the physical separation no longer exists as the city has grown and the boundaries of these neighbourhoods are not longer as distinct, they still exist for local people. This is especially true for canoe fishers who represent the most traditional and conservative group in the municipality. Conflict between members of the different beaches is immediately apparent. Residents, especially canoe fishers, do not just live on one beach or another, they are *from* a certain beach. The following quotes illustrate the contemporary relevance of these divisions:

Resident from Praia Grande:

'In truth, there were three hamlets, not one. It wasn't one people. Each group stayed in their corner. Prainha, that's where the blacks stayed. Anjos, belonged to the fair people with blue eyes, and they were rude, less civilised, ignorant, really ignorant, so much so that you can see today that the youths from Praia Grande are more expressive, more cultured and developed, more educated...' (P14: 400).

Resident from Praia dos Anjos:

"The [residents of Praia Grande] are just different from us, you know, a different race, a different breed. They're ignorant and rude. I almost never go there. I only go when my daughter comes to visit, she drags me there and I always get snide comments like, 'What are you doing here, this isn't your neighbourhood!' (P18:2491).

Reinaldo Fialho, a local historian, notes that although the two groups lived only a small distance away from each other people from the different neighbourhoods developed very different identities. 'Those from Praia Grande are known to be more sociable, those from Anjos more closed and serious and those from Prainha, black' (P18:2149).⁵⁶

Although they share the same rules, seiners from each beach act autonomously when responding to threats to their activities. This may be in part because the sources of these threats are different. On Praia Grande for example, one of the issues of concern is the number of surfers that obstruct the flow of fish schools. On the Anjos Beaches (Maramuta, Praia do Farol, Prainhas) it is the Marines⁵⁷ who complicate seining by requiring tourists to submit their passes⁵⁸ right through the middle of their seining spot, not only disrupting activities but startling fish as well. On Prainha, the source of problems is the number of tourists that crowd the beaches during the summer months⁵⁹ leaving seiners with little space to recoil their large nets. And finally, the fishers from Praia do Pontal complain about the pollution coming from the nearby Alkalis plant.

There has been no case where seiners from multiple beaches have united to address a common problem. And, apart from the Praia Grande seiners who have after years of negotiation signed a contract with the Surfers Association regulating their activities, none of the beaches have independently addressed their problems. This indicates that conflict and division is not only an aspect of the relationships between the seiners (and

⁵⁶ It may be worthwhile noting that he is from Praia Grande.

⁵⁷ When the Marines initially came, during the 1980's they tried to prohibit beach seining on the island all together. The canoe fishers (from Praia dos Anjos) continued to fish. Now it seems they do everything possible to disrupt this activity in the hopes that fishers will eventually leave.

⁵⁸ The island is protected by UNESCO and access is controlled by the Marines.

⁵⁹ These represent the most important months for beach seining.

wider community to a lesser degree) of different beaches but also among the seiners of each beach.

Although the beaches are all within a ten minute walk of each other (with the exception of Praia do Pontal which is a five minute drive - 20 min walk) there are few fishers who fish on more than one beach. Of those that do, most are from Praia Grande. There was only one instance where a fisher from either Praia dos Anjos or Prainha fished on Praia Grande, and this individual was a lookout. An elderly canoe fisher from Praia dos Anjos notes that this measure was acceptable to the fishers from Praia Grande for two reasons. One because the lookout remains physically separated from the rest of the *companha* and two because good lookouts are a scarce resource (P18: 2485). Observations and informal interviews revealed that fishers and owners from Praia Grande have an increasing presence on beaches outside of their neighbourhood. Nevertheless, fishers from other beaches are not welcome to fish on Praia Grande.

Conflict and disunity are also reflected in the interactions between fishers of the same beach. One might think that seiners working for years on the same canoe would develop a certain sense of loyalty to their work-team. Seiners though, describe relations within the *companha* differently.

'If a seiner works on one canoe for a day, he'll work with the crew and hope that that day they will catch some fish. If the next day that same seiner works with a different crew, he'll hope that the crew from the day before doesn't catch anything at all. It's like we're loyal to each other just for the day but there's no long-term commitment to the *companha*' (P11: 493).

Problems with sharing the same space on beaches often result in sub-optimal outcomes for *companhas*. An example from Praia dos Anjos

illustrates this. On Praia dos Anjos, each canoe must bring a portable gas cooker, water, pots pans and other staples to the hut where they work each day. They first must carry these goods from their homes to the beach. Then transport them by canoe to the fishing spot, unload them and carry them to their hut and of course, repeat this whole process at the end of the day. When asked why they do not leave these resources on the beach one fisher explained,

'We can't leave anything in the hut. Not even in a locked box. We've tried it and it just doesn't work. We come back a couple days later and everything is gone or broken. You'd think there was some way to avoid carrying all this weight over here everyday but there isn't. There's just no respect between companhas' (P12: 318).

Another seiner offers an example,

'That rich guy on the hill⁶⁰, he built us a nice hut down by his house to replace the old one. It had electricity and a toilet and everything. In no time it was ruined. Seiners took everything home with them, even the light bulbs. Now we don't even need to lock the door when we leave because there's nothing left. It could have been really useful to have those things. Us canoe fishers are really divided. We can't do anything together' (P11: 320).

A fisher from Praia dos Anjos describes the interactions between fishers on his beach;

⁶⁰ This wealthy individual has been elected prefect of the municipality since this fieldwork was completed. The construction of this hut was very likely used to influence votes during election time

"So they think like this; 'I don't like that guy and so I don't want to do anything that helps him, even if it's going to help me too.' In order to make the hut on Maramuta we could only get six of the twelve [Praia dos Anjos] canoes to help. Can you believe it, there are twelve canoes that would benefit and six wouldn't help make it, they just didn't want to work together. And those that didn't help are benefiting from it just the same."(P15:274)

Seiners do not characterise themselves as a unified group. They are the first to reveal the long-standing divisions which exist among and within the beaches. They are also very quick to describe how these divisions complicate collective action. This lack of 'social capital' exists not only between the different beaches which have suffered from an historical legacy of mistrust but also within the beaches themselves, even among members of the *companha*. Although the size of the beach seining 'community' is relatively small there are deep divisions which separate seiners at all levels.

Dependence on Resource

Baland and Plateau (1996:297) argue that collective action is more likely to result when the common resource is recognised as scarce and is critical to local incomes. The recognition by beach seiners that the stocks and flows of migratory fish upon which their activities depend are becoming increasingly scarce was discussed at the beginning of this chapter. The relative dependence of this community on their seining activities is particularly relevant though and will be discussed in the following paragraphs.

Significantly, both quantitative and qualitative data collected indicate that there are few fishers who depend on seining as their sole source of income over the long-term. Ninety-two percent of fishers have been employed for extended periods with something other than beach seining. Of these, 44

percent were employed with Alkalis and 22 percent with the municipal government. Other sources of employment include other types of fishing activities and work with local commerce. Duration of employment outside of their traditional beach seining activities varied although over 50 percent of seiners held jobs for over ten years with 14 percent of all seiners having worked over twenty-five years in another profession.

It is hard to say precisely what percentage of total income seining provides for these individuals. This is because of the uncertainty involved in seining. For example, it is not unheard of for months to pass without a significant catch being pulled in. Fishers may come home with enough fish to put on their dinner tables but not enough (or the right quality) to sell. Therefore, even during hard times, seining provides small benefits. The percentage of income derived from seining is also heavily dependent on where and how often each individual seines. What is clear, though, is that fishers do not live from seining alone and that other economic activities and sources of income are essential to their livelihoods. Although it has been common to engage in economic activities other than beach seining for extended periods, research revealed that these individuals often continued to seine during their period of employment. In fact, the survey showed that 50 percent of seiners continued to beach seine during these periods.

An elder fisher explains:

'When Alkalis came to the Cape in '45 it hired a lot of Cabistas. So a lot of seiners went to work. Just because they took these jobs though doesn't mean they stopped being fishers. They never stopped being fishers. They fished on their days off and whenever they could' (P14: 674).

The statistics which represent the number of fishers who currently depend on outside employment are similar to those of the past. The survey revealed that 80 percent of beach seiners have other sources of income apart from their seining activities. During interviews many stated that they would engage in other activities when they became available but would always come back to seining.

Table 7.4 Days per week that canoe fishers fish

# of Days	Percent
1.00	16.0
2.00	4.0
3.00	34.0
4.00	18.0
5.00	14.0
6.00	10.0
7.00	4.0
Total	100.0

Whereas in the past 44 percent of canoe fishers were employed by Alkalis, only four percent could say so today due to cutbacks and down-sizing as well as increased mechanisation of this industry. Alkalis, though, still plays a very important role in the lives of canoe fishers. Although only four percent actually work there, many still receive a pension from the Company.

Currently, 48 percent of beach seiners receive a pension of some sort with the vast majority earning this income from their past employment with Alkalis. The value of these pensions usually varies between 50 and 100 £ per month. And although this may not seem like much, this income places them in the 50th percentile of the income distribution in the municipality (IBGE, 1996). The pensions they receive provide them with something that fishers earning shares infrequently have; income stability.

When asked if it was possible to live from canoe fishing alone, a fisher from Praia dos Anjos replied, 'No, it's not possible. No way. It just isn't enough,

even fishing seven days a week. Because if you catch some fish today, you may not catch anything for the next one or two months. You can't stay that long without earning anything' (P15: 341).

Fifty-four percent of canoe fishers interviewed fish three or fewer days per week. Seventy-two percent seine four or fewer days per week. That is, more than half fish up to three days per week. Given the uncertain income associated with this (and most) types of fishing, it is easy to see why fishers must engage in other economic activities.

Table 7.5 Does the canoe fisher currently live from fishing alone?

Response	Percent
yes	20.0
no	80.0
Total	100.0

Those that do not have other sources of income often seine six or seven days per week, also a factor that could affect their ability to engage in collective activities. Eight percent are still in secondary

school and live with their parents. Only six percent engage in other types of fishing activities (professionally).⁶¹ The breakdown of the source of outside earnings is related to the age distribution of the beach seining community.

Age distribution

As indicated by the findings presented in the previous section, fisher dependence on beach seining in Arraial is deeply intertwined with the age of fishers, many of whom complement their fishing earnings with pensions. The elderly represent a significant portion of active beach seiners. Forty-two percent of seiners are over 49 years of age and, very significantly, 32 percent

⁶¹ It is not uncommon to see fishers line fishing for a fish to take home but not for commercial sale.

are over sixty. It was not uncommon to see fishers in their eighties pulling in nets.

A respondent from Praia dos Anjos describes this phenomenon,

'The majority [of canoe fishers] are retired, elderly people. On our canoe there are a number of youths but that is rare, most of the others are old men. The other canoes usually have two younger people and eight older ones. They seine just to complement their salary. If they don't catch anything they still have a guaranteed amount at the end of the month. So they can leave the beach and go home, lie down and have a rest while we have to go to our other jobs.'

Table 7.6 Age Distribution of active Beach Seiners

Age	Percent
16 to 26	16.0
27 to 37	22.0
38 to 48	20.0
49 to 59	10.0
60 or older	32.0
Total	100.0

Most of these fishers receive pension payments from Alkalis. Even though they would be eligible to receive pension payments from the government for their years as fishers, most do not as they have not been registered as professional fishers during their active years and therefore lose access to this resource. In fact, of all fishers who participated in the interviews, only a fraction receives pension payments from the government for their fishing years.

At the other end of the spectrum, there are also a significant number of youths who participate in this activity. Those interviewed were still in secondary school and live at home with their families. These individuals fish in order to earn spending money or help out at home. Unlike the elderly who claim to be fishers even when they are not fishing, this group do not define themselves as fishers even though they are fishing. To them, seining is just a job and not part of their identity. Although seining is respected as an important part of the history and traditions of the Cape, it is also seen as uncertain, low-paying manual labour and a future which most youths on the Cape would like to escape. An indication of this is the fact that young fishers do not like to be seen in the streets carrying fish.

Participation in fishing associations

Regardless of their age, canoe fishers, possibly more than any other fishers on the Cape, live on the periphery of formal organisational life. There is marginal adherence to the laws that regulate fishing activities requiring fishers to be registered with both the Port Authority⁶² and IBAMA⁶³. Participation in local associations is equally scant not only in terms of membership but also in terms of the depths and dimensions of the little participation that does take place. Even given the fact that membership of the local fishermen's guild is no longer mandatory, only a small fraction remain members and fewer still contribute monthly dues. A higher percentage is members of APAC, the local fishers association, but as this organisation is all but defunct, active participation in this entity is limited.

⁶² The government entity which provides training for fishers seeking a professional license along with the registration of their crafts.

⁶³ IBAMA is the Federal Environmental Agency responsible for providing licenses to fishers who have successfully completed their course with the Port Authority. This agency is also responsible for ensuring that fishing activities are carried out in accordance with environmental legislation.

This situation can be described as one in which participation has been limited to consultation at best. Without decision-making power or an ability to influence the direction of the organization, fishers have yet to be empowered by local organizations.

As discussed earlier, the current structure of the traditional management regime that governs seining activities no longer provides the space for active fisher participation. Although fishers participate in other ways, such as upholding the rules and gaining access and other benefits by its existence, it is only owners of the gear and access days who are included in decision-making. And even within this group of owners, small owners have a negligible impact on decision-making because of the power held by a few. To all intents and purposes, seiners have become employees of these individuals.

According to the survey, 95 percent of canoe fishers are not registered with the Port Authority. This situation has important consequences. Unregistered fishers are not treated as professional fishers (no matter how long they have been fishing) and their fishing activities are considered illegal. This also has important implications in terms of fishers' relationship with these authorities to the extent that they fear sanctions and do not feel that they can seek out these entities with their own concerns. Focus groups revealed that fishers feel that these organisations work against them and do not support them.

Also according to the survey, 82 percent of seiners are not registered with IBAMA which is another requirement for a professional fisher to legally fish in Brazil. Only four percent of canoe fishers are members of the local fishing colony and 12 percent are members of the (now defunct) fishing association (APAC). This lack of participation affects the ability of fishers to have organisations that represent them. It also means that fishers over the

years will have no way of proving that they were fishers their whole lives and will not be able to claim social security (INSS) benefits. These figures illustrate the peripheral position that seiners have vis a vis the authorities that regulate fishing activities along with the local institutions created to represent fishers.

When asked why they were members of the different associations, respondents focused on issues of representation and access to medical services which in the past were provided by the colony. The majority who were not members of any local organisations cited the lack of benefits of membership as the primary reason for opting out. In fact, they cited the lack of representative leadership and incentives, such as access to medical care, as reasons for not participating. Responses also indicated a general apathy towards collective efforts. Seiners felt that many institutions have come and gone without providing any benefits. They often cited the leadership of the local Colony as a current example of this. Qualitative data clearly revealed a mistrust of local leadership and general apathy towards membership.

'The groups around here, they don't represent the fishers and they haven't managed to show fishers any real progress, they haven't done anything. The leaders of those organisations are just out for themselves. Behind all the mission statements, behind all the boards of directors there are parallel interests at play that have nothing to do with what's good for us' (P10: 422).

Research into the finances of ALPAC, the first free association, corroborates these concerns. Membership required the contribution of three percent of gross earnings of canoe fishers to be paid in monthly. Records show that the majority of these funds were used for the purchase of building materials but no one could identify what was actually constructed with these funds.

Fifteen percent of the total contributions would go to the director of the organisation and another 15 percent to the president. The longest running board of this organisation included two sons of the biggest canoe owner in Arraial. In other words, the organisation served as another way for a few individuals to gain a larger share of the potential earnings from canoe fishing.

For the most part, participation in fishing organisations has been limited to paying dues. Few local organizations have held meetings open to its members and even fewer have allowed fishers to participate directly in decision-making in the organisation such as, for example, where funds will be allocated. Most fishers are not members and as they have little to offer to attract (and keep) a strong membership base.

A quote from a representative of the state-level fishing institute (FIPERJ) illustrates why fishers are reluctant to participate in the Colonia and other associations,

'It's a question of economics. The fishers stopped paying the colonies and now the colonies have no money. This is the case throughout the entire state [of Rio de Janeiro]. So, the colony was left with no money to pay for a dentist or doctor. Why doesn't the fisher pay his dues? Because he doesn't have a place to unload his fish, he lives under the thumb of the middlemen and therefore has no money to pay' (P3:346).

In conversations with fishers, it is also apparent that their relationship with their associations has been based on weak ties. Their level of participation in these organisations has been low, and usually based solely on their monthly payments of a few reais. Formal meetings are rare, none provide any space for fishers to participate in decision-making within the

organisations, budgets are kept a secret and most fishers if not all, regard these organisations with distrust. Their leaders are known for taking advantage of their positions through nepotism and corruption.

7.7 Outcomes and Consequences

Although many other factors were explored throughout the period of fieldwork, the analysis above restricts itself to characteristics of the canoe fishers' CPR that were particularly relevant in determining the strengths and weaknesses of this regime. Clearly, the beach seiners have over time developed an intricate set of institutions which govern their activities. The fact that these institutions are still in place and on all beaches where beach seining has traditionally been practised is an indication of their resilience in the face of ecological and social change. Qualitative and quantitative data, though, indicate that these institutions have become increasingly fragile.

If judged by the design principals identified by Ostrom (1990) the CPR developed by the beach seiners would be categorised as weak or not robust. In fact, the beach seiners' common property resource regime meets few if any of Ostrom's conditions (See Table 7.7). Although operational rules define and limit the number of users and frequency of use within the seining community, the characteristics of the resource in question (migratory fish) complicate the ability of commoners to exclude other resource users.

Table 7.7 Ostrom's Principles as applied to the Seiners CPR, past and present

Design Principle	Past	Current Strength of Canoe Fisher Resource Regime
1. Clearly defined Boundaries	YES	NO. Although boundaries are clear and seiners understand the flow of the resources upon which they depend. In the past there was no need to close the area to outsiders as there were very few users. Now, this flow is often appropriated or disrupted by other users creating an excludability problem.
2. Congruence between appropriation and provision rules and local conditions	YES	NO. There are a number of indicators that these rules and conditions are incongruent. Fishers do not feel that they earn enough to live on. Owners have sold their shares as too many days were added on some beaches leading to rent dissipation.
3. Collective - choice arrangements	YES	NO. Extremely few owners make decisions for everyone. Fishers have little say in changes to or the management of the regime.
4. Monitoring	YES	YES. Day to day monitoring still takes place but rules are enforced selectively and continuous rule-breaking by big owners is not uncommon.
5. Graduated Sanctions	YES	NO. Although rules do include the use of graduated sanctions, these are not longer used.
6. Conflict-resolution mechanisms	YES	NO. In the past, the Colony and the owners of canoes/nets would play an important role in this. Now it seems it is up to the big owners to resolve (or not) discrepancies between rules and behaviour.
7. Minimal recognition of rights to organise	YES	YES. Local government, Port Authority and other fisheries officials including the head of the colony recognise the legitimacy of the canoe fishers CPR. They may in fact perpetuate some of the inequalities inherent in the system as it is not uncommon for local politicians to have family ties with the big owners.

This fragility has multiple roots interacting at many levels. Oakerson (1992) refers to the technology used and the nature of the resource itself as the 'hard constraints'. In the case of the seiners' CPR, the nature of the resource coupled with the traditional fishing methods employed create a situation whereby (as in most fisheries) monitoring and excluding others is particularly difficult. Because this type of seining depends on the unobstructed flow of migratory fish, vast undisturbed areas are needed to provide ideal conditions.

Socio-economic change over the last fifty years has created many obstacles for successful seining as well as many challenges for the institutions in place to overcome. Population growth locally and regionally has put more pressure on resources. New fishing technologies have been introduced which conflict with the ecological patterns upon which seining depends. This has presented difficulties for monitoring external threats to the resource regime.

The arrival of the Alkalix plant along with other aspects of modernisation created possibilities for wealth accumulation and introduced hierarchical structures into the community which previously were less acute. These processes also changed the way the community interpreted the beach seining activity; from tradition and social identity to a 'backward' activity representative of the past, not the future. Historical documents and oral testimonies suggest that in the past the situation was very different. This changed because too many people were let into the access sequence, producing a problem of rent dissipation whereby investment in the gear etc., was no longer worth the benefits. This situation was exacerbated by falling fish stocks.

These social changes have had important implications for the sustainability of the resource regime. Many if not most fishers at the time found wage

labour opportunities with the Company (Alkalis). These opportunities led to the accumulation of wealth amongst those employees who made it to the higher ranks within Alkalis. This process introduced a hierarchy in the community based on positions within the company as opposed to the concept of respect based on traditional knowledge whereby fishers with knowledge and experience were the most respected. It also facilitated the emergence of concentrated ownership of the nets and canoes which has led to subtractive behaviour and selective rule enforcement. These internal threats have been monitored but rules have not been enforced.

The inability of canoe fishers to overcome the historical legacy of deep divisions between beaches has inhibited their ability to articulate themselves politically in order to overcome common problems. The concentrated ownership of canoes and nets coupled with control over market access by the same individuals are problems that all canoe fishers face. This situation has been exacerbated by the lack of representative leadership among this group. The combination of a fragmented community with little faith in local leaders has created an environment ripe for the proliferation of negative social capital whereby local institutions are being harnessed by a few individuals for their own benefit.

Seiners, especially non-owners, play a very passive role in decisions that affect their livelihoods. Even those who are owners and therefore entitled to a say in the management of the system no longer have much power. Seiners participate passively in the management regime and their participation in other associations and entities is extremely limited both in quality and quantity.

Although most fishers have other sources of income, the majority earn a very small pension and still depend on seining for a living. This should make the group more willing to fight for their concerns and needs. But as

many seiners are elderly, they are less able to find employment elsewhere and may for other reasons, which will be explored in the next chapter, be less likely to articulate themselves politically.

Ironically, while Alkalis is symbolic of the processes of modernisation that have challenged the resilience of this regime, the Company still plays an important role in beach seining. The pensions paid to over 40 percent of fishers in a sense subsidise and support this activity. Although fishers feel that there are fewer fish today, many continue to seine because they have these pensions to fall back on. Although in the past, regulating the canoe fishers' resource management regime was enough to protect their livelihoods, changes over the last 50 years (technology, population growth) have meant that the scale of regulation has had to be increased in order to protect the commons. During this period, both internal and external threats have increased.

Even if the beach seiners' management institutions were robust, they would not be able to significantly effect the health of the ecosystem on which they depend. With the introduction of the Extractive Reserve, the health of the ecosystem and the future of the traditional activities which rely on it is now dependent the ability of trawler fishers, boat fishers and SCUBA fishers to be integrated into a larger CPR. It is also essential that the reserve mitigate against external threats from industrial fishing which present a constant threat to the ecosystem and all who fish in this area.

7.8 Summary & Conclusion

This chapter presented research findings related to the quality of resource governing institutions among the beach seining community in Arraial do Cabo. These included a description of the characteristics of the resource itself. It also included a description of the work teams or *companhas* that

participate in this activity along with the Right of Day system which regulates access to the physical areas where beach seining takes place. It went on to describe how the gains from this activity are distributed, including a description of the ownership patterns on some of the different beaches.

The chapter also presented data relating to some of the characteristics of the beach seining community. These factors include the degree of dependence on this activity, threats to seining activities, the level of participation in local fishing institutions and fishers' attitudes towards these institutions. It also presented qualitative and quantitative data relating to the historical divisions which persist among the beaches.

The last section took the findings presented above and, using some of the design principals for long standing CPR's identified by Ostrom (1990, 1992), attempted to gauge the strength of the management system employed by canoe fishers to manage their activities. It found that, although the seiner CPR has been in place for generations, there are many reasons for believing that it has become increasingly fragile. Indicators of this fragility include selective rule enforcement, subtractive behaviour and low levels of participation in decision-making along with increased threats to the boundaries of the CPR and the natural resource itself.

In 1997, Brazil's first Maritime Extractive Reserve was established to protect the activities and resources of this traditional fishing community. The following chapter will present and analyse data detailing the relationship between the canoe fishers and the newly created conservation and development initiative. It will look at what role seiners had in the creation of the reserve and their involvement in its current management. It will also analyse seiners' attitudes towards and participation in the reserve.

Finally it will summarise the impact the creation of the reserve has had on the long-term sustainability of the canoe fishers' CPR.

Chapter 8 Social Change and the RESEX A.C.

One of the primary goals of Brazil's first Maritime Extractive Reserve is to protect the beach seining community. The traditional fishing practices employed by this group along with the informal institutions that support its activities were identified and subsequently targeted with this innovative conservation and development regime in order to protect this cultural diversity. The creation of the Extractive Reserve was also seen as a vehicle for the long-term protection of the natural resource base, nurtured by the up-welling phenomenon and intrinsically linked to these traditional activities. In part, protection of these aspects of the community is seen as important because local fishing activities are based to a large degree on sustainable principles and local knowledge.

Because the RESEX A.C. is the first of its kind, there is little prior experience of how traditional maritime fishing populations and their management systems interact with these initiatives and what role they play in them. The aim of this chapter is to present data on the relationship

between canoe fishers, their management systems and the newly-established Extractive Reserve. This chapter will analyse the way that the canoe fishers' institutions described in previous chapters were contemplated in the Utilisation Plan and will look at the articles in that plan that directly impact on their activities and their management arrangements. It will also present data related to the type and intensity of participation of this group in the reserve with a particular focus on their ability to influence management decisions. This chapter will also analyse how the different dimensions of the reserve (management, monitoring, etc.) are perceived by fishers. The chapter will then conclude with a discussion about the impacts of the reserve on the sustainability of the canoe fisher CPR and to what extent the social objectives of the RESEX A.C. have been achieved.

8.1 Creation of the Utilisation Plan

The legal establishment of the Extractive Reserve in Arraial do Cabo represented the first step in creating a common property resource regime collaboratively managed by fishers and government. The intentions and purpose of this CPR are similar to those of the regime that governs the canoe fishers; to manage access to resources in a sustainable and equitable way for a limited number of resource users. Although their intentions are similar, however, other characteristics of these two regimes differ significantly. The RESEX A.C. absorbed the existing canoe fishers' CPR and created a larger system which included all fishers in the municipality as opposed to just one gear group. Other differences in the structure of these systems, apart from federal government support and involvement, are related to the way decisions are made and by whom.

The Utilisation Plan was developed to define the rules that govern the Extractive Reserve. This plan represents the social contract among fishers

as well as between fishers and government. It also regulates other activities such as SCUBA diving that take place within the reserve boundaries. The Utilisation Plan took approximately one year to develop and was finally published by the federal public registry in February 1999. All fishers, local NGOs, and secondary stakeholders were invited to participate in a series of meetings in which the rules were discussed and voted upon. For the most part, this process was facilitated by the local representative of IBAMA with support from representatives of the Brasilia-based National Centre for Traditional Populations (CNPT).

The creation of the Utilisation Plan was the first step visible to the fishers themselves that the RESEX A.C. was a reality and did not exist just on paper. With the creation of the plan, fishers along with other stakeholders had the opportunity to see how the concept that they had generally agreed upon in theory would be operationalized. This was the first time that fishers from different modalities were brought together to try to resolve their problems. In order to develop the plan, there was a need to find common ground upon which to build. Furtado describes this process:

'Besides the outside threats to the fishing grounds, the creation of the RESEX revealed the absence of a common identity [among local fishers]....Because of the proliferation of different identities which resulted from the social change which had taken place in the area [namely as a result of the establishment of the Alkalis plant], no one knew anymore how best to define who really was a traditional fisher of the Cape. The principal internal problem for these fishers was to distinguish, in this enormous sea of immigrants, who could be considered Cabista and therefore gain access to the reserve' (Prado, 2000: 132 author's translation)

The initial idea of creating an Extractive Reserve in A.C. was well received by local government, leaders of fishing organisations and traditional leaders. The unity behind the creation of the reserve came from the widespread agreement that predatory fishing pressures from around the region were compromising local fishing efforts. This common outside threat provided an important unifying factor for these groups. This collective support dwindled quickly, though, when some groups began to perceive the newly created reserve as a potential threat to their own power base.

Power Struggles

With the creation of the Utilisation Plan it immediately became clear that the traditional authorities which governed fishing activities in the area such as boat owners, local government and the Colónia, would be challenged by the new powers of IBAMA and AREMAC. This realisation developed into conflict between these organisations and an overall loss of support for the RESEX.

The development of the Utilisation Plan went far beyond excluding predatory activities and fishers from outside the Cape. It focused on issues internal to the fishing community on the Cape such as the conflicts between user groups and use of space, issues that were much more divisive than joining forces against a common enemy. Also, the Colony and other local institutions and traditional leaders thought that they would be playing a much greater role in the management of the reserve. When AREMAC was created, and none of these groups were represented, many withdrew support. Examples of this situation are presented in the following paragraphs.

The Colónia

As the largest local fishing organisation, support from the Colónia was pivotal for the creation of the RESEX. Initially, the Colónia supported the setting up of the reserve by signing the petition included in the original proposal sent to the federal government. The president of the Colónia believed that his organisation would be strengthened by the creation of the reserve and that he would be involved in its management:

'The reserve was created by using a petition that was not signed by a single person in our municipality. When the decree was published [formally creating the reserve] it stated that the reserve could form a partnership with any association or co-operative in the municipality. But, for some reason, the Colónia was not included in this process, and I'm not sure why. What I am sure of, though, is that when they needed my signature in order to create the reserve they told me all kinds of things to make sure I signed it.

When the time came to create an association to manage the reserve, they forgot about the Colónia and chose a little group of their friends to head it. I was with the Mayor at the time and we contested the choice, we took it all the way to Brasilia...the Reserve is a farce. If they [AREMAC/IBAMA] take the port away from us⁶⁴ what will I do? I'll tell you, I'll defend the Colónia with tooth and nail' (P7: 0192).

Since the creation of the reserve, the Colónia has refused to participate in any of the activities associated with the RESEX A.C.

⁶⁴ Before the creation of the Reserve, the port was administered by the Colony.

Owners

Decisions about the rights and responsibilities of members of the RESEX were made through public voting which provided fishers and other community members (to a limited degree) with the opportunity to influence this process. The process of voting on user regulations deviated enormously from traditional decision-making arrangements. As presented in earlier chapters, the power to regulate fishing activities has generally been monopolised by a few individuals. This is true for canoe fishing as well as the other gear groups present in A.C. In this new forum, non-owners, it was assumed, would have the same influence over the process as would owners.

The establishment of the reserve bypassed the legitimacy of the canoe owners as the final decision-makers in the canoe fishers' CPR. From then, all decisions would have to be voted on in the general assembly. In practice though, it did not work this way and the voice of the owners was still considered important. Some, such as the fisher that provided the following quote, would even argue that their word continues to rule the conduct of canoe fishers (and other fishers) and affects their participation in the reserve:

'I think Fabio Fabiano [of IBAMA] is afraid of the owners from Praia Grande. I'm sure he is because they are disrespecting IBAMA, a federal agency, right in front of his face. That alone shows how powerful they are. They are not following the rules set out in the Utilisation Plan. Today, the word of the owners of Praia Grande is more important than those of IBAMA and the Assembly. They are very powerful. We've had voluntary monitors quit because they were being threatened by the owners' (P9: 625).

In the beginning the owners/middlemen were involved and enthusiastic about the creation of the reserve, but now they refuse to come to the meetings and discourage people who work for them from going. The owners from Praia Grande also continue to defy the articles that specifically address the 'waiting net' problem on this beach.

'In the beginning they were much more involved, mainly so they could make rules that would suit them. When we [members of AREMAC] voted in a new canoe to their sequence, they wouldn't let it enter. One side says you can, the other says you can't.' (P9: 582)

'The owners of the canoes are also the middlemen who control the marketing of their catch. So, they think they can do whatever they want. When you go to Praia Grande to talk about something they say, "What do you know about fishing? Are you 'cabista'? What are your roots? I've heard there are people in that Reserve talking about fishing that don't know anything about fishing!" These owners have a lot of power over the canoe fishers and they don't want anything to do with the reserve.' (P9: 675)

The owner of the greatest number of canoes commented on the reserve:

'The idea of the reserve was mine. I'd been talking about it for ages but they've made a mess out of it and now I don't want anything to do with it. There's some group running the place that doesn't know the first thing about fishing. I don't even want to get near the front door of that place because I don't have the least respect for those people or their ideas.' (P18: 1622)

The fact is that the owners/middlemen involved in seining activities have largely rejected the authority of AREMAC and IBAMA, and this has

important implications for current levels of participation in reserve activities.

Local Government

Although the reserve was created with full support from the Mayor, successors felt threatened by the implications that the reserve would have on their power and control over the resources in the municipality. The economic life of the Municipality of Arraial do Cabo is almost entirely dependent on the water resources that surround the Cape.

Since the creation of the RESEX A.C. control over the local port has been transferred from the federal government to the municipal government. Built in order to service the National Alkalis Company, the port has since been under-utilised. With the municipalisation of the port, local government is now entertaining bids from private companies. Among these Honda, Petrobras, Shell and Odebrecht have demonstrated interest (Jornal do Sabado, 1998). Local government plans for the port include building an offshore terminal to service oil platforms from the nearby Campos Basin. The government would also like to encourage cruise liners to stop on the Cape on their way to Rio de Janeiro.

With the creation of the Extractive Reserve, these opportunities would have to be supported by IBAMA and voted on in general assemblies. So far, IBAMA and AREMAC have been sceptical about the appropriateness of servicing oil rigs inside the reserve and have become a potentially enormous obstacle for local economic development as envisaged by the current government.

Since the reserve was created, it has become increasingly clear that fishers, through AREMAC, could have powers in the community never before

imagined. Apart from those mentioned above, other groups, such as the Tourism Association and fishing groups from other municipalities also felt threatened by the creation of the Utilisation Plan. The next section will focus the relationship between the beach seiners themselves and the utilisation plan.

8.2 Beach Seiners and the Utilisation Plan

Although the beach seiners occupy a central place in the origins of the RESEX A.C., only four articles (of approximately 75 in total) in the Utilisation Plan apply directly to beach seining. Of these articles, none addresses the weaknesses in the traditional management systems used by canoe fishers presented in Chapter 6. The management regime used by this group is included on a general level but specific rules have not been explicitly (re)defined and consolidated into this plan. As a result, the utilisation plan does not provide a clear and solid foundation upon which to rebuild these traditional management systems. The relevant articles are described below.

The first article in the Utilisation Plan that relates directly to the activities of the seiners (Article 5.1) vaguely defines the relationship between their 'traditional' management regime and the Extractive Reserve. Specifically, Article 5.1 of the plan states that, 'Canoe fishing is permitted according to the norms of the 'right of way' system that regulates the canoe sequence (*corrida*)...as well as any agreements between *companhas* duly registered with AREMAC' (IBAMA, 1999: 2). In essence, Article 5.1 incorporates the written and unwritten rules discussed in Chapter 6 without stating exactly what these rules are. It is as though an assumption has been made that those rules that have traditionally governed this gear group are intact, up-to-date and effective. It does state however that any changes to these rules

in the future would have to be formally registered with AREMAC, the association of the Extractive Reserve created to represent the local fishing community.

Articles 5.2 and 5.3 address the relationship between canoe fishing and other gear groups. The former regulates the use of throw nets within 500 metres of canoe fishing activities and the latter restricts the use of lanterns during night canoe fishing which takes place on Prainha so as not to disturb the trawlers that fish nearby who need total darkness. Article 5.4 stipulates the exact dimensions that each seine should have.

Article 5.5 is the only one in the Utilisation Plan that directly addresses one of the main points of contention among canoe fishers presented in detail in the previous chapter. Namely, this problem centres around the use of a waiting net by fishers on Praia Grande that disturbs the resource flow to other seining beaches. Specifically, Article 5.5 states that on Praia Grande, seining can only be practised 'while there is a canoe present and in the water alongside the net' characterising the activity as artisanal and harmonious with the 'right of way' system' (IBAMA, 1998:2). In fact, what is meant by this is that a canoe and companha have to be present in the water.

Impact on the Seiner CPR

Little change is required of canoe fishers in terms of the technology they use, the timing of this use and place for use as a result of the establishment of the reserve and the creation of the Utilisation Plan. For the most part, change in these factors is required much more by the other modalities than by the canoe fishers.

In essence, the reserve has had little impact on the way canoe fishing is practised, either in terms of monitoring adherence to rules or in terms of dealing with ownership patterns or other weaknesses in the seiner CPR. The Utilisation Plan does attempt to address the problem of the 'waiting net' on Praia Grande. This problem is of particular significance because it is by far the most important recognised internal threat to successful seining. The 'waiting net' problem is symbolic of the disunion between the different seining beaches. It is also symbolic of the power that canoe owners have in changing the rules unilaterally. For these reasons, it is essential for the reserve to clearly define and monitor rules to mitigate against this practice. But without the support and participation from the owners and without redefining the rules which govern this activity the short-term impact is minimal. The plan has in fact complicated the management of the seining activities as it has become less clear who in fact has the authority to alter and enforce them.

For example, the practice of using the 'waiting net' continued after the creation of the Utilisation Plan, even though the plan directly addressed this issue. Over a year after the plan was made, the owners from Praia Grande were invited in writing to the RESEX headquarters to discuss this practice. Neither of the powerful owners attended the meeting and both sent their invitation back to the headquarters unopened. Although they now leave a canoe in the water with the waiting net (as stipulated by the Management Plan), the canoe *companha* does not stay. So these owners have taken a literal interpretation of these rules which has left seiners from other beaches along with the AREMAC and IBAMA representatives increasingly frustrated.

The Utilisation Plan could have played an important role in redefining the rules of engagement among canoe fishers (as well as redefining the relationship between canoe fishers and other modalities) but it did not

succeed in doing this. The plan assumed that the traditional management system was effective and that it could simply be absorbed by the larger regime. As a result, the plan sends out a contradictory message. On the one hand, it codifies the authority of canoe owners to continue with the status quo of selective rule enforcement. On the other, it gives canoe fishers (as well as other fishers) a right to vote, offering a new more democratic forum in which individual canoe fishers have greater influence over decisions made regarding their fishing practice. This situation in turn has negative consequences for participation because people are afraid to expose themselves by going against the owners.

As a result, the management plan does not provide a solid base for managing beach seining activities. It does not compensate for the weaknesses in the existing CPR which would be necessary in order to clarify both the 'rules of the game' and the power structures which govern them.

8.3 Beach Seiner Participation in the Extractive Reserve

The ability of the RESEX A.C. to meet the needs of the seining community is largely dependent on the ability of this group to articulate their needs through greater participation in decision-making as well as in other aspects of the reserve management and implementation. The following paragraphs review the legal provisions for participation in the RESEX. They will also look at the incentives that exist to encourage participation by this group. This section will also explore the current membership of this group and other groups in the reserve.

Legal provisions for participation

Chapter 5 reviewed some of the preconditions for inclusion in the RESEX A.C. To be considered a 'traditional fisher' as defined in a General Assembly,

a fisher must have been resident in the municipality for ten years and voting in it for five years. Meeting these conditions, however, does not immediately guarantee membership or the associated voting rights. Whether or not a fisher is a member, s/he is responsible for adhering to the rules defined by the Utilisation Plan. In future, all fishers utilising the space of the reserve must become members.

Apart from meeting the conditions for being a 'traditional fisher', in order to gain membership to the reserve, fishers must be registered with IBAMA and the Port Authority. Whereas registration with IBAMA is fairly simple, the Port Authority requires that every professional fisher complete a competency course and exam in order to get their fishing license. In order to sign up for the course, the fisher must produce a number of documents including proof of registration with IBAMA.

The following is a list of the documentation necessary in order to take the professional fisherman's course (POP) given by the Port Authority:

- 1) Identity Card
- 2) Proof of Residence
- 3) CPF (equivalent to a social security number)
- 4) Army Reserve Certificate
- 5) Proof of good health
- 6) Two photos
- 7) IBAMA registration
- 8) Statement of intended activity (in this case, professional fishing).

The local Port Authority is located an hour away from Arraial do Cabo by bus and has restrictive hours. Efforts have been made by the local government fishing organisation (FIPAC) to try and improve access by providing opportunities for fishers to sign up for courses within the

municipality. Fishers complain that their experiences with the Port Authority have not been good. They feel that this administrative body exists in order to police them as opposed to supporting their activities. Many are illiterate and afraid that they will not be able to pass the test that is required at the end of the course.⁶⁵ Fishers also complain that the courses are offered infrequently and often fill up quickly.

A canoe fisher from Praia dos Anjos explains why he has not yet joined:

'I've been to AREMAC headquarters to sign up but I have to get my fishing license first so that I can register with IBAMA. Most fishers don't have a fishing license. It's difficult to get a place in the classes in order to take the exam. The course itself isn't hard, but whenever we go to sign up, the class is full of engineers and rich tourists. There are people that don't even fish but they take the course just to have the license....Arraial has more than 1,500 fishers and 90 percent of them don't have their license' (P15: 234).

Many fishers complain that they do not have the time to take the course. It lasts approximately five days and, although it is free, the associated costs such as lunch away from home and transport are not insignificant barriers. Because fishers depend so much on the changing weather conditions and the flow of resources, many stated that taking a week off work could result either in no loss of income or it could be the week that they earn their months wages.

'Weeks can pass without us catching anything but then, all of a sudden, we catch a lot in one day. Taking a week off work could mean losing a month's salary' (P15: 278).

⁶⁵ These tests are made in such a way that they do not disadvantage individuals without reading or writing skills.

As a result, less than half of all canoe fishers are registered with the Port Authority. This is a significantly greater percentage than other fishing groups, probably due to the number of elderly fishers who were automatically registered with the PA during a period when the Colônia provided this service for fishers. Confirmation of this lies in the fact that less than 20 percent of canoe fishers are registered with IBAMA. Once a fisher has the appropriate documentation, they can then bring this to the RESEX headquarters to register for membership with the reserve.

Incentives to participate

'Even assuming that [resource users] are aware of the on-going processes for resource depletion and of the extent of damage done, rural dwellers are likely to be reluctant to participate in local conservation efforts if they do not receive external assistance to tide them over the critical period during which they must build up their resource to the steady-state level where it can be optimally maintained' (Baland and Platteau 1996: 295).

The president of the reserve, a canoe fisher with a long history of involvement in fishers' rights offers his explanation for why incentives are essential in this process:

'Fishers need to see results. Fishers have always paid. They paid their three percent to the Colony their whole life, understand? They have never gotten anything in return. The day we have to go to the Colony to get a tooth pulled, we have to pay extra, it's not included in our three percent or our monthly payment.....Fishers today are always told what they can and can't do but what about some return for them? What about meeting some of their needs?' (P10: 659).

In the short-term, fishers are not provided with direct economic incentives to encourage their participation in the reserve. Unlike many such types of conservation and development initiatives where alternative income generating activities are introduced or increased access to health care or education are provided, the RESEX A.C. does not have any of these incentives built into the plan. In general, very little funding has been made available for operationalizing the reserve. Financial incentives could play an important role in the future when AREMAC begins to earn money from local tourism and possibly through Petrobras and other companies that want to use the Reserves water space. For now though, financial incentives have not been cited as a reason for participating in the reserve.

Although no economic incentives have been offered, the creation of the RESEX A.C. along with the implementation of the Utilisation Plan has not put canoe fishers in a situation where they must forgo short-term benefits for long term gains - a factor which would heighten the need for financial incentives for participation. The Utilisation Plan has not restricted their activity at all. They are free to fish almost precisely as they did before the reserve was created. Other gear groups though, have been faced with restrictions on their activities through the creation of 'no go' areas within the reserve as well as not being as free to invade the areas traditionally fished by beach seiners. But even these constraints are limited as they only cover a small total area within the reserve and many fishers are aware of the need to rest these areas (See Figure 8.1).

Almost all gear groups operating within the reserve were automatically classified as artisanal and therefore environmentally sustainable. This meant that their methods of fishing were not affected by the creation of the reserve. As a result, local fishers did not suffer from a decrease in income after the reserve was created. On the contrary, by combating predatory

fishing, these groups have much to gain (through increases in catch rates) from the creation of the reserve. The fact that threats to the resource base stemmed from the predatory fishers invading the area from the outside is a boon to the process because it means that local fishing practices can for the most part go on as usual.

Figure 8.1 'No go' areas: Bank of Brazil

'We are no longer allowed to fish at the Ilha dos Franceses. You know what we call that island, the Bank of Brazil because it used to be guaranteed that each time we would go we would come back with a lot of fish. It was like a bank. It's not like that anymore, that's for sure' (P18: 224).

Canoe fishers feel that significant benefits for them could result from excluding predatory fishers and from organising themselves internally. The exclusion of predatory fishers would very likely lead to increases in catch. Through more representative organisations, they would have a

greater chance of challenging the stranglehold the owners currently have on them. Canoe fishers have perhaps more to gain from these arrangements than any other gear group because their activities are so vulnerable to the actions of others. Other incentives exist such as the opportunity to gain a voice in the decisions that affect their activities, greater possibility of challenging the hierarchical nature of the existing system and ultimately getting better prices for their fish.

This may mean that economic incentives may not be as necessary in this case as in others where there is an immediate opportunity cost absorbed by resource users in order for conservation goals to be achieved. Although there are certainly social barriers to participation, financially fishers are better off with the reserve in place. As described in Chapter 6, increased catches have been an important incentive for local support for the reserve. Only minor changes have been made which have direct negative economic impacts on fishers. This may very well be positive given the questionable

long-term sustainability of financial incentives for participation in conservation initiatives.

Membership

A breakdown of AREMAC membership is a crude but useful indicator of levels of participation within the RESEX A.C. (See Table 8.1). AREMAC records indicate that there is a total of 209 members in this association. This total includes both voting and non-voting members. Non-voting members include fishers from other districts that legally fish within the reserve and supporters of the reserve that contribute monthly dues and often attend meetings. Individuals related to the tourism industry, particularly those involved with SCUBA diving activities, make up more than half of the non-voting members of AREMAC.

Table 8.1 Breakdown of AREMAC membership

Canoe fishers by beach	Total # of fishers	Total # of members of AREMAC
Praia dos Anjos	40	8
Praia Grande	70	23
Prainha	40	13
Pontal (cocktail beach)	n/a	n/a
Sub-Total	150	44
Other voting members		
Boat/Line fishers	1,000	57
Trawlers	80	19
Shell collectors	90	26
SCUBA fishers	20	20
Sub Total	1,190	122
Total # of voting members	1,340	166

Canoe fishers by beach	Total # of fishers	Total # of members of AREMAC
Non Voting members		
Divers & Trawlers from Cabo Frio	10	10
Collaborators (pay but do not vote)		5
Tourism (recreational divers, fishers and boats involved in tourism)		23
Sub total		38
Other		5
Grand Total AREMAC membership		209

The gear group with the largest number of members is the boat/line fishers. As presented in earlier chapters (1 & 5), this group is characterised by their use of motor boats and the fact that they mainly line fish (as opposed to using seine nets like the trawlers and canoe fishers do). They are also, for the most part, not 'cabista' but immigrants from the Northeast of the country and the north of the state of Rio de Janeiro and are discriminated against by the 'cabistas'. With one thousand individuals engaging in this activity, this gear group is far larger than any of the others.

Currently, only six percent of boat/line fishers are members. This group, therefore, has enormous potential to increase their level of participation in AREMAC. Over time, this will certainly occur as all fishers will have to become members. The fact that every member of the AREMAC directory has been 'cabista' could be a factor explaining why this gear group is not better represented. This gear group has the potential to harness up to 74 percent of the total possible votes in the assembly. If they do begin to join AREMAC and participate in greater numbers, they will be able to dominate the management decisions made by AREMAC.

Forty-four canoe fishers are members of AREMAC. This rate is significantly higher than the other groups and even given their small numbers (approximately 150 total) canoe fishers still make up the second largest gear group represented in the association. There are 23 members from Praia Grande, making it the beach with the highest membership of the four beaches. This high number is in part due to the fact that the RESEX headquarters are located on this beach, making it much easier for this group to join. Also, members of APAC, who were predominately canoe fishers from Praia Grande, were automatically given membership of AREMAC.

Eight beach seiners from Praia dos Anjos are AREMAC members and thirteen from Prainha. Most members from Prainha joined in order to increase their chances of gaining access to the user sequence on that beach. This process is explained below.

Joining the user sequence

One of the factors that has contributed to increasing AREMAC membership among canoe fishers is related to their newly enhanced ability to join the user sequence on the different beaches. The creation of the reserve has allowed fishers to join the 'Right of Day' system. If an individual meeting the criteria expresses interest, their request will be voted on in the general assembly. In 1983, canoe owners from Praia Grande had signed a 'social accord' which stated that no new days could be added to the use sequence. New owners could only enter if they were to buy an existing day. Although other beaches did not have a written agreement on this issue, owners from Prainha, Praia dos Anjos and Praia do Pontal were/are just as reluctant about letting new owners join. Thus, the RESEX has created new opportunities for those individuals who have a gear set (canoe and net) and

meet the other conditions for membership in the reserve (residency, etc.) and want an opportunity to seine.

As stated above, owners on all beaches have discouraged the entry of new canoes on their beaches. 'Seu' Manuel, a fisher and resident of Prainha is an illustration of this attitude. A resident of Prainha for over fifty years and a fisher (and owner of the required gear) for over twenty years, Manuel has only in the last year managed to get a 'day' of access to the beach seining sites on Prainha. In order to be able to use the voting process of the reserve to get his canoe onto the user sequence, he had to become a member of AREMAC. He also had to persuade other fishers to support him and to vote for him in the general assembly. An important source of fisher support came from the nine men that work on his canoe and make up its *companha*. Manuel encouraged them to become members as they had a lot to gain by being able to fish in the sequence as well.

At the general assembly called to discuss this issue, apart from the four members of the AREMAC board, only 14 individuals with voting rights attended. Of this group, nine were crew members of 'Seu' Manuel's canoe, Blue Thunder. Apart from voting members, others present included two representatives from ACRIMAC, two Scuba dive shop representatives, one fisher from Cabo Frio, three marine biologists from the nearby oceanography institute (IEAPM) and six academics from the Department of Anthropology at the Federal Fluminense University (UFF).

Although the canoe owners and middlemen were against their entry, none attended the meeting. There were significantly fewer fishers at this meeting than at any other general assembly called during the 1999-2001 period of fieldwork. All voting members present voted for the entry of the canoe. On the day that 'Seu' Manuel's canoe entered the water, the local police, IBAMA and members of AREMAC went along to ensure that no problems

would arise. The process was trouble-free and Blue Thunder caught four tons of fish that day.

Although gaining access to the fishing grounds is a powerful incentive for individuals to join, it is questionable how active in the Association these members will be after they have achieved their goal. It is also questionable what will be the impact of letting more users into the system. Many have also raised concerns about the legitimacy of these decisions as they are often made by a small handful of individuals.

Participation in RESEX Meetings

Canoe fishers have played a marginal role in the process of creating and implementing the RESEX A.C. This is exemplified by their lack of attendance at meetings held at the RESEX headquarters and particularly by the fact that most have never voted on any decision made at these meetings. Many argue that they do not feel comfortable speaking in the meetings and it is highly probably that their participation is constrained by the opposition that the RESEX faces from the owners and middlemen that control their activities. As mentioned before, economic and time factors also play a role in whether these individuals become eligible for membership.

There are two types of meetings held at the RESEX that involve fishers. Some meetings include only a gear group or specific group of fishers and are called in order to discuss a problem of particular relevance to them. The other type of meeting is the General Assembly. All changes to the Utilisation Plan are made during these meetings and all fishers (and any other interested parties) have the right to attend. As explained earlier though, only those who are members of the RESEX and up-to-date with their payments are allowed to vote on amendments to the plan or any other decisions that are made by the General Assembly.

Word of mouth was by far the most common way that fishers became aware of meetings held at RESEX headquarters. The other ways that fishers were informed of meetings were through direct contact with the AREMAC directorate or by hearing the announcement made by the sound car.⁶⁶ Announcements are often made one or two days before the meeting itself and people are generally not aware of the agenda beforehand. This agenda is set by IBAMA and AREMAC although members of the directorate argue that it is IBAMA that determines the issues to be discussed at meetings.

Forty-eight percent of canoe fishers stated that they have at some point participated in a meeting at the RESEX headquarters (on Praia Grande). Of the 48 percent of canoe fishers that had attended meetings, 80 percent felt that the issues discussed were important to their livelihood. Qualitative responses to this question expanded on this saying that although the topics were often important, the meetings were too long and disorganized.

Of those that did not attend, most were aware that the meetings were being held. Therefore, lack of knowledge of the meetings is not the reason for the low turnout of canoe fishers (and other fishers). Questionnaire responses indicate that there is a general awareness of the RESEX but that many fishers still opt not to participate. Those canoe fishers who had never attended a meeting at the reserve offered three principal reasons: 1) they did not feel that their presence would make a difference, 2) they were working - either fishing or at another job, or 3) they were not aware that the meetings were taking place.

⁶⁶ Sound cars are cars with large speakers attached to them that are commonly used in Brazil, especially in small towns, in order to make public announcements such as funerals and meetings.

Figure 8.2 RESEX A.C general assembly



One of the independent owners from Praia dos Anjos who is also one of the more active seiners describes the reasons beach seiners do not attend meetings:

'Canoe fishers think the reserve is a great thing, but they don't go and join. When the time comes that something is happening that is of interest to him, it's too late to join. There are a lot of fishers who go to the meetings without being a member. They can't vote on anything! Like that, how are we supposed to win? The others are the majority, the trawler fishers. When Ze Maria⁶⁷ was president, he called on all his friends to join up. The reserve will only be able to benefit the canoe fisher if he participates in the meetings and votes. If we [canoe fishers] don't get organised, the reserve will serve as an instrument for those that are members, like the trawler

⁶⁷ Ze Maria owns and fishes on a trawler.

fishers. And the people from the reserve are going to say, 'What do you want us to do? The canoe fishers couldn't be bothered, they don't show up, how are we supposed to fight for them' (P13: 2265)?

Significantly, only 34 percent of canoe fishers were aware that members of the reserve have the right to vote. Of those, only one fisher who participated in the survey voted in any meeting at the reserve headquarters. This figure is particularly alarming, as the entire Utilisation Plan has been defined specifically for the purposes of protecting this traditional population through the process of co-management.

One factor that seemed to hinder the ability of canoe fishers (and other fishers) to feel comfortable voting was the way that votes are made and recorded. Voting is made publicly and fishers must raise their hands to have their votes counted. Fishers must keep their hands up until their vote has been counted. This means that everyone in the room is aware of how fishers voted. Given the tensions between gear groups and between fishers and owners, this could be a significant deterrent for fishers to express their views and opinions through voting.

The non-secret ballot, although transparent, is not very reliable as hands go up and down and it is difficult to record votes. These problems could be resolved using a different form of voting, such as 'pocket chart voting' whereby fishers go behind a panel to vote and insert their vote in a secret envelope. Like this, votes would be recorded on paper and would be easier to count and fishers would be free to vote as they choose.

Another factor identified as an inhibitor of verbal contributions in meetings is the presence of biologists, sociologist and other professionals who often attend these meetings. Fishers feel timid and aware of the differences in

class and experience between themselves and these groups. One fisher describes this issue:

'There is always that fear that we have in the meetings, when there are biologists, scientists, doctors, university students. Some of us are afraid to speak out. We feel ashamed and afraid that we are not going to speak correctly. Fishers have their own way of speaking that is different to theirs' (P10: 245).

The creation of a representative democracy, where smaller groups are represented by elected individuals, could help alleviate some of the problems caused by the lack of space and large numbers of fishers involved. Breaking down the larger group into smaller ones also might lessen the likelihood of 'participation fatigue' and be more efficient. A system like this could also help to avoid the possibility that one group could in the future dominate the whole process as decisions are made democratically.

Physical setting of meetings

Figure 8.3: RESEX headquarters on Praia Grande



Assemblies are held at reserve headquarters comprising a small concrete storehouse donated to AREMAC by Alkalis (See Figure 8.3). The building is located just above the beach seining grounds on Praia Grande. The structure consists of two main rooms approximately four square metres in size connected only by a small doorway. Attached is a small room that IBAMA uses as an office. Each of the larger rooms has a small window protected by iron bars. The entry way into the space consists of two large wooden doors. The space available for meetings is hot and cramped. The public phone outside is the only phone available and it is via this telephone (when it is working) that AREMAC and IBAMA conduct their business.

The room used for meetings is sparsely furnished. There are a few old chairs scattered around the room with one desk at the far end of the room. There is enough seating for approximately ten people, leaving others to stand throughout the assemblies. The room itself holds enough space for approximately twenty people uncomfortably, forcing other interested parties to stand outside the meeting proceedings and either listen through the doorway or find out what is taking place from others who leave the room from time to time. No fresh water is available and the toilet is rarely in working order. There are plans to modernise facilities with funds from Alkalis but negotiations are still underway.

Meetings take place during the day or early evening. They often do not start on time and usually last for many hours and sometimes all day. Voting often takes place at the end of these long meetings. It is not unusual for people to come and go throughout the meetings and by the time voting takes place, few of the total number of attendees are still present while some have only just arrived and have not been a part of the discussions leading up to the voting. This could be another factor explaining why, although many seiners have attended meetings, few have actually voted.

The front of the building has a concrete bench used mainly by elderly fishers who congregate here in order to watch the seining activities on Praia Grande. Any seiner coming to or from the fishing grounds on Praia Grande must pass by this building. Given the historical divisions between seining beaches, the location alone is enough to deter some individuals and groups from attending meetings. This means that seiners from other beaches are much less likely to have more casual interactions with AREMAC and IBAMA that would result if they were just to stop by and see what was going on.

The agendas for the meetings are usually set in advance. The agenda is decided by representatives of AREMAC and IBAMA although the directorate often complains that the IBAMA representative makes many decisions unilaterally. Fishers complain that meetings tend to focus on issues that are not related to their interests.

8.4 Beach Seiner Perceptions of the RESEX

Understanding beach seiners' perceptions of the RESEX is the key to understanding current levels of participation in this process as well as for determining the likelihood for long-term participation. The following sections will review different aspects of the seiners' perceptions of the reserve including their overall awareness, their perceptions of its leadership, meetings and monitoring practices.

'The reserve has been a dream for the fishermen. It's given them everything they need; they just need to realise it. The problem is, they barely pay attention, they're so disinterested, complacent, you know what I mean? They are at the mercy of the canoe owners and

middlemen. Canoe fishers have a lot of problems. We do a lot just to survive from fishing. Today there's squid, tomorrow there's bluefish but who knows how long that will last. The squid season is already ending. After that there's the mullet season and we can hardly get any of those because that's when the sea starts to get real rough and the wind so strong we can't even leave the house.' (P10: 222)

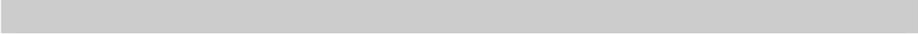
The vast majority of canoe fishers are aware that the RESEX A.C. exists. Although, 90 percent of canoe fishers interviewed said they were aware that the Extractive Reserve had been created, many were not sure why the reserve had been set up. Of those who knew of the reserve, 60 percent stated that it was created in order to provide support for the fishing community of Arraial do Cabo. Significantly, 34 percent of canoe fishers were not sure what its purpose was.

Perceptions of the reserve by the elderly

The previous chapter documented the importance of the elderly in the seining tradition. Not only are they the holders of much of the traditional knowledge upon which this activity rests, but they make up a large proportion of the active canoe fishers. It is not uncommon to see men in their eighties fishing four days a week.

Figure 8.4 Perceptions of the reserve by the elderly

- The directors of the reserve are the trawler fishers that are scaring our fish away!
- They don't care about us old people and they don't listen to what we have to say!
- The directory of AREMAC is just doing things to benefit themselves and their friends.
- They (AREMAC) have forgotten about us. All they care about are the canoe fishers from Praia Grande.
- The reserve is just another coat hanger for government jobs!



There are important implications stemming from this situation in terms of canoe fishers' participation in the RESEX. For example, the elderly may not have as much incentive to invest for the future - especially if they do not have family who work as canoe fishers (which many do not). Also, the elderly may be less apt to participate vocally in reserve meetings as they are often more soft spoken and the younger fishers usually dominate the space. Another important issue is the fact that many of the elderly work for the "big sharks" and their retirement payments are often only one minimum salary per month (approximately 50 £). This extra income is important to their livelihoods. Since there are few options for other employment they may be hesitant to 'make waves' and risk losing their already fragile positions as canoe fishers.

Perception of the AREMAC Leadership

The AREMAC board is made up of a president, vice president, first and second secretary and treasurer. It is this group of individuals that directly interface with government representatives in the collaborative management partnership. These individuals are by far the most active fishers in the reserve structure and are the core of fisher representation in the RESEX. The capacity and strength of this group to carry out their duties is essential to the success of the reserve. However, there are a number of indications that this group is weak.

Since the establishment of the reserve, the leadership has not changed and three out of the original six members of the directorate have resigned for different reasons. Although new elections were to take place, no individuals presented themselves as willing candidates to fill these positions so the three remaining individuals reluctantly continued to lead AREMAC.

The first president of AREMAC recently resigned. He had held the post for over a year and cited problems with IBAMA as his reason for leaving. He was a trawler fisherman, a controversial character often blamed for summoning his 'friends' (trawler fishers) to join at the expense of the needs of other fishers. During his presidency, he was spotted fishing illegally in the area designated for the Prainha canoe fishers on a number of occasions and was eventually caught by IBAMA and fined. This was most likely one of the reasons that he resigned as he lost a lot of support from fishers. Understandably, canoe fishers repeatedly cited his behaviour as the reason that they did not feel that AREMAC represented their interests. This incident also compromised his ability to work side-by-side with the IBAMA representative.

Canoe fishers and other fishers often complain about irregularities in the financial dealings of the reserve. They feel that it is unclear how funds are being spent. Because other fishing organisations, such as the Colônia, have been highly criticised for this, fishers are wary of supporting another organisation that will not account for its expenditures. There were frequent accusations that money earned by selling the catch of trawlers fishing illegally in the reserve ended up in personal bank accounts as opposed to in the hands of local charities.

Many fishers feel that AREMAC leadership is no different from the leaders of the other organisations. Canoe fishers and other fishers clearly resent the fact that board members are paid monthly salaries by the municipal government. Payments range from 300 reais to 600 reais (approximately 100 to 200 £). These are significant payments not only in terms of the amounts but also in terms of their regularity. Whereas other fishers do not have the security of knowing what their month's earnings will be, these

individuals now have a guaranteed income. One fisher commented on this situation:

'They are all getting paid, all except the treasurer who is running for council member. The local government has them all in their back pocket. Why should we bust our butts monitoring the reserve when we could be fishing? What do they get paid for anyway?' (P18: 116)

A former member of the directory of AREMAC states:

'If they were to call a meeting now, no one would show up. The fishers are angry, they weren't told about payments made to the board and now the Mayor has them in his back pocket just in time for the elections' (P18: 2383).

The directory felt justified in receiving these payments since they were putting in a lot of time and effort in the reserve and this meant that they spent less time fishing. The former president justifies these payments:

'Fabio Fabiano gets paid for the work that he does for IBAMA, why shouldn't we? Not only do we have to follow the rules and set an example for the other fishers but we also spend a lot of time working for AREMAC, monitoring and doing other things and that means we have less time to fish!' (P9: 577)

Fishers are jaded as a result of their negative experiences with local leadership. This history has left them with an apathetic attitude towards the reserve. The problem is exacerbated by their inability to unite to change the structures by which they are constrained. In interviews and focus groups it was clear that fishers are waiting for the reserve to do something for them. They do not recognise the central role that they should play. As a

result, there is little sense of ownership over the process. The idea of co-management is a new one for them and one that they do not fully understand. Although beach seiners do have a history of informal/formal resource governing institutions, they have little else upon which to build this effort.

Monitoring

A crucial weakness of the RESEX A.C. rests in its ineffective monitoring system. The ability of AREMAC and IBAMA to monitor the entire reserve rests on:

1. Support from IBAMA
2. Availability of resources
3. Collaboration of fishers/ other community members

As stated previously, monitoring is primarily the responsibility of IBAMA. This activity is supposed to be carried out by monitors trained and empowered to levy fines and confiscate fishing material as well as carry out other types of monitoring on land and at sea. IBAMA is unable to carry out these tasks within the RESEX A.C. because it lacks both the manpower of trained monitors as well as the infrastructure and equipment necessary to monitor the marine area.

There is only one full-time IBAMA representative on site at the reserve, a biologist, and he was recently promoted to be the regional representative for CNPT so that he can facilitate the creation of more Maritime Extractive Reserves in the state of Rio de Janeiro. This has put extra constraints on his time. Also, because he does not have a monitoring license to police the reserve, there is very little he can do to defend the area from outside predatory fishers or even from internal threats. Not only is IBAMA

understaffed but even if the staff could be mobilised, they do not have the infrastructure to monitor the reserve. Although they do have a car which increases their mobility on land, they do not even have a boat which would be a minimum requirement to begin policing the waters around the cape, to say the least.

Civilians (fishers and other community members) were initially incorporated into an overall monitoring plan through a programme of training voluntary monitors. In this vein, approximately 30 individuals were trained to be voluntary monitors and given permits by IBAMA to carry out related activities. Currently, only one or two of these individuals are still carrying out their monitoring duties. This decline in effort is due largely to the lack of response to the infractions that they record. Any infractions had to be addressed by official monitors who would be called in from time to time from IBAMA's state headquarters in the city of Rio de Janeiro. But again, these monitors cannot be effective without having access to a craft with which to police the waters.

A member of the AREMAC directory complained about the situation:

'Extractivism is a word which a lot of people are saying these days. It's just a word that people say, it doesn't mean anything. Just like the Extractive Reserve, it only exists in name. It may even exist on paper but nothing more. The commitment by the federal government doesn't exist, that's for sure. IBAMA is supposed to monitor the area, that's their job. Isn't marine life part of the environment? They just talk, that's all. IBAMA doesn't even have a boat to do the work they're supposed to do. Its never going to work like that. The dragnets keep dragging, right near the beach. I see them.' (P14 : 706)

Some voluntary monitors have ceased their efforts because of the controversy that now surrounds the reserve. Because the activities of the reserve have left many groups dissatisfied, some fear that association with the reserve could create problems with other groups. Some fear that their association with the reserve could lead to them losing their job with the local government or a relative being fired etc. This is a significant threat as most if not all individuals in Arraial do Cabo have one or more relatives who work for the local municipality. For voluntary monitors who are fishers, monitoring would often mean reporting infractions made by their own bosses and other fishers, clearly a disincentive for them. Monitors complained that they would submit their reports, jeopardise their relationships with other fishers, their employers etc. and no authority would follow up with these claims.

Ironically, although the federal environmental control agency (IBAMA) does not have a boat, the fishers' organisation (AREMAC) does. A craft was donated to AREMAC by a wealthy individual from São Paulo. But even the day-to-day up keep and fuel costs are difficult for AREMAC to sustain. Although they receive donations from time to time from the local government and Alkalis for petrol, any engine problems or other problems with the craft (which is quite old) inevitably means that the boat is out of service for long periods. It is not uncommon for the boat to stay out of the water due to the lack of funds to fix it. And since communication within the reserve is done by radio, this means that all fishing boats around, especially the larger ones that are more likely to have radios, are fully aware that there is no one to police the reserve and they can do whatever they want.

All these factors cripple the reserve's ability to monitor the area effectively. IBAMA and AREMAC cannot effectively address infractions committed by individuals from the municipality and are much less able to deal with offenders coming from other regions. This makes fishers question the

authority, purpose and seriousness of the reserve effort. It is also a factor which could discourage long-term participation in the reserve.

8.5 Outcomes & Consequences

Ecological sustainability

By broadening the scope and scale of the management regimes in place, the RESEX A.C. has taken an important first step towards the sustainable use of the A.C. fishing grounds. The creation of a legal framework which supports restricted use of these fishing grounds has decreased the discount rate among fishers and created a forum for collective action to protect the resources upon which their livelihoods depend. By mitigating against the immediate threats to these resources (ie: industrial fishing), fishers can now take on a longer-term vision in their own use of these resources. This could lead to less subtractive behaviour between and among the different gear groups as well as greater protection from external threat. This is a particularly important first step for canoe fishers as their fishing practices are limited to small areas within the reserve and the success of their activities is dependent on the regulated use of much larger areas. It is these large areas that seiners have found difficult to monitor and control in the past.

Threats to the canoe fishers' traditional activities stem not only from external but also from internal sources. Internal threats include those from within the canoe fishers themselves and between them and other gear groups. The RESEX has not, so far, dealt with the weaknesses inherent in the canoe fishers' management regime. Weakened management institutions will have to be redeveloped, codified and enforced. With greater opportunities for participation, these rules should be developed by a broader base of canoe fishers as opposed to just owners, as in the past. Greater

participation will encourage a more equitable system. Because of the size of the fishing community in A.C. it would be useful to divide it into gear groups in order to facilitate management and to encourage participation.

Achieving ecological sustainability within the reserve will require more than just creating the reserve and developing the Utilisation Plan. Results depend on an effective monitoring system supported both by IBAMA as well as by local fishers and their representative organisations. The conflicts which have emerged among the different community groups (local government, colónia, tourism association etc.) indicate that sustainability will also depend on the reserve's ability to plan a long-term strategy for the development of the area which takes into account the rest of the community, not just fishers.

Co-management

At different stages, the RESEX A.C. has exemplified characteristics of the entire spectrum of co-management arrangements. At no stage, though, has the contribution of either group (fishers or state) been ideal. The federal environmental organisation, IBAMA, has not kept its part of the bargain. With only one representative on site and no monitors, this group is clearly not able to staff or fund its responsibilities. However, although fishers have participated to some degree, canoe fishers have not had a significant voice in this process. The RESEX A.C. may best be characterised as a form of co-operative management where both sides lack the capacity (funds, training, experience) to support an efficient and effective system for collaborative resource governance. Greater fisher participation and more support from the federal government are necessary in order to achieve a more equitable and effective management system.

With the creation of the reserve, canoe fishers have been given the opportunity to influence decisions made about their own activities as well as to contribute to decisions on the activities of the wider fishing community. Even so, few fishers have taken advantage of this opportunity. Reasons for this include the barriers to fishers obtaining the legal status to vote. But even with their documents in place, canoe fishers are clearly constrained by the power structures which have in recent years come to control their activities. Also, although canoe fishers do have experience in managing common property resources, in general, the organisations that have represented fishers in the past have not given fishers the opportunity to influence the process in the way that the RESEX proposes today. As a result, the fishing community may need some time to adapt to its new opportunities and new role in creating and sustaining a common property management regime in collaboration with the State. In the meantime, there is a feeling that fishers are waiting for IBAMA and AREMAC to do something for them and little indication of a general awareness of what role the fishers themselves can play in the process (monitoring, decision-making etc.).

Empowerment and Participation

There is enormous potential for community empowerment that has not yet been realised. It is taking time for fishers to perceive what kind of an instrument the reserve could be for reorganising and protecting their activities. New opportunities include creating alternatives to the current marketing structure whereby few owners have a stranglehold on fishers. Higher earnings, coupled with an improved catch and a strong voice in negotiating with the different modalities would not only strengthen the canoe fishers' management regime but also provide hope for the continuity of this sustainable practice.

Canoe fisher participation is constrained on a number of levels. Historically, rifts between beaches still run deep, complicating the ability of individuals from different beaches to come together to resolve common problems. Power structures within these groups (owners and middlemen) also act as a deterrent to participation. The creation of the reserve has led to conflict between fishing groups, IBAMA and the local government. These negative relationships also inhibit membership, monitoring and other forms of participation. Other factors such as the documentation needed to join the reserve constrain membership numbers.

Although the Utilisation Plan flirts with the existing imbalance of power within the canoe fisher community it has not yet managed to change it significantly. The process by which this change was made is questionable as canoe fishers did not play an active role in the process. An indication of this lies in the few articles in the Utilisation Plan which directly refer to canoe fishing. Because of the conflict which has emerged as a result of the creation of the reserve, it is possible that fishers are wary of the implications of participating.

If the process of reserve creation cannot bring about more equitable power sharing, reserve activities may very well serve to reinforce inequalities. In fact, it is not impossible for canoe owners (who are also middlemen and owners of many other boats used in the reserve) to hijack the process of the reserve given the fact that they are legally registered fishers (as opposed to many of the fishers themselves that fish without legal papers).

Clear procedures and rules

The institutions governing the canoe fishers have not been clarified or revitalised by the creation of the reserve. These institutions, weakened over the years, have not been strengthened in the short-term. The Utilisation

Plan does not address these weaknesses and sends an ambiguous message regarding who now has the authority over the management of these activities. Many fishers are not aware of their rights to influence the decision-making process through voting, participating in meetings, and monitoring. Of those who are aware of their rights and responsibilities to the reserve, many have not taken advantage of them due to their fears and reservations.

In the short-term, the reserve has not strengthened the livelihoods of local people, principally because of the lack of monitoring as well as the lack of funds to invest in reserve management and infrastructure. Although the activities of fishers remained relatively unchanged with the implementation of the Utilisation Plan, external monitoring is essential in order to consolidate the reserve, build credibility in the reserve and garner support from seiners.

Health of the CPR

Table 8.2 analyses the changes in the strength of the common property management regimes that have managed access to marine resources on the Cape. It uses Ostrom's (1990) design principals to gauge the strength of the reserve during different periods (Pre-1960, Pre reserve, currently). It also attempts to gauge the potential for a robust regime supported by the RESEX in the future.

Although there is enormous potential for the reserve to meet its intended goals and to strengthen its ability to collectively manage the common-pool marine resources in A.C. the RESEX has so far realised little of this potential. In two areas, it has improved the situation. As mentioned previously, the reserve has made important strides in defining the boundaries of the common use area (even though it has not secured these

boundaries), and it has also provided an improved forum for conflict resolution between and among gear groups.

Areas where the reserve has not been effective in strengthening the management regime are concern the monitoring and sanctioning process as well as fisher participation in decision-making. Almost no monitoring is taking place within the reserve. This is due largely to lack of funds and infrastructure as well as the absence of support from IBAMA. The weak monitoring system complicates the ability of AREMAC/IBAMA to sanction infractors and limits the legitimacy that these sanctions could have. Although there is enormous potential for collective choice arrangements in the RESEX, currently, fisher participation in the different dimensions of the reserve remains low. Using the typology chart presented in Chapter 3, current participation could be described as ‘functional participation’. Also, without changing the way votes are counted and calculated, it is very possible that one gear group will eventually dominate the decision-making process. This could have negative consequences for the beach seiners’ activities.

Table 8.2 Assessment of A.C. Resource Management Regimes

Design Principal	Pre-1960	Pre-Reserve	Potential for	As part of the Extractive Reserve
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Design Principal	Pre-1960	Pre-Reserve	Potential for	As part of the Extractive Reserve
1. Clearly defined Boundaries	YES	NO	YES	YES. With the creation of the RESEX A.C. a three mile belt was created encompassing all existing artisanal/traditional fishing activities while making predatory fishing activities illegal. It has also clarified the internal spaces utilised by canoe fishers. Resource flow problems still exist between the beaches though not everyone is aware of or follows the rules regarding user rights within the reserve.
2. Congruence between appropriation and provision rules and local conditions	YES	NO	YES	NO. This situation has not improved since the creation of the reserve. There are a number of indicators that these rules and conditions are incongruent. Fishers do not feel that they earn enough to live on. Owners have sold their shares as too many days were added on some beaches leading to rent dissipation. In some cases this situation is getting even worse because the RESEX is encouraging and enabling new canoes to enter on all the beaches.
3. Collective - choice arrangements	YES	NO	YES	NO. Although there is great potential for collective choice arrangements in the RESEX, currently, there is very little participation in the process. There is also a risk that those gear groups with the most fishers will dominate. It is also possible for the owners/middlemen (as they meet the conditions for membership) to hijack this process.
4. Monitoring	YES	YES	YES	NO. Almost no monitoring is taking place within the reserve. This is due to lack of funds, infrastructure and personnel as well as lack of awareness of the rules.

Design Principal	Pre-1960	Pre-Reserve	Potential for	As part of the Extractive Reserve
5. Graduated Sanctions	YES	NO	YES	NO. Although the Utilisation Plan does include the use of graduated sanctions, because the monitoring system is so ineffective, these cannot and have not been applied.
6. Conflict-resolution mechanisms	YES	NO	YES	YES. The RESEX does create an important forum where different groups within the community can resolve their issues. Unfortunately, because the owners of the canoes do not recognise the authority of AREMAC or the decisions made at general assemblies, they are not a part of this important process.
7. Minimal recognition of rights to organise	YES	YES	YES	YES. Although the canoe fishers' CPR was recognised by the local government and organisations related to fishing, the creation of the reserve has emphasised these rights.

Even given all their criticisms of the process and their complaints about leadership etc., 44 percent of canoe fishers interviewed felt that they had somehow benefited from the creation of the reserve. When asked about how they felt the RESEX would impact them in the future, 40 percent of beach seiners surveyed were hopeful that the reserve would bring positive changes to their livelihoods. This could suggest that seiners are aware that social change and resource conservation is a long process and that measurable results may not appear immediately.

Table 8.2 also gauges the possibility for the RESEX to become a robust regime in the future. With increased support from both fishers and the State, the RESEX A.C. could certainly strengthen in time in support of local livelihoods and resource conservation.

8.6 Summary & Conclusion

The purpose of this chapter has been to analyse the relationship between canoe fishers, their management systems and the RESEX A.C. The chapter began with a description of the conflicts and power struggles that emerged during the implementation stage of the reserve and the subsequent loss of support for this process. It then looked at how the beach seiner institutions and management regimes had been contemplated in the plan by looking at those articles in the utilization plan which pertain to this gear group. This analysis revealed the minimal attention that had been given to the internal weaknesses of this regime. Disappointingly, the analysis suggests that few changes have therefore been made to the beach seiners' management regime. In fact, data suggest that the institutions which manage this regime may have been weakened in some ways by the creation of the reserve as it is less clear now who has the authority to make, change and monitor these rules.

The chapter then explored the current levels of participation in reserve management including indicators such as attendance at reserve meetings, voting and monitoring. It also investigated the incentives for and deterrents to the beach seiners' ability to influence reserve decisions. This analysis revealed that both the quantity and quality of participation are low. The chapter also reviewed other relevant aspects of the reserve which influence the likelihood of long-term participation by canoe fishers. These aspects included the monitoring systems currently in place as the perceptions of leadership within the reserve.

The following chapter will conclude this thesis. It will summarise the main findings of the research and present the policy recommendations related to these findings. It will also provide recommendations for future research in this area.

Chapter 9 Outcomes and Consequences: Potential for successful collaborative management

In the preceding chapters, the literature related to common property resource theory and environmental management was reviewed and data related to the interaction between the newly created marine RESEX and the beach seining community was analysed. The purpose of this process was to better understand under what circumstances extractive marine reserves in Brazil can be used as a conservation and development tool for supporting the traditional institutions and livelihoods of local resource users. Traditional resource governing institutions were analysed in order to determine the state of these institutions (weak/robust). Levels and types of participation and perceptions of the RESEX by this resource user community were explored. Finally, community-level factors that constrain or provide potential for long-term participatory conservation in this area were presented. This concluding chapter will present the main findings of the study along with implications for conservation practitioners.

The Extractive Reserve conservation category is one of the most seasoned examples of collaborative management in Brazil. The RESEX A.C. is the

first maritime extractive reserve of many to be established in the Brazilian coastal zone. Therefore, lessons learned from early experiences may prove valuable when planning similar marine extractive reserves in Brazil.

In this study, the processes of change within the traditional beach seining community of Arraial do Cabo, Rio de Janeiro were examined through historical, economic and social investigation. This multi-dimensional analytical approach was necessary because traditional resource governing institutions are created and are affected by changes in each of these areas. Therefore, in order to gauge the success of the RESEX A.C. in achieving its social objective it is necessary to understand the complex interplay of ecological, social, structural, and organisational and contextual factors. The following paragraphs will present findings related to the different characteristics of the case study which constrain or support the collaborative management process.

9.1 Physical and Technical Attributes

The physical and technical attributes of the RESEX A.C. provide opportunities as well as constraints for successful collaborative management. Because Arraial do Cabo is a cape which extends 40 kilometres into the ocean, it is largely isolated from the mainland and other fishing communities. As a result, small-scale fishers from neighbouring areas were not seriously affected by the creation of the reserve. The community lives in a small, compact area making communications between resource users easier, thereby facilitating management. Another factor that simplifies the creation and management of the RESEX is that all fishers included in this plan fish close to shore. This meant that reserve boundaries did not have to extend as far out to sea as would be necessary for other fishing communities whose livelihoods depend on resources beyond

the continental shelf. The fact that fishers fish close to shore also makes their activities easier to monitor.

The physical attributes of the resource itself complicate the relationship between seiners from different beaches. Because this group is dependent on a single flow of resources (migratory fish) that pass each beach (starting with Praia Grande), a subtractability problem exists. Canoe fishers are clearly aware of the stocks in the area at any given time. Therefore, fish caught by fishers on one beach will not be caught by fishers from another. This not only creates problems between beaches but among them as well. Because access days are managed, the canoe of the day will be given the opportunity to catch those shoals passing in the area. Depleting stocks have heightened awareness of this issue.

The single most important factor facilitating the creation and management of the reserve is related to the type of fishing technologies used by local fishers. Because all local fishers employ relatively sustainable methods, no local fishers were excluded by the creation of the reserve. In fact, local fishing methods did not have to change at all. Although small areas were designated as biological reserves within the extractive reserve, fishers largely recognised the need for these areas to recuperate. This situation made garnering support for the RESEX much easier than it would have been in a situation where there would have been 'winners' and 'losers'. Given the sustainable technology used in the area, no fishers lost out as a result of the creation of the reserve. This situation contributed, initially, to a sense of local pride and a conviction to keep predatory fishers, their common enemy, from fishing within the limits of the RESEX.

Even given these advantages, effective monitoring of the reserve has been impossible due to the lack of local resources and the lack of State support. As a result, local fishers do not feel that much change has taken place with

the creation of the reserve. They continued fishing as they did before and the trawlers still trawl the area.

9.2 Local resource governing institutions

Clearly, the beach seining community enjoys a rich history of formal and informal resource management institutions. Access rights to the resource are clearly defined. Resource user numbers are known and controlled. Local identity has developed around these activities and rules and the daily rituals involved in this activity constantly reinforce them. Monitoring systems are embedded in this system of rotating access and use whereby each day's user has the incentive to protect their access rights. Collective choice arrangements were secured through ownership rights and responsibilities. In terms of the type of technology used and certain aspects of local culture, this group is fairly homogenous.

Research revealed, however, that although resource governing institutions still exist, they are no longer robust. On the surface, it appears that they are still intact since fishing continues largely unchanged. A closer look reveals that many of the rules are not being followed and that these institutions have been hijacked by a handful of wealthier individuals to serve their own purposes. Indications of this include the presence of deeply rooted conflicts within this community, hierarchical structures, and low levels of participation in these regimes. Marketing structures have become increasingly centralised along with decision-making. It appears that the rules that have been maintained are those that benefit the powerful owners. Rules which are still adhered to are those that control access to the fishing grounds along with decision-making arrangements.

It should be noted, however, that although these institutions are weak at present, in the past they were much stronger. As depicted in Table 8.2,

before 1950, the management regime of the canoe fishers met almost all of Ostrom's conditions. The deterioration of local institutions is the result of a process of social change that has been instigated largely by government policies. External factors such as the establishment of the Alkalís industrial plant along with subsidies for industrial fishers contributed to a process of social change that has tested the resilience of local resource-governing institutions.

The creation of the extractive reserve has not yet managed to replace or redefine these institutions. In fact, although the existence of a 'traditional population' warranted the creation of this conservation and development unit, seiners themselves do not seem to have been seriously involved in its design. Rather, assumptions were made about the quality of their institutions. The utilisation plan skates over their weaknesses and de facto supports the status quo. It does this by accepting the existing rule structure and practices and not offering an effective system of sanctions.

The RESEX A.C. has introduced a more democratic decision-making forum for regulating fishing activities and addressing the concerns of this community. However, the system is beyond the reach of many fishers who find themselves constrained by the middlemen and owners for whom they work. Fishers are afraid of losing an important part of their livelihood along with their position in society, by 'sticking their necks out.' These constraints are exacerbated by the way that non-secret voting is carried out. Other constraints relate to the characteristics of the people and community culture.

9.3 Community and culture

The characteristics of the community in Arraial do Cabo suggest that collective action among this group is constrained by a number of social

factors. Chapter three discussed the importance of horizontal networks at the local level as an indicator of social capital. Communities with high levels of social capital are thought to be more likely to work together to resolve collective problems. According to a World Bank study (W.B. 1997b) local level indicators of social capital include factors such as the type and number of local associations and membership rates, as well as trust amongst community groups and government.

Numerous associations have been created since the onset of democratic rule in order to organize and represent fishers. Most of the organizations that emerged during this period were related to the beach seining community. Unfortunately, however, the quality of these associations is poor. This is indicated by small membership bases and low levels of participation. Until the creation of the RESEX and subsequently of AREMAC, none of these associations were active in any significant form. Although free-association has been legal since the signing of the new constitution in 1988, the State-sponsored fishing guild still enjoys the largest membership. Even so, membership levels in the Colonia are at an all-time low and few fishers feel that this organization represents their needs. Fisher participation in this organization is negligible. Associations created to represent canoe fishers have often been taken over by the local elite and membership has often been limited to fishers from Praia Grande.

Fishers' experiences with government have generally been negative. An example of this is their relationship with the Port Authority, which they view as a threat to their activities rather than a source of support. Fishers also hold a negative view of IBAMA, an organisation they feel is riddled with corruption and inefficiency. Apart from the creation of the RESEX, fishers feel largely abandoned by government at all levels. This view has not improved with the creation of the reserve since many feel that the

reserve is an added responsibility placed on fishers without sufficient support from the government. Consequently, trust in government is low.

The different communities that practice beach seining use identical fishing methods and are bound by the same codes of conduct. All are aware of the depletion of stocks, a variable cited as important for creating incentives for collective action. They do have a wealth of local ecological knowledge. They also have existing management regimes - all of which are factors that could provide a strong base for collective action in defence of their activities and their resource base. Although these main conditions are met, other factors create significant barriers to collaborative management. Deeply rooted historical divisions within the canoe fishing community exist and cannot be underestimated. Data show that these issues are not limited to the relationship between beaches but occur among them as well.

Power relationships between buyers and suppliers have constrained participation. Negative social capital is manifested in the hierarchical structures which have come to control this activity, while a historical legacy of deep divisions within this gear group also complicates and constrains participation. It is essential to understand these relationships in order to mitigate against them and design appropriate management systems. Existing conflicts and hierarchies have hindered the ability of the beach seining community to articulate its needs within the reserve structure. As a result, the reserve has not significantly fortified local management institutions and has overlooked or not been able to deal with these obstacles to participation and empowerment. Currently, it is not apparent that local fishers are decisive players in the decision-making process. An indication of this lies in the low level and poor quality of their participation in reserve activities.

9.4 Financial sustainability

Financial sustainability is an important element in the long-term sustainability of Extractive Reserves. The RESEX A.C., in this respect, seems to be well-positioned to achieve this over time. Tourist entrance fees and user fees from the companies that use the port could provide the income necessary for the reserve to operate effectively. It is questionable, however, to what extent these sources of income will be congruent to the goals of the reserve and to what degree secondary stakeholders, such as local government, will accept decisions made in the General Assembly.

Although the RESEX A.C. has significant earning potential, other Extractive Reserves established on the coastline may not be located in such touristically attractive areas and may not be able to garner the resources they need through these means. Mangroves, for example, provide the breeding grounds for fish that coastal fishers and offshore fishers alike depend on. These areas may not be easy to market in the same way. RESEX managers will need to be creative to ensure financial sustainability. For example, extractive reserves could be promoted through product marketing and extractive reserve labelling and/or eco-tourism.

Given the population, stocks and technology used, the need for incentives to participate is less than in areas in which fishers must alter their livelihood strategies significantly. In those cases, access to alternative income generating strategies, micro-credit, or the provision of social services such as improved access to health and education are essential. In A.C. they are important but it seems likely that, in the future, funds generated by the reserve will be allocated for these purposes. This ability to generate funds through 'sustainable tourism' is an opportunity on which only some Maritime Extractive Reserves will be able to capitalize.

Experiences with similar projects in Amazonia may be able to offer some insight into how extractive reserves can achieve their social objective. The Mamiraua management plan, for example, directly addresses some of the social issues related to the reserve in a way that the RESEX A.C. has not. For example, Mamiraua looks at the health of the community as a whole instead of only looking at those individuals that interact directly with the resource. Not only do the environmental education and health components of this wetlands project provide incentives for cooperation, they also recognize that participatory conservation depends on support from all stakeholders. The RESEX A.C. could benefit from these experiences. Mamiraua, though, has the added advantage of linkages with national and international NGOs and governments which the RESEX A.C. does not.

In the short-term, financial resources are scarce and neither AREMAC nor IBAMA have the necessary funds to effectively carry out their mandates. As a result, fishers are wary about the RESEX serving as a vehicle for effective change. Fishers pay two reais a month (65 p) to the organisation, an amount that would not be insignificant if all fishers (approximately 1,500) paid. Given current membership rates (230) and the fact that many fishers are not up-to-date with their payments means that this source of income, at present, does not assist the RESEX in meeting its financial needs.

9.5 Outcomes and consequences: Potential for successful collaborative management

At different stages, the RESEX A.C. has demonstrated some characteristics from the entire spectrum of co-management arrangements. At no stage, however, has the contribution of either group (fishers or State) been ideal. The federal environmental organization, IBAMA, has not kept its part of the

bargain. With only one representative on-site and no monitors, this group is clearly not able to meet its responsibilities. Furthermore, although fishers have participated to some degree, canoe fishers have not played a significant role in this process. The RESEX A.C. may best be characterized as a form of co-operative management arrangement in which both sides lack the capacity (funds, training, and experience) to support an efficient and effective system for collaborative resource governance. Greater fisher participation and more support from the federal government are necessary in order to achieve a more equitable and effective management system.

With the creation of the RESEX, fishers in Arraial, including the beach seiners have been given an enormous opportunity to control the resources on which they depend. While on the one hand this has the potential to empower local fishers (the extent of this empowerment may not be clear yet to them) it has also overburdened them with the responsibility associated with creating and managing this RESEX. Research suggests that, due to a number of social factors and financial constraints, the local community is not prepared to handle this responsibility on its own. As a result, local leadership is bending under the pressure. As one frustrated member of the directorate describes the situation, '[the government] has planted a seed and forgotten to water it.'

The establishment of an extractive reserve will cause change and disturb the status quo. Because so little government support is available, communities have been left more or less on their own to adapt to this new situation. Extractive reserves in Brazil, by definition, are located in places where traditional populations exist. Often, these groups have developed informal institutions to manage their resources. There is no guarantee though that these institutions are effective and up-to-date. Given the fact that these areas have been affected by external factors (such as technology change and State fisheries policies) it is likely that many of these

institutions have disintegrated over time. Therefore, although local collective resource management regimes may have once offered sustainable, democratic and participatory structures, practitioners must be careful to assume that they are still robust.

9.6 Conclusions

The following is a list of the main conclusions drawn from this case study.

- ❖ Traditional resource management systems in Arraial do Cabo are in decline.
- ❖ Economic change, social change and historical factors have tested the resilience of these systems
- ❖ Ownership and marketing structures have become increasingly centralized.
- ❖ Weaknesses in these management systems have not been addressed in the RESEX Utilization Plan.
- ❖ In order for the RESEX to achieve its social objective it must address these weaknesses.
- ❖ Participation in the RESEX is low both in quantity and quality. Canoe fishers are clearly not decisive players in this process
- ❖ Low levels of social capital and the existence of negative social capital are constraining participation and the likelihood for collective action

- ❖ Mistrust in government constrains the likelihood of collaborative management
- ❖ These issues are exacerbated by the fact that the state has not held up its part of the bargain, especially in terms of assistance with monitoring.

9.7 Policy Implications

Maritime Extraterritorial Reserves are being created in significant numbers at both the state and federal levels. Although creating these areas may be relatively easy, the challenge lies in sustaining them over the long-term. Policy makers and conservation practitioners should bear in mind the following:

- ❖ Conservation practitioners should not assume that traditional resource management systems are just, equitable system and up-to-date. An assessment of the existence and health of these institutions should be undertaken before creating the Utilization Plan. Information on the state of these institutions is essential in order to design effective regimes to collaboratively manage natural resources.
- ❖ Communities may need to go through a process of social preparedness before 'receiving' these reserves. In A.C. this process should have involved bringing fishers together from different gear groups and/or beaches in order discuss and resolve common problems. This process should also include secondary stakeholders such as local government and fishing associations. Participatory research methods could guide this process and help ensure transparency.

- ❖ Marketing structures should be analysed and an effort should be made to create more equitable systems and choice for fishers. Extractive reserves will not automatically change these structures. Inequitable marketing structures could affect the ability for the extractive reserve to secure local livelihoods. It might be useful to consider these structures before creating these areas.
- ❖ In order for government to build trust with fishing communities relationships of reciprocity need to be developed. This relationship will disintegrate quickly if parties do not hold up their promises. Brazilian small-scale fishers have historically lived outside the law. Few are registered with the Port Authority or IBAMA and few have participated in fishing associations. This lack of experience with government has left fishers sceptical and care should be taken to build a new relationship between the State and these groups.
- ❖ Fishing communities are unlikely to be able to take sole responsibility for these initiatives and will not succeed in long-term conservation and development goals without external assistance (i.e. Government, NGOs). There is a danger that communities will be overburdened with the responsibilities associated with these regimes. Therefore, it is essential that the State hold to its commitments.
- ❖ Clear guidelines for voting and financial management should be in place to ensure the legitimacy and transparency of the organization.

Extractive Maritime Reserves are one of the first Federal-level policy initiatives to directly address the needs of small-scale coastal fishers. Extractive reserves in general represent the first conservation units in Brazil which specifically involve local communities in their design and management. These initiatives have enormous potential for conserving

coastal areas and securing the livelihoods of coastal populations. This study suggests, however, that in order for these goals to be realized both parties must be willing and able to carry out their role in the process.

Suggestions for further research

- ❖ Given the innovative nature of extractive maritime reserves in Brazil, there are many areas in which further research would be timely and useful. The following recommendations for research are limited to extractive maritime reserves:
- ❖ Investigate the role of secondary stakeholders in this process. How can extractive reserves coexist in areas with a diverse and often conflicting economic base?
- ❖ Research the policy level factors that limit the States' ability to participate in this collaborative management process in a more significant way. What can government do to improve its support for these initiatives?
- ❖ Explore the possibilities of creating this type of initiative in areas where fishers fish far from shore. In Brazil, this type of fishing takes place in the northeast where fishers are particularly vulnerable and have little alternative livelihood sources.

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Annex I: Ecological and Social Change in A.C.

	Pre-Colonial - 1503	Colonial 1503 - 1920	Modernisation 1920 - 1988	Post-Modernisation 1988 - present
1) Quality of stock	Although little data exists, given low population densities it is assumed that resource extraction was sustainable	Although greater pressure on fish stocks, continued low population densities and technological limits suggest extraction was within sustainable levels - terrestrial resources received more attention and use and specific resources were depleted: i.e., pau brasil, other hardwoods.	Industrial fishing fleets encouraged by national government. Oral histories of local resource monitoring suggest that during this period, stocks and flows to the cape decreased substantially High population growth and local pollution affect environmental quality.	Considerable change in fish stock availability. During this period, local efforts began in an attempt to buffer outside threats to depleting fish stocks.
2) Population trends and changes	Indigenous native populations varying in language and tribe and representing a diversity of cultures.	European immigrants begin to colonize area along with African slaves.	Immigrants from north-eastern brazil come to take advantage of work opportunities at	Fishers continue to come from other regions. Although there is still an increase in total population, younger

	Pre-Colonial - 1503	Colonial 1503 - 1920	Modernisation 1920 - 1988	Post-Modernisation 1988 - present
	<p>Oldest recorded are the sambaquianas (5,500 years ago). At the time of the colonial conquests, it was the Tamoio peoples which occupied the area. A population with origins in the Tupi-Guarani nation.</p>		<p>Alkalis along with skilled labourers from around the country and abroad.</p> <p>Fishers from the north of the state move to Arraial to look for more fertile fishing grounds (also spurred by financial incentives offered by local politicians).</p> <p>Veranistas buy homes in Arraial and are included in population statistics</p>	<p>residents leave to look for work opportunities in the state capital.</p>
3) Religion	Animist	Introduction of Christianity	<p>Predominately Catholic</p> <p>Veranistas buy homes in Arraial and are included in population statistics</p>	<p>Introduction of variety of evangelical religions such as: Kingdom of God, Universal,</p> <p>Note: animism is still practised in a somewhat</p>

	Pre-Colonial - 1503	Colonial 1503 - 1920	Modernisation 1920 - 1988	Post-Modernisation 1988 - present
4) Technology/ Resource use	<p>Bows and arrows, hooks and line made from fish bones and a local plant variety called tucum also used for making nets and hammocks.</p> <p>Boats: rafts made from tying 4 or 5 logs together</p> <p>Housing: lived in communal huts made from wood and palm fronds.</p>	<p>Europeans brought iron tools with them - including, knives, hooks etc....</p> <p>Family homes made from "pau a pique e barro" - sticks and mud.</p> <p>Dug out canoes are only type of boat used during this period.</p> <p>Cal was made from shells in wood kilns.</p> <p>Transport done by man power and animal power</p>		<p>concealed fashion and represents a mixture of African and indigenous beliefs.</p> <p>Resex imposes limits on types of technology used within a three nautical mile radius of the cape.</p> <p>Terrestrial resources for fishing become decrease in importance with the availability of commercialised alternatives</p>
5) Property	Communal living	Household becomes	Private property, land	Extractive reserve

	Pre-Colonial - 1503	Colonial 1503 - 1920	Modernisation 1920 - 1988	Post-Modernisation 1988 - present
Rights	arrangements	primary social unit coupled with common property regimes develop/are modified Many owners for each canoe and net. Fish sold at auctions on the beach. Catch went to highest bidder.	gains value - titling introduced. Number of Canoe owners decreases and most of the few that remain become middlemen. Wealth became more concentrated. Means of production became concentrated during this period leaving it at the end in the hands of few.	redefining property rights in the local context
6) Social Change	Constant flux between two main tribes battling for control of the coast.	Arrival of Europeans. Social organisation is fishing and intrinsically related to this activity. Conflict between	Establishment of Alkalis bring urbanisation along with large numbers of immigrants looking for 'better opportunities'.	Conflict within canoe fishers, between them and other modalities as well as with outside fishers is prevalent. Establishment of the reserve introduces

	Pre-Colonial - 1503	Colonial 1503 - 1920	Modernisation 1920 - 1988	Post-Modernisation 1988 - present
		<p>Praia Grande and Praia dos Anjos develops</p>	<p>Abolition of slavery creates afro-Brazilian neighbourhood. Women's role in fishing activities greatly reduced. Wage labour introduces new social order and 'civilises' A.C. Conflict between beaches peaks and begins to subside.</p>	<p>participatory decision-making forums, altering former structure where canoe owners are responsible for this. Time of extreme flux.</p>
7) Economy	<p>Although representing diversity of cultures, all native populations inhibiting this cape depended on fishing, hunting and gathering for their subsistence.</p>	<p>Extra fish salted and/or dried and sold in Rio markets as inexpensive alimantation for slaves.</p>	<p>Alkalis provides major boost to local economy.</p>	<p>Diversified: Although still important other alternatives to fishing develop. An d greater economic diversity ranging from eco-tourism and mass tourism to mining oil off the coast by Petrobras. Port continues to be an</p>

	Pre-Colonial - 1503	Colonial 1503 - 1920	Modernisation 1920 - 1988	Post-Modernisation 1988 - present
8) Fisher Participation in informal institutions	High	Medium	Low	important income generator for the municipality. Low but there is potential for increase

Exogenous influences on socio-ecological system

	Pre-Colonial	Colonial	Modernisation	Post-modernisation
Regional	Inter-tribal wars between Tamoios and Goytacezes.	Emergence of Regional markets	Wage labour?	Regional tourism, commerce, proximity to Rio de Janeiro/Sao Paulo markets
National			Creation of Alkalis Support for industrial fishing	Extractive Reserve, Petrobras, Navy research
Global		Discoveries, Church, 'civilisation', trade and contact with many different groups going to Rio. Extraction of natural resources for European market.	Japanese whaling industry	Pressures for protection of traditional populations/sustainable extraction gain support from western governments, primarily as a result of activities/movements in Amazonia.

(categories adapted from Warren and Pinkston in Berkes and Folke, 1998)

Change in Gender roles

	Pre - colonial	Colonial	Modernisation/ Industrialisation	Post- Modernisation
Role of Women	Gathering, keeping the home.	Salted/processed fish, helped in net making 'fiacao de tucum', and lace making (introduced by Portuguese women). Also responsible for child rearing and household needs such as water collection etc.	Reduced role of women in the out of home productive sphere largely as a result of the introduction of ice making technologies (and piped water/electricity). Many women complemented husbands activities with home vegetable gardens.	Urbanisation, high population growth and land speculation related to tourism development reduces quantity of land available for cultivation. Women look outside the home for work opportunities in local government, hospital, commerce, tourism etc....
Role of Men	Hunting and fishing, wars/protection	Primarily fishing with some hunting...	Work for men continues outside of the home.	Work continues outside of the home, fishing becomes a male affair.

Annex II: Timeline of Arraial do Cabo

3500 bc-1500	Different groups of indigenous people inhabit the area - Sambaquinis to Tamoios
1503	Amerigo Vespucci arrives at the Porto do Forno
1583	1 st light house in Latin America built on the island of Cabo Frio
1750	Saint Hilaire visits Arraial providing the first written documentation of life on the Cape
1830	Telegraph set up
1888	Abolition of Slavery
1900	Approximate date that Bacural comes to P. Grande (oldest canoe still in on the beach)
1921	Fishermen's Guild established
1945	first trawlers and motorised boats come to the area
1943	Alkalis established
1963	Japanese whaling industry set up in "Baleia" on P. dos Anjos
1971	IEAPM established for research and technology diffusion
1986	Free Association of Fishermen established
1983	Treaty signed by owners to regulate canoe fishing
1985	Municipality gains independence from Cabo Frio
1996	Municipality begins to sell itself as "Dive Capital of Brazil"
1995	FIPAC created - local government fishing office
1995	Highest catch in years - attributed to enforcement of industrial fishing activities by IBAMA and FIPAC.
1997	'Zangarejo' hooks introduced by "Japanese" for squid fishing, underwater lanterns come soon afterwards.
1997	Brazils first Maritime Extractive Reserve created.

