

Better together: partnership building in a Brazilian coastal protected area

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ABSTRACT

The Peixe Lagoon National Park was created in 1986 in an area of high environmental significance for the reproduction and feeding of several species of endemic and migratory birds. The implementation of this protected area has been jeopardized due to conflicts between the local population and the federal environmental agency responsible for managing it - the recently created Instituto Chico Mendes. The present research was done to explore the advantages and barriers of including the local traditional fishers in the management and conservation of the protected area and its resources. Participant observation, semi-structured interviews and focus group interviews were the methods used for data gathering during four months in 2007. In that period 36 traditional local fishers and 10 officials from organizations with some stake in the National Park were interviewed. Currently 166 traditional fishers have a temporary license to fish inside the protected area. Despite the growing recognition in Brazil of the rights of traditional communities and the role for resource management, the environmental agency continues pressing them to leave the National Park. The creation of a partnership which integrates environmental conservation and sustainable livelihood maintenance could be the solution for current environmental and social issues. Despite of numerous barriers for the implementation of a participatory approach, there exist considerable benefits to be gained through the inclusion of the local fisher communities in protected area management.

KEYWORDS: protected areas, fisheries management, co-management, Brazil

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INTRODUCTION

This paper is concerned with the conflicts taking place at the Peixe Lagoon region, where the creation of a National Park has been threatening the livelihoods of a traditional population of small-scale fishers. That is because in Brazil, National Park is a status of protected area that does not allow any kind of extraction of natural resources or the presence of people inside its area (Brazil 2000).

Until the end of the last decade, the establishment of protected areas in Brazil occurred in a different way it does today. In the year 2000, a new system of protected areas was created: the National System of Conservation Units (SNUC – acronym in Portuguese). This system regulates under the Law 9.985/00 all the different types of protected areas possible to be created in the national territory. Those are divided in two main groups: integral protection conservation units and sustainable use conservation units. The basic difference between them is that use of natural resources is allowed in the first group but prohibited in the second (Table 1).

According to SNUC objectives and guidelines, traditional population of resource users must have their livelihoods and culture protected and recognized, and the implementation of protected areas must be done in a democratic way, through popular consultations (Brazil 2000). Such participatory approach was an innovation of SNUC. As the Peixe Lagoon National Park (PLNP) was created in 1986, previous to SNUC, its creation was done with little participation of the local people and without regard to the needs of the traditional fisher communities.

This has created a situation of difficult relationships between the local communities and the environmental agency responsible for the National Park management. The conflict jeopardizes both conservation efforts and traditional peoples livelihoods (Almudi 2005). Until 2007, the responsibility for creating, managing and enforcing protected areas in Brazil was given to *IBAMA* (Brazilian Institute of Environment and Renewable Natural Resources). This responsibility was transferred (as of 2007) to the newly created *Instituto Chico Mendes de Conservação da Biodiversidade* (Chico Mendes Institute of Biodiversity Conservation). The present study was conducted when responsibilities over protected areas in Brazil were still under IBAMA. Therefore any institutional change or innovation regarding the implementation of National Conversation Units in Brazil that could happen under the Chico Mendes Institute of Biodiversity Conservation were not evaluated here.

The Peixe Lagoon has approximately 35 km of extension and an average of 1 km of width and is situated in the central portion of the Rio Grande do Sul State coast, Southern Brazil (Figure 1). It is located and an area of high environmental significance for endemic and migratory birds, within the geographical coordinates 31°26' S, 51°09' W and 31°14' S, 50°56' W. The average depth of the Lagoon is lower than 50 cm with exception of some channels that can be slightly deeper than 2 m (Loebmann and Vieira 2006).

This Lagoon has an intermittent connection with the ocean through a mouth located in its central zone. When the Lagoon mouth does not open naturally in the end of the winter season, the local population manages to open it. The connection with the sea allows for species and nutrient exchanges, making the Lagoon a nursery and feeding place for diverse species of mollusks, crustaceans and fishes, among other typical estuarine fauna (Knak 2004). For this reason, Peixe Lagoon also presents a great abundance of migrant birds that periodically visit this region migrating from the south (Argentina) and from the northern hemisphere (Resende 1988).

Since the first Portuguese immigrants arrived from the Azores Islands - in the middle of the eighteen century - they have relied on agriculture and fisheries in the Lagoon and adjacent ocean for livelihoods (Tagliani, et al. 1992). Today, fishing is still essential for subsistence and as a main source of income for the inhabitants of the Peixe Lagoon region. As the National Park status legally does not allow for the presence of people in its area, IBAMA had the legal obligation of removing the fisher communities from the area. Due to lack of financial resources to relocate them, one hundred and sixty-six traditional fishers have got a provisory licence for fishing inside the protected area.

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

Fishing resources captured in the sea are widely used for fishermen's own subsistence, constituting important element for their food security. Shellfish (*Mesodema mactroides*) is also collected, being mostly used as a means of subsistence. Fishermen collect shellfishes with their own hands or using shovels. In the Lagoon, the fishermen use small open boats made of wood, locally called *caíco*. These boats are approximately twenty feet long and are not motorized. The main aimed species is the pink-shrimp (*Farfantepenaeus paulensis*, *Farfantepenaeus brasiliensis*) which is caught with hoop-nets with wings (Figure 2). Butane lamps are used in order to attract the shrimps to the nets. Mullet, blueside and flatfish (*Paralichthys orbignyana*) are also fished in the Lagoon. For that, the fishermen use one-mesh gillnets with less height than those used in the sea.

The objectives of this research were (1) to investigate the Peixe Lagoon fishers agenda in regards to the protected area; (2) to identify and document their resource management strategies; and (3) to examine the benefits and constrains of including the fisher groups in the protected area management.

METHODS

This research was conducted within the qualitative methodology, which is adequate for exploratory studies (Creswell 2003). The specific methods of investigation consisted in primary data collection, which were complemented by secondary sources of information such as local newspapers and the Management Plan of the National Park.

Primary data was collected using semi-structured in-depth interviews (Creswell 1994; Czaja and Bleir 1996), focus group interviews (Creswell 2003) and participant observation (Vieira, Berkes and Seixas 2005). Approximately four months was spent in the field, from the beginning of May to the end of August 2007. Thirty-six fishers were individually interviewed for approximately one hour. Ten officials from several institutions related to the National Park management issues and to the fishing communities were also interviewed. The interviews were digitally recorded and lasted between one and one and a half hour.

A focus group interview with five fishers, informal communication and extended period in the field allowed for data validation. In addition, data triangulation was accomplished in order to check for consistent patterns in the collected information (Creswell 2003).

FISHERS' RESOURCE MANAGEMENT STRATEGIES

Peixe Lagoon's traditional fisher communities have developed a detailed body of knowledge about the local environment, especially in what concerns the life cycles of fishing species and the interactions between atmosphere, lagoon and ocean. That is because the success of fisheries is closely related to weather conditions and to the exchange of nutrients and species between the Peixe Lagoon and the adjacent sea (Almudi 2005). Such knowledge has been accumulated through generations and has been used to devise resource and environmental management strategies essential not only for the success of fisheries but also for maintaining the Lagoon hydrological cycles that preserve the migratory birds habitats.

The annual opening of the Lagoon's mouth, the control of fishing spots and the temporary closures in the pink-shrimp season are the main management strategies in place (Table 2). Those are regulated by informal institutions formed by traditional fishers. Although the first two management measures take place in a regular basis, the pink-shrimp fishery closures has not been a continuous institution in the sense that there is no formal mechanism in place to open and close the fishery season every time it would be necessary. Rather, this strategy has been carried out only when local fishers are able to self-organize temporarily to make it work.

The Peixe Lagoon has an ephemeral connection with the Atlantic Ocean. Usually this connection disappears in the end of the summer, allowing the Lagoon to accumulate water during the fall and winter. When the Lagoon mouth does not open its connection to the ocean naturally, the local population opens it (Figure 3), decreasing land flooding

and allowing for marine species to enter the Lagoon for feeding and nursery purposes. This practice has been carried out at least since the beginning of the nineteenth century (Saint Hilaire 1887). Experienced fishers determine when and how the Lagoon mouth is opened, depending on natural conditions such as tide, direction and intensity of wind and amount of water in the Lagoon.

The control of fishing spots takes place both in the ocean and in the channel near the Lagoon's mouth. Since the beginning of the 1980's, local fishers have protected the most productive fishing grounds close to their houses. This is an institution which has been maintained for decades through informal agreements and passed to generations through oral communication. Although no punishment is established for those who eventually disrespect this institution, the level of compliance has been high, probably due to fear of social constraints.

Mechanisms to close the pink-shrimp season in a dynamic and adaptive basis have become more often since the year 2000, probably due to decreasing in the stocks, which makes the adoption of conservation measures to improve captures more necessary. Attempts to close the fishery occur when the shrimps captured are under the commercial size, however fishers are not always able to do it due to lack of consensus. When it does take place, during two weeks nobody is allowed to enter the specific sectors of the Lagoon. This is the necessary time for the shrimps to grow considerably, reaching the commercial size, according to the fishers' traditional ecological knowledge.

FISHERS' AGENDA IN REGARDS TO PROTECTED AREA

Table 3 demonstrates what has the fishers' aspirations, concerns and top priorities been in regards to the Peixe Lagoon National Park. Maintaining access rights to fishing resources is the most important priority, as to determine their capacity of making a living and feeding their families. Fishers have had also a high concern about the access rights of their children as most of them either have chosen or need to continue the profession of their parents for livelihood.

Living inside the protected area or at least in its close surroundings is another priority of this community. The easy access to the fishing spots and the daily observations of environmental conditions and of the resources itself are advantages of living inside the protected area. It allows for their ecological knowledge to be maintained, updated and enriched, and for the monitoring and protection of fishing spots (Sabetian 2002). However, for living inside the protected area fishers have demonstrated be concerned with the implementation of better conditions such as the maintenance of access roads and the availability of reliable fresh water and electricity.

Another issue of high importance is to continue having chance to participate in fisheries management, i.e. to keep being able to establish the fishing regulations for the protected area together with IBAMA. On the other hand they do not prioritize participating in the protected area management. Most of them consider the issues not

related to the fisheries (such as restrictions of activities in the dunes zone and the prohibition of cutting Pinus forests) as not making part of their responsibility or interest. Nevertheless, some fishers would be willing, and prioritize, to assist the Parks administration in the management of broader issues related to the protected area.

Ability to increase fishing effort through the use of more nets or fishing for a longer period has not been considered a priority. Most of the interviewees declared to be content with the number and length of nets allowed and with the places and periods in which fishing is permitted. Having alternative sources of income is not one of the main concerns of this community either. When asked about this theme, most of them answered that they just want to continue fishing as that is what they really know how to do. In addition they declared to be hopeless about the existence of other sources of income for them.

WHY FISHERS PARTICIPATION IN THE PARK'S MANAGEMENT MATTER?

First of all the Brazilian legislation on protected areas changed significantly in the year 2000, incorporating requirements for the participation of local peoples in the creation and management of protected areas (Brazil 2000). In the new 'National System of Conservation Units' (SNUC), special attention is given to the traditional populations in what concerns their rights of accessing the lands they have historically occupied and the resources they depend on for livelihoods. Beyond legal requirements, the following items demonstrate the advantages of including the local population in the management of the Peixe Lagoon National Park:

a) Local support for protection: conservationists are becoming more conscious that an effective environmental protection is only possible if the local communities support protected areas and can benefit from its implementation (Pimbert and Pretty 1995). As the Peixe Lagoon National Park was created with little involvement - and therefore little acceptance - of the local population, a legitimate and effective implementation of its objectives has not been achieved.

b) Preservation of local and traditional ecological knowledge: the removal of traditional populations from their territory may cause an irremediable loss of a unique and complex cumulative body of knowledge and practices accumulated through generations (Berkes 2008). Peixe Lagoon fishers hold rich ecological knowledge and traditional management strategies that represent valuable tools for resources and environmental management.

c) Maintenance of culture: if Peixe Lagoon fishers are removed from their territory they will not only lose their means of survival but also their cultural identity. However, the establishment of protected areas should be done with the recognition that cultural diversity has an important role for the maintenance of biological diversity (Diegues 2000).

d) Assistance in management, research and enforcement: the costs of protected area management are very high when local communities are not involved on it (Pimbert and Pretty 1995). This is an important issue in developing countries, such as Brazil, where historically there have been insufficient financial and human resources for protected areas (Medeiros 2004). The Peixe Lagoon National Park has demonstrated to have deficiency of human and financial resources just like many other Brazilian protected areas.

e) Avoid unnecessary social costs and socio-cultural tensions: relocation of traditional peoples may disorganize the habitats where populations are transferred (Colchester 1997), and contribute to enhance the crowds living in situation of misery in urban areas (Arruda 2000). In addition, the enormous financial resources that would be spend for relocation could be used in environmental protection and management.

f) Minimization of conflicts: the history of establishment of this protected area has been marked by chronic conflicts. In 2003, around 3000 people (more than half of the Tavares city population) participated in a parade to demonstrate their dissatisfaction with the National Park administration and to demand the rights of local peoples. Sayer (1991) argues that establishing protected areas with no regards to the aspirations and necessities of the local people can create insoluble social problems that threaten the viability of the parks in the long run.

CONSTRAINS FOR PARTICIPATION

Despite of the advantages above exposed the Peixe Lagoon National Park has been implemented without regard to the contributions that local communities can provide for environmental and resource management. Achieving such contributions would require that a number of existing barriers for a participatory approach were overcome. Those barriers are mainly related to the continuity of the governmental policy of maintaining a 'no-take' protected area, to the history of conflicts between government and local communities, and to the level of preparedness of communities for participation (Table 4).

Governmental intentions towards changing the current type of protected area

IBAMA, until the end of this study had no intention of switching the status of protected area, i.e. 'no take' for one that allows the fisher population to maintain their ways of life through resource uses and establish a partnership for environmental conservation. According to Diegues (2005), the establishment of 'no-take' protected areas in Brazil has been considered by the government as a sign of international prestige, even if it comes together with social marginalization and conflicts with local people, which is often the case. The Peixe Lagoon National Park has been included as part of three international treaties: (1) Atlantic Forest Biosphere Reserve - UNESCO, (2) Wetland of International Importance - Ramsar Convention, and (3) Western Hemisphere Shorebird

Reserve. Following Diegues' rationale, the Brazilian government could be avoiding giving up total control over the protected area due to fear of losing prestige.

An indispensable step for the establishment of a partnership with the local communities in the Peixe Lagoon is the implementation of a protected area which legally allows the community to participate in its management and to have their livelihoods guaranteed. Otherwise it is hard to imagine how they could be expected to support the conservation strategies implemented in the region. As National Parks in Brazil imply the removal of resource users, while this protected area status is in place and the legislation is not modified, artisanal fishers will be considered as a problem to get rid off instead of as part of the solution.

Resource managers in many parts of the world have difficulties in dealing with multiple management objectives. This is especially true when objectives (livelihood protection vs. biodiversity conservation) are seen to be in conflict (Berkes 2007). Such a conflict in objectives occurs in part due to differences in their agenda. It is also usually due to the incapacity and uneasiness of the environmental agencies to deal with multiple and complex objectives. Nevertheless, conservation issues typically occur in a set of social and ecological relationships which demands the ability to consider the aspirations of several actors and to deal with intricate problems.

Beyond the reasons mentioned above, there may be other causes for the environmental agency's unwillingness to include the traditional resource users in the management of the protected area. Reluctance to give power and strict preservationist thinking are probably two of those reasons. In regards to the first one, it is often the case that exist little incentive for environmental agencies to give up their control (Berkes 2002). Top-down decisions are easier to take, instead of sharing power with lay people, and be compelled to engage in a difficult and arduous process of joint decision-making. Several examples of co-management arrangements implemented in Brazil demonstrate readiness from the part of the government to attribute responsibilities to resource users but lack of enthusiasm for genuinely sharing power for taking decisions (Kalikoski, et al. 2006).

Environmental agency officers in Brazil have professional backgrounds that give them a strict preservationist thinking. Most of them have biology or ecology background and are not prepared to consider local communities as part of the solution for environmental issues. Diegues (2005) made the same point, affirming that particularly in the developing countries the vast majority of the professionals and scientists dealing with marine protected areas have a biological background. Nevertheless, it has been increasingly recognized that taking decisions related to environmental management is not only about technical expertise but inevitably involves value-choices issues to which local people can and should provide their inputs for solution (Lane 2001).

History of conflicts

Relationship between government agencies and stakeholders is a fundamental issue in participatory arrangements. The creation of the National Park in the Peixe Lagoon has a long history of conflict between the Park administration and the local population, with periods of higher and lower tension. This conflict had periods in which there were material losses (e.g. boats and vehicles burned) and even physical violence from both parties.

Accounts from fishers and from current National Park officials demonstrate that seven or eight years ago, enforcement activities were done aggressively and with abuse of authority. As a fisher complained “the enforcement staff used to arrive already pointing guns towards us”. Local newspapers have a number of articles denouncing inappropriate behaviour of the environmental agency’s (IBAMA) enforcement staff, such as setting fire in fishers’ boats and vehicles, and even breaking apart their houses (Jornal Freguesia das Águas, February 1, 2003). On the other hand, there are accounts of cases of fishers ‘payback’. In one occasion a National Park’s official had to leave the region as the conflict reached such intensity: fishers beat him up to the point of breaking his bones.

Chuenpagdee and Jentoft (2007) explain that hostility between fishers and government may be a major constraint for the establishment of platforms for communication and discussion. They still argue that the creation of participatory structures should ideally be established at the planning stage of the protected area as its acceptance is determined in early stages of implementation. The actual outcome is strongly influenced by what have happened in the past. In the case of the Peixe Lagoon, not only during the initial authoritarian process of implementing the National Park created negative relationships, but also the level of animosity increased by subsequent difficult relationship.

The history of implementation of the Peixe Lagoon National Park shows that the way stakeholders deal with each other has major consequences. It is important to recognize and to keep in mind that human beings usually respond according to the way they are treated. Even though the level of conflict has decreased today, the feelings of inferiority and of being considered invaders of their own lands still cause major constraints for the local fishers to interact with the National Park administration.

Level of community preparedness for participation

Communities are rarely homogeneous, being usually formed by different sub-groups and individuals with different interests and world-views (Carlsson and Berkes 2005). These sub-groups may be separated by innumerable factors such as age, gender, social status, economic condition and different ways of resource use. Among the Peixe Lagoon fishers there are two different communities. One of them is formed by urban-based fishers who work only in the Lagoon and the other is formed by beach fishers who work both in the Lagoon and in the ocean. The existence of conflicting interests between these communities has threatened the establishment of a participatory

management as it has hindered their ability to defend commons goals which oppose the governmental policies.

Another factor related to lack of preparedness is the Peixe Lagoon fishers' mind-sets, which are not quite appropriate for a participatory approach to environmental management. Participating in formal meetings and sitting down for hours discussing conservation issues or any other subject definitely does not make part of their usual activities. Pinto da Silva (2004) argues that Brazilian small-scale fishers have lived on the margins of organizational life, and because of that, participating in formal institutions is a difficult task for them. Even if there was opportunity for including the Peixe Lagoon fishers in protected area management, it would have been necessary to create mechanisms that allowed them to participate meaningfully in the decision-making process. Given their responsibilities that they are not ready to take could cause frustration and even increase current conflicts.

Peixe Lagoon fisher communities are poorly organized. Fishers in general are little motivated for acting in group and demonstrate to have lack of trust on other fishers from the same or from a different community. They also have poor knowledge about their rights and about possible ways of modifying the problems their communities have currently faced. Individual interests predominate over common interests and, despite the existence of a few leaders, they are not always recognized as such, and have had low ability for mobilizing their community fellows.

In addition to low self-organization capabilities, the local communities have faced little institutional support from external organizations. Unlike other traditional resource user communities in Brazil, Peixe Lagoon fishers have lacked support from NGOs, the Catholic Church and others which could provide several kinds of assistance. Local organizations which could include in their agendas the interests of local fisher communities have had a limited role in doing so. This is the case of the Fishing Colony Z11, which is the organization officially responsible for representing fishers in the region. Another example is the Peixe Lagoon Fishing Forum which is an organization which serves as platform for discussion between the local population and the National Park officers. Despite its essential role, the Forum has failed in addressing issues other than those of immediate concern such as the dates of opening fishing seasons (Figure 4).

The few existing informal institutions devised by fishers themselves have not been properly recognized by the National Park administration, becoming rather marginalized. As a consequence of this lack of representation, once more poorer and less empowered groups within society are bearing the costs of conservation projects without fair compensations (Jeanrenaud 1999).

CONCLUSIONS

Conflicts between the traditional population of fishers and the implementation of a 'no-take' National Park have jeopardized environmental conservation in the Peixe Lagoon region, and threatened local culture and livelihoods. Despite the increased recognition in Brazil of the rights and the role of traditional communities for resource management, IBAMA continued pressing traditional fishers to leave the National Park during the period of this study. Although those fishers still maintain their rights of accessing their territory and its resources, they have been under the threat of losing their rights as soon as there are resources to be used for community relocation. This is the case unless the policy adopted by the new Chico Mendes Institute revises the mandate of National Parks and finds a mechanism to establish partnerships with the local population towards a co-management arrangement. This is the option which we strongly recommend, as is also consistent with the SNUC approach.

The current policy of excluding the local population from the protected area disregards their rich traditional ecological knowledge mirrored in resource management strategies adapted to the local environment. Those strategies not only allow for controlling resource exploitation but also maintain the cycle of opening and closing the Peixe Lagoon's mouth, creating the appropriate conditions of habitat for migratory bird and marine species – the very object of the conservation effort.

In addition to the benefits of maintaining locally devised resource management strategies, there are a number of other reasons for the inclusion of the traditional fisher communities in protected area management. The legislation of Brazilian protected areas requires that local people provide inputs for the governmental decisions which affect them. There are also several practical advantages of furthering a participatory management in the Peixe Lagoon National Park, such as maintenance of the local culture and traditional knowledge, minimization of opposition against protected area and prevention to unnecessary expenses.

The creation of a partnership which encompasses environmental conservation and local sustainable development could be the solution for the current conflict. However there are significant barriers for the establishment of a participatory management for the protected area. Those are hard to overcome as they are related to values and mindsets of the fishers and the environmental agency officials as well as historic difficult relationships.

For the establishment of a participatory approach to protected area management, it would be necessary to develop working relationships and to further reciprocal trust among the interested parties, including the traditional population and environmental agency staff. For participation to be meaningful, fisher communities should be enabled and prepared to negotiate with new Chico Mendes Institute at the same level. For that, it is essential that those communities create linkages with neighbour communities and external organizations. Our study concludes that the success of protected area implementation depends on the establishment of strategies which integrate

environmental conservation with the provision of the means for the maintenance of local culture and livelihoods.

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TABLES

Table 1: Types of Brazilian protected areas and their main purposes and characteristics (Brazil 2000)

Types of protected areas	Main purpose	Examples
Group I: conservation units of integral protection	Environmental preservation, without direct use of natural resources	National Park
		Biological Reserve
Group II: conservation units of sustainable use	Environmental conservation combined with sustainable resource use	Extractive Reserve
		Reserve of Sustainable Development

Table 2: Resource management strategies devised by Peixe Lagoon fishers

Management strategy	Brief description	Years
Control of fishing spots	Fishers protected their own fishing spots in the ocean and Lagoon channel	Since the 1980s
Lagoon mouth annual opening	Knowledgeable fishers indicate the way to open it, allowing fishing species to enter the Lagoon from the ocean	Since 19 th century
Pink-shrimp fisheries closures	Fishers voluntarily agree to stop fishing for two weeks, the necessary time for the shrimps to reach commercial size	2001, 2002 and 2004

**Table 3: Peixe Lagoon fishers' agenda in regards to the protected area
(The values are presented in percentage)**

<i>n</i> = 36	Top priority	Very important	Important	Not important	No answer
Fishing inside the park	100	0	0	0	0
Better conditions for the park area	66.7	19.4	5.6	0	8.3
Living inside the park	63.9	25	11	0	0
Participating in fisheries management	61.1	33.3	5.6	0	0
Fishers' sons be allowed to fish	50	27.8	8.3	13.9	0
Participating in park management	19.4	22.2	25	27.8	5.6
Ability to increase fishing effort	13.9	27.8	36.1	22.2	0
Having alternative sources of income	2.8	25	33.3	38.9	0

Table 4: Factors hindering the establishment of participatory management

Factors external to fisher communities
Unwillingness of government to share management power
Rigidity of National Park status and difficulty in changing status
Factors related to relationships
An history of conflicts interfering with trust and reciprocity
Lack of institutional support and insufficient connection with partners
Factors internal to fisher communities
Peixe Lagoon fishers are not a monolithic entity, presenting certain conflicting interests
Difficult community organization and leadership
Fishers mindsets not quite appropriate for participation

Figure 3: Backhoe opening a ditch to connect the lagoon to the sea



Figure 4: Mullet fishery in the Peixe Lagoon

