

# **Common property rights: a methodological approach for marine extractive reserves in Brazil<sup>1</sup>**

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## **1. INTRODUCTION**

One of the premises of neoclassical economics is that since markets are self-regulatory their efficiency can only come from free markets. Therefore, it is necessary for property rights to be clearly defined and fully guaranteed. Nonetheless, for many goods in an economy, such property rights are not readily defined and for this reason the market fails in providing such goods. In the case of most common property natural resources access is free to any user and this lack of definition of property rights is at the root of environmental problems. Fishing resources are an example of resources widely used in discussing property rights. The fact that they are commonly owned and freely accessed resources makes the market solution difficult, such that it is necessary for the government to intervene or the concept of communal property to be implemented.

Even so, management of resources through common property rights does not emerge spontaneously; rather, it is a social construct, an institutional arrangement among the interested parties. Elinor Ostrom (1990) stresses the fact that there is collective action behind each such arrangement. In other words, common property rights may be a solution, but it is one that requires the building up of institutions, systems of rules and norms that are accepted and respected by all concerned. OSTROM et al (2002) argue that the institutions are the rules that people develop to specify "what to do and what not to do" in relation to a particular situation. As regards commonly owned resources, the institutions define rules as to who has access to a determined resource, what the resources are, how they can be used, and who participates in the key decisions regarding these issues and the transfer of rights and duties with respect to others. The stimulus for change in institutional arrangements has frequently been the struggles for distribution of resources. Several types of institutional arrangements have been created to try to reduce the problems of excessive use and over-exploitation, as well as distributional conflicts (GUTBERLET et al 2007).

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Such institutions are understood here as “*the rules of the game in a society or, more formally, ... the humanly devised constraints that shape human interaction. In consequence, they structure incentives in human exchange, whether political, social, or economic*” NORTH (1995, p.1). Institutions are important to the extent that they define the conditions under which transactions are carried out. The more or less efficient allocation of the resources will depend in good measure on the institutional arrangements in place and the distribution of ownership rights among users.

The management of commonly owned resources requires effective answers for collective actions. Hence, the larger the physical space occupied by the resource, the greater is the number of users dependent upon the benefits of using those resource, the spatial effects of the technology applied to such resources and the resultant externalities, both positive and negative, will also all be larger. Under such circumstances, the requirements for strategies of collective action to promote the adoption of large-scale technologies, for example, and the practices for natural resource management are generally greater. Institutions for collective action cannot only facilitate the management of common resources but also have to include inter-community dialogue and conflict resolution. This does not mean that the costs of association, monitoring and enforcement for collective action do not increase with space, but that the costs of coordination, as well as the losses of efficiency in managing common resources on a large scale, up to a determined level or size, will frequently bring down other costs, making collective action an economically superior alternative, at least in terms of costs and social benefits (BERKES et al, 2001).

In light of what has been set out above, the objective of this study is to analyze the categories of property rights for the management of commonly owned resources, highlighting their importance for the management of fishing resources in particular. To such end, we will present in a detailed manner the division of such rights according to the categorization developed in the seminal work of SCHLAGER & OSTROM (1992), namely: “*access, removal, management, exclusion and disposal rights.*” The authors in question argue further that “*the performance of property-rights regimes in field settings needs to be compared to other regimes in field settings. No real-world institution can win in a contest against idealized institutions*”.

Our case study focuses on the Marine Extractive Reserve of Arraial do Cabo in Southeastern Brazil, a Sustainable Use Conservation Unit based on an institutional arrangement that involves the co-management of fishing resources. Considering its characteristics, it is believed that the establishment of well-defined rules is fundamental for the success of managing this Conservation Unit.

## 2. THE CONTEXT OF FISHING

The world-wide crisis in the fishing industry is contested by some researchers and governments who state that there is no overall drop in catches. Nevertheless, with the collapse in the catch of commercially valuable species, pressure has been brought to bear on stocks of fish species previously discarded commercially. In the striving to increase (or maintain) the catch levels, there has been an increase in fishing efforts. Thus, leveraged among other issues by biological problems of scarcity of resources, problems of a social and economic nature have arisen in the Brazilian artisanal fishing industry that, in order to be overcome, require effective fishing management.

The United Nations Food and Agricultural Organization (FAO SOFIA report, 2010, p. 7) calculated that in 2008, 44.9 million people worked in fishing and aquaculture worldwide. Given that each worker in the fishing industry has an average of three dependents or extended family members, this represents a total of 540 million people who depend on fishing and aquaculture for their survival, which means 8% of the world's population. Catching fish directly accounts for 53% of world production, with artisanal fishing representing fully 70% of this total. According to the latest statistics available for 2008 and 2009, catching fish (marine and inland) accounted for 69% of the total in Brazil. According to the General Fishing Register (RGP) of the Fishing and Aquaculture Ministry (MPA, 2010), in 2009 there were 833,205 professional fishers in Brazil.

Insofar as biological aspects are concerned, according to the FAO (SOFIA Report, 2010, p. 8), the larger part of the total populations of the ten principal fish species, which add up to a total volume of 30% of world production, are fully exploited or even over-exploited, which means there can be no expectations for a significant rise in catches thereof. Further according to FAO (SOFIA Report, 2010, p. 8): *it is estimated that in 2008 15% of the groups of populations monitored by FAO were under-exploited (3%) and moderately exploited (12%) (...). It is estimated that over half the population of fish (53%) was fully exploited and, therefore, catches thereof have either reached or are near to reaching their sustainable maximum yield, without expansion. The remaining 32% are considered under-exploited (28%), exhausted (3%) or being replenished (1%) and, accordingly, their production is below their maximum potential production. Due to the excessive pressure of fishing, such species need plans for replenishment. This combined percentage is the highest in the series and for this reason cause for concern.*

In Brazil, the problems related to over-fishing are also evident. According to the Special Secretariat for Aquaculture and Fishing (SEAP/PR, 2003, p. 11), a federal agency that reported

directly to the President of Brazil and as from 2009 became a full-fledged Ministry (Ministry of Fishing and Aquaculture – MPA), the fishing industry is responsible for generating approximately 800,000 direct jobs and contributing to 0.4% of the nation's GDP. Nonetheless, with respect to the social and ecological aspects of fishing in Brazil, recent studies indicate that over 80% of the principal stocks of maritime coastal fish have reached a level of full exploitation, above the sustainable level or even at the stage of exhaustion. A wide array of conflicts is noted, both between industrial-scale and artisanal fishing, and different types of fishing operations, as well as between different uses of water, besides out-of-date legislation and lack of inspection, all of which combined encourage clandestine activities in the production and sale of fish (SEAP/PR, 2003, p: 11; GUTBERLET et al., 2007).

Attaining a sustainable level of fishing exploitation in Brazil depends to a great extent on the initiatives of the federal government. In Brazil, the government intervenes in the industry by providing incentives for renewal of the fishing fleet, as well as subsidizing diesel oil for fishing vessels. In this sense, there are two problems to be considered: 1) besides benefiting a single segment (industrial to the detriment of artisanal methods at the individual or collective level); 2) pressuring even more the fish stocks. This pro-development approach adopted by the Ministry of Fishing and Aquaculture (MPA) is not in line with the conservation policy adopted by the Ministry of the Environment. They are two different ministries with distinct and at times antagonistic objectives. Further exacerbating such social and economic problems, there is also the dependency of free-lance fishers on intermediaries (or profiteers) to distribute their catch, as well as the problems with the growing tourist real estate industry that squeezes fishers out of the bases for their activities – the beach and the sea.

### **3. PROPERTY RIGHTS AND MANAGEMENT OF COMMON RESOURCES**

According to BROMLEY (1991, p. 15), property rights can be defined as “*the capacity to call upon the collective to stand behind one's claim to a benefit stream*”. In talking about property rights over resources that are used in common, it is useful to employ the legal perspective of pluralism, recognizing that there is not just one legal system that applies, nor a simple division between rules of law (statutory), and of fact (local practice). Hence, consideration should be given not just to the normative and legal structures to institute property rights, but also habitual and religious laws, and even local norms, and to delegate responsibilities to the users for correct management of the natural resource in question.

BROMLEY and CERNEA (1989) apud BERKES et al (2001) attest that failure in the management of commonly owned resources also occurs when the property rights of

the community are challenged by outsiders, including in certain cases the State (for example, nationalization of pastureland and forests), and in response to market forces, political intervention and other institutional and technological forces that weaken the institutions controlling the resource. It is of the utmost importance to consider these aspects in decision-making, since the difficulties associated with the establishment of ownership rights over natural resources of common use are at the root of environmental problems.

It is possible to note a consensus among the authors who have studied the exploitation of fishing resources to the effect that the principal cause of the over-scoping of fishing efforts is the lack of definition of property rights. Even so, as is highlighted by OSTROM et al (2002, p. 24-25), there is considerable scientific uncertainty as to how the various ownership systems and associated institutional forms affect the sustainability of resources. The knowledge available strongly suggests that the search for a single strategy for the management of commonly owned resources is useless. The best tool for sustainable management of a commonly owned resource depends on the characteristics of the resource and the users. The consensus among researchers is that evolution is slow and that multiple institutional strategies are necessary, given the enormous diversity of ecological, economic and social aspects. Substantial ingenuity is required to design institutions that deal effectively with the attributes of a particular resource, such as political conditions, culture and economic environment in which this resource is incorporated.

As pointed out by CORIAT (2010), notions of law and property are deconstructed and seen as resulting from combinations of individual and collective attributes guaranteed by a web of formal and informal rules that should be identified and analyzed. Ownership is therefore not associated with a single right, but rather is dependent on a set of rights of different degrees (guaranteed by law, common law, allowed in practice).

The terms "rights" and "rules" are frequently used as synonyms in referring to the use of natural resources. Clarity in the analysis is reinforced by the recognition that "rights" are the product of "rules" and thus are not equivalent to rules. "Rights" refer to determined actions that are authorized. "Rules" refer to prescriptions that create authorizations. The right of ownership is the authority to engage in specific actions related to a specific domain (COMMONS, 1968 apud SCHLAGER and OSTROM, 1992). For every right that an individual has there are rules that authorize or require particular actions in the exercise of such ownership right. Having a right entails that someone has a proportional duty to observe such right. Thus, rules establish rights and duties. Property rights are normally divided into: free access, private property, state property and common property. When we deal with fishing resources, we have the latter category.

## *Common property*<sup>2</sup>

In this case, resources are managed by an identifiable community of inter-dependent users. Such users exclude the action of outside individuals, at the same time as they regulate use by members of the local community. Internally, insofar as the community is concerned, the rights to the resources are normally not exclusive or transferable, but rather often egalitarian in relation to access and use. Some inland fishing areas, pastures and forests have been managed as common properties. The group's rights can be legally recognized. In other cases, such rights are recognized in fact, depending on the benign negligence of the State (FENNY, *et. al.*, 2001, p. 21).

For POMEROY and RIVERA-GUIEB (2005, p. 13-14):

*“... common property regimes as collective resource management systems have been shown to develop when a group of individuals is highly dependent on a resource and when the availability of the resource is uncertain or limited (RUNGE, 1992). If the resource problem is repeatedly experienced, such as low or no catch, and if it exists within a single community of users, the fishers are likely to develop a collective institutional arrangement to deal with the problem. Institutional arrangements are sets of rights the fishers possess in relation to the resource and the rules that define what actions they can take in utilizing the resource. In the face of uncertainty in resource availability, fishers are more willing to group together to trade-off some benefit from individual use of the resource for the collective assurance that the resource will be used in a more equitable and sustainable manner (GIBBS and BROMLEY, 1992).”*

Under common property regimes, exclusion means the ability to exclude people that do not belong to a defined group. Evidence suggests that the success of processes of exclusion in the case of common appropriation are more the rule than the exception, but the stress of population growth, technological changes and economic shifts can contribute to the de-structuring of the exclusion mechanisms adopted (VIEIRA et al, 2005).

In relation to common property resources, the most relevant ownership rights at the operational level are the “access” and “extraction” rights, which are defined as follow: 1) *Access*: the right to formulate a definition of physical property, and 2) *Removal or Extraction*: the right to obtain "products" from a resource (for example, the catching of fish).

The individuals who have access and the possibility of removal may or may not have more extensive rights that authorize their participation in the choice for collective action. It is here that the distinction between rights at the operational level and at the level of collective choice becomes crucial – at the fundamental level it is the difference that exists between having a right and participating in defining the future rights to be exercised. The authority to plan the future in operational level rights is what makes the rights to collective choice powerful. In

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<sup>2</sup> This item uses to a great extent the conceptual analysis of property rights based on the work of SCHLAGER and OSTROM (1992). The full reference is contained at the end of this study in the bibliography.

relation to commonly owned resources, property rights for collective choice include Management, Exclusion and Disposal. They are defined as follows: 1) *Management*: translates into the right to regulate the standards for use, transformation and improvement of the resource; 2) *Exclusion*: determines who has the right of access and how it can be transferred; and 3) *Disposal*: capacity to sell and/or lease the previous rights.

The right to Management translates into the right to regulate the standards for use, transformation and improvement of the resource. Therefore, the individuals who have this right are authorized to determine who can catch, how they can catch and when they can catch fish, and when and how the structure of the resource can be altered. For example, a group of fishers who establish several types of fish-catching activities in a determined zone are exercising their management rights.

The right to Exclusion is determining who has the right of access and how it can be transferred. It is thus a right of collective choice that authorizes the members to establish operational access rights. The people having such rights have the authority to define the qualifications that individuals must have in order to gain access to the resource. For example, when a set of fishers limits the access to fishing boats to colleagues as from a certain age, or to people using a certain type of technology, then they are exercising their exclusion rights.

Disposal is capacity to sell and/or lease the other rights. Thus, the right of Disposal permits transfer of all or part of the entire rights held by an individual or group. Exercising this right means selling/leasing the management and/or exclusion rights. The right to Disposal refers only to the authority to dispose of the rights of collective choice.

TABLE 1 - BUNDLES OF RIGHTS ASSOCIATED WITH DIFFERENT POSITIONS

	Owner	Proprietor	Claimant	Authorized user
Access/Removal	X	X	X	X
Management	X	X	X	
Exclusion	X	X		
Disposal	X			

These five ownership rights, or bundles of rights, are independent of each other, even though in relation to fishing they can be bundled in different or cumulative forms, as shown by SCHLAGER and OSTROM (1992) in Table 1 copied above. The possible combinations of situations can function as a conceptual analysis chart for the study of the different types of fishing based on their institutional situation.

The development of effective systems of property rights for the management of coastal fishing is extraordinarily difficult regardless of the type of regime of property rights that is

adopted (JOHNSON and LIBECAP, 1982; BUCK, 1988 apud SCHLAGER and OSTROM, 1992). As far as these authors are concerned, instead of blind faith in private property, in common property institutions or in governmental intervention, students of the subject need to have a greater comprehension regarding: (i) the conditions that increase or decrease based on the emergence of more efficient regimes of property rights related to various resources; (ii) the stability or instability of these systems when challenged by various types of exogenous or endogenous changes; (iii) the costs of enforcing norms that are not in accordance with the people involved; and (iv) the performance of property-rights regimes in field settings needs to be compared to other regimes in field settings. As the authors state, no real-world institution can win in a contest against idealized institutions.

#### **4. ARTISANAL FISHING AT RESEX-MAR IN ARRAIAL DO CABO <sup>3</sup>**

The municipality of Arraial do Cabo (literally Cape Fishing Village) is located in the shoreline lowlands in the north of the State of Rio de Janeiro (RJ), in southeastern Brazil. According to the decree that created it, Resex-Mar encompasses a fishing belt between the Massambaba and Pontal beaches near the municipal border line with the City of Cabo Frio, including the marine strip of three miles from the coast. The stated purpose of Resex-Mar is to “*guarantee the self-sustainable exploitation and conservation of renewable natural resources traditionally used for artisanal fishing by the local fishing (extractive) population of the Municipality of Arraial do Cabo*” (Art. 2).

Owing to the phenomenon of upwelling (“*Ressurgência*”), this region constitutes the most important area for the breeding, reproduction and feeding of most of the fish that inhabit the southeastern waters of Brazil. According to the Brazilian Institute of Geography & Statistics IBGE (2010), the population of Arraial do Cabo is approximately 27,770 inhabitants, all residents of an urban area measuring 152 Km<sup>2</sup>, with an age profile concentrated in the 30-39 and over-50 age brackets. The town has an average human development index (IDH) of 0.790, holding 14<sup>th</sup> place in the ranking of the State of Rio de Janeiro. In 2010 it posted a gross domestic product (GDP) of R\$ 328,840,000.00, making it the next-to-last place in the ranking of the state’s shoreline lowland region (which features very wealthy towns and cities devoted to tourism and oil and gas production).

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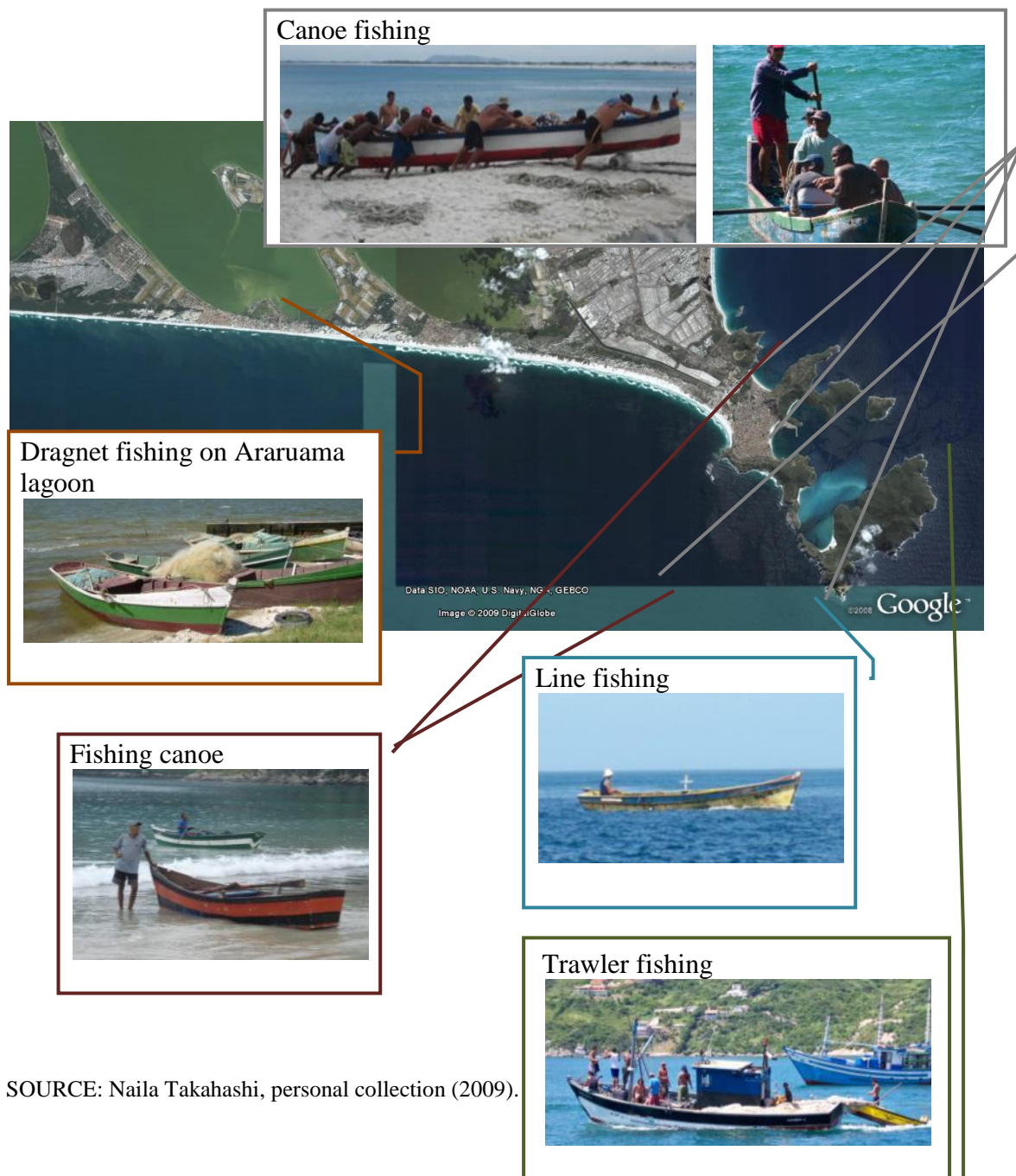
<sup>3</sup> The data presented here is based on the survey of primary and secondary data compiled in the first quarter of 2008 by the authors in the context of the Rio de Janeiro Federal University Graduate Research and Engineering School’s Resurgence Project – Sustainable Fishing Village Network (*Projeto Ressurgência – Rede Arraial Sustentável COPPE/UFRJ*).



There are no precise figures on the number of fishers, though according to the Z-5 fishing “colony”, the estimate is that there are around 1,500 people engaged in fishing activities. As regards fish production, the average catch is roughly 2,000 metric tons per year. The artisanal or small-scale fishing communities are located near the beaches surrounding the urban region: Praia Grande, Praia dos Anjos (where the Public Fisherman’s Marine is located), the Lighthouse Island Beach (Praia da Ilha do Farol), Prainha, Praia do Pontal, Monte Alto and Figueira beaches (COPPE/UFRJ, 2008).

The following photographs show the main fishing spots in the town and the type of vessels used in each location:

### LOCATIONS AND TYPES OF FISHING IN ARRAIAL DO CABO – RJ



SOURCE: Naila Takahashi, personal collection (2009).

On average, the Resex-Mar fishers are men between the age of 20 and 45 (some women devote themselves to gathering shellfish and line fishing), have not finished high school and have average monthly incomes of twice the local minimum salary<sup>4</sup>. Besides their retirement supplement, some complement their income by working in the building trades, general services and tourism (sightseeing boat trips, mainly, in this very touristy region). Since fishing is traditionally a hand-down activity, the individuals begin very young and learn the tricks of the trade from their elders. Nevertheless, the younger fishers state that they engage in the trade due to lack of other job opportunities or owing to their lack of schooling.

### ***Target species, manners of working, selling and technology employed***

The main species caught at the fishing village are as follows: blue fish, anchovy or tailor (known locally as “*enchova*”), spade (“*espada*”), victor fish or oceanic bonito (“*bonito*”), fiddler-fish (“*cachorro*”), blue runner (“*xerelete*”), true sardine (“*sardinha verdadeira*”), painted victor fish or oceanic bonito (“*bonito pintado*”), another kind of victor fish or oceanic bonito (“*serra*”), Brazilian mullet (“*tainha*”), dorado (“*dourado*”), small mackerel (“*cavalinha*”) and sandperch (“*namorado*”). Squid have been rising in importance in recent catches, even attracting fishers from outside the community, since it is a good alternative in summer months. It is important to record here that in the survey conducted in 2008 a shift was noted in the species caught, resulting in the decline in the stocks of the more commercially valuable ones and the revaluation of species abandoned for some time (COPPE/UFRJ, 2008).

The local “Capetown” fishers work in fishing “companies”, which vary according to the type of vessel and mode of fishing, with 2 to 4 fishers heading out in smaller vessels and more than 10 in trawlers. Most of the fish caught is sold as is to local middlemen, that is, without adding value to the product. The degree of dependence of the fishers in relation to these unscrupulous merchants is high. As fish is a highly perishable product, and they have no equipment of their own to preserve their catch, they wind up having to sell out to the profiteer at whatever price the latter sets. This relationship of subordination is reinforced by the loans made by the intermediaries to the fishers, such as the supply of gas used in fishing for squid, and diesel oil for the vessels, and the fact that the means of production like fishing tackle and vessels are for the most part owned by the middlemen.

Another fundamental characteristic of small-scale fishing is the low technological level. The main arts of fishing are fishing line, paternoster line, various kinds of fishing nets (such as

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<sup>4</sup> In the period the survey was conducted (1st quarter of 2008), the monthly minimum salary was R\$ 380.

dragnets, shrimp nets and trawling nets). The types of vessels are as follows: skiff, dinghy, canoe, trawler, mid-rowing boat and ketch. Most of them have engines, but few have such equipment as radios and depth gauges.

## **5. INSTITUTIONAL ASPECTS OF THE RESEX-MAR IN ARRAIAL DO CABO**

As described, the Resurgence Project (Resex-mar) at Arraial do Cabo contemplates the town's urban area. This characteristic makes management more difficult since there are many interacting and in many situations conflicting economic activities and interests. Although created in 1997, only in 2010 was the Steering Council legally set up (through Administrative Rule No.77 of August 27, 2010) to draw up the Management Plan for Resex-Mar. According to the administrative rule, the steering council will be made up of 12 governmental institutions (from all three branches of government) and homeowners associations, as well as 13 associations and legal representatives of the fishing community. The fact that the steering council members number a total of 25 indicates the wide-ranging set of interests that have to be intermediated in order to come up with a Management Plan acceptable to all.

According to KALIKOSKI (2007), a marine extractive reserve is an institutional arrangement that has a direct effect on redistribution of territories, use and exclusion rights that, if they are done in an exclusive manner, disregarding traditional fishing communities, can directly affect their means of subsistence and ways of life. As far as PINTO DA SILVA (2007, p. 160) is concerned, the important thing in the co-management process is the recognition and the legitimacy of systems of management at the local, informal or traditional level, and the participation of users in the management of natural resources. Therefore, in managing Resex-Mar, users of the local resources should participate in the decision-making process and guarantee implementation and feasibility of the decisions. When we analyze the Arraial do Cabo Resex-Mar in light of these premises, we can see that the attributes of legitimacy and community participation, although on the rise in recent years, still fall short of being fully effective. We shall illustrate this argument by presenting some results produced by the diagnosis conducted in 2008.

### ***Resex-Mar from the viewpoint of Arraial do Cabo fishers***

The survey conducted in 2008 involved a wide-ranging diagnosis of the socio-environmental world of Resex-Mar in Arraial do Cabo from the viewpoint of artisanal fishers, and was aimed at contributing to expanding their participation in the making of decisions regarding the management of the reserve. Using varied techniques, such as semi-structured

interviews, mappings and focus group workshops (fishers, children of fishers, government, NGO's), the field work involved 18 persons on scholarships who were students of the Federal Institute of Professional Education, with strong links to artisanal fishing (they were either children of fishers or had fishers in their family). As part of this research project, they were trained in participative techniques so as to be able to apply questionnaires to 514 local fishing families. The questionnaire was structured around three axes: profile of the fisher, the work of fishing and perception of the Arraial do Cabo Resex-Mar. During the entire process, the students were accompanied by the researchers, in order to form a qualified and homogenous research group. The fact that such students lived the reality of local artisanal fishing was fundamental for accessing the knowledge retained by the fishers. As extolled by Thiollent (2002) and Brandão (1981), in discoursing on the exploratory phase of the participative action survey, this takes shape through the procedural involvement of the subjects in the reality investigated in the planning and carrying out of the investigation oriented to resolution of their own problems. Moreover, such participation opens up possibilities for democratization of knowledge (Powell & Colin, 2009).

In the community mapping carried out during one of the three workshops with the students, we identified important spaces for the fisher relating to access to marine natural resources and protection thereof in terms of quality/quantity and spaces where there is interference in fishing due to environmental degradation (chiefly linked to water quality), expansion of human activity (real estate speculation along the coast, rise in the number of boats, etc.) or structural changes in the local economy (closing down of industries, expansion of tourism, etc.). This exercise permitted listing of the topics that most influence management of the reserve.

Community mapping is one of the principal participative techniques, since it generates a product at the end of the process, which is a chart or map (Amsden & Van Wynsberghe, 2005; Glöckner, Mkanga & Ndezi, 2004). It also serves as a participative education tool, as it makes people dialogue with others who have different views so as to arrive at a common understanding. During the workshop conducted with the students, a semi-structured interview was jointly developed that was first tested in a pilot application and then applied apart in the world of the local artisanal fishers. The questionnaire contained 52 closed and open questions distributed according to the following topics: profile of the fishers, activity and production of current artisanal fishing, and also their perceptions regarding the Arraial do Cabo Resex-Mar. The following is a discussion of the results relating to the latter topic.

Although there was a period of 11 years between the time Resex-Mar was founded and the survey period, the persons interviewed stated that they did not participate in management thereof, with 55% not even knowing about the existence of the conservation unit. Demarcation of the marine area did not even have a cognitive representativeness for persons engaged in coastal extractive activities, i.e. the artisanal fishers who fish its entire length. However, those who replied that they knew of the reserve stated its importance in terms of inspection and, accordingly, protect the fish stocks (“... *it [Resex] will generate more fish*”, “... *it may improve inspection and no longer permit the dragnets and trawlers that come from outside*, “... *it will make inspection increase so that outside people don't come in and catch our fish*”).

The lack of belief as to the possibility of achieving some benefit for fishing is greater, however: more than two-thirds (68%) of the persons interviewed stated that Resex-Mar does not benefit artisanal fishing and only less than one third (32%) admitted the possibility of some benefit. Around 25% of the interviewees expressed particular frustration regarding the lack of inspection and environmental protection for the Resex-Mar, concluding that “*it brings no benefit because it doesn't work yet*” and because “*there's no inspection*”, though they recognize that if the laws were enforced, it would be beneficial “*because there would be more fish on all the beaches of Arraial do Cabo*”.

The high level of lack of faith in the Resex-Mar obliged the survey to get further into determining the reasons for which the fishers felt themselves absent from a process that deals with their livelihood, since the extractive reserve category presumes shared management. The lack of control over predatory fishing was pointed out by the interviewees as being the biggest problem in the region, since it affects the stocks of fish and thus harms the very survival of the fishers. One of the interviewees summed up what other fishers likewise expressed: “*...it would be very important if it worked effectively*”.

## **6. FINAL COMMENTS: THE PARADOX OF MARINE EXTRACTIVE RESERVE**

Paradoxically, when asked if the reserve had any problem, most of the fishers interviewed said no, although some recognized that the lack of inspection generated a “mess”, since there are other activities competing for the use of the space formally reserved for fishing, among them, sightseeing, diving and sport fishing. The presence of the oil and gas giant Petrobras was also the target of criticism, since it anchors some of its rigs in the reserve area to make repairs. On the other hand, it contributed to reducing the shortage of job opportunities, even to the point of directly hiring several fishers.

Another angle of this paradox was revealed in the answer to the question as to how the fishers could contribute to improving management of the reserve. Even though 2/3 of the interviewees who stated they knew of Resex-Mar – that is, half of the total fishers of Arraial do Cabo – replied that they could contribute to enhancing its management, accepting the application of stricter rules regarding the use of the resources, only 30 fishers (about 10%) stated they knew about the Utilization Plan for the reserve's resources that is contained in the decree that created it. To these we have to add the remaining 1/3 who said they could not contribute.

A few fishers expressed their frustration at the populist style assistance that has made a pact of silence one of its central characteristics, as observed in the following statements: *“it gets you nowhere to ask for anything, because it'll get you nowhere”*; *“the fishers are forgotten and they do nothing for them”*, or *“it is hoped that the fishers will be helped”*.

As we described, the management of the Marine Extractive Reserve of Arraial do Cabo is marked by conflicts among users, lack of clear rules and precarious control and monitoring. Besides, the local institutional arrangements did not incorporate the basic principles of co-management due to the difficulty of extending to all traditional resources users in the reserve the same property rights and common resource uses, since this is a small area, located in an urbanized coastal zone, with a high and diverse number of users (VINHA, 2010).

Even though the literature on the subject indicates that there are protected marine areas where shared management works, this equation does not apply everywhere (CASTELLO, 2008), mainly in areas undergoing massive intensification of the pressure exerted on the resources by a large number of different users like Arraial do Cabo. Given this, we can conclude that a marine extractive reserve is not always the most appropriate institutional format for establishing common property rights based on strict rules, which are essential for defining the uses of territory and the limits for exploitation thereof. As we discussed in topic 3, the best tool for sustainable management of a commonly owned resource depends on the characteristics of the resource and the users (OSTROM, 2002; CORIAT, 2010).

Furthermore, property rights that either do not exist or have been established in an inadequate manner give rise to externalities that compromise the efficient use of the resources. According to FURUBOTN and RICHTER (2000), the costs of defining, monitoring and enforcing private property rights over resources, or internalizing external effects, may be very high, which requires some form of collective action. Therefore, the adequate use of resources depends on rules that regulate their use and the legal recognition of common property rights.

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