INTERFACE BETWEEN ECONOMICS AND LAW IN THE DEBATE ON PROPERTY RIGHTS FOR COMMON RESOURCES: THE CASE OF RESEX-MAR FOR FISHERIES CO-MANAGEMENT IN BRAZIL

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Abstract

Artisanal fisheries constitutes an important economic and social activity in Brazil, constituting upwards of 50% of overall fish catches, being more expressive in certain parts of the country, such as Northern and Northeast Brazil. However, over the years, this sector has been struggling in economic, social and environmental aspects. Therefore, one of the alternatives to address these problems was the establishment of participatory management schemes (or co-management). In Brazil, one alternative put in place for the co-management was the creation of Marine Extractive Reserves. In this form of co-management both government and fishing communities are involved in the decision making process. Despite being pointed out as a more democratic form of management, given that management was previously carried out in a top-down manner by the Brazilian Government, the Marine Extractive Reserves need to mature in order to achieve an effective co-management of resources. To analyze co-management in Marine Extractive Reserves, the theoretical framework used in the research will be the literature on institutions, with the contribution of the different institutionalist schools in the debate on Property Rights and the Theory of Common-Pool Resource Management, focusing on the analysis of assumptions for success of co-management from the work of Elinor Ostrom.

1. INTRODUCTION

One of the premises of neoclassic economics is that since markets are self-regulatory their efficiency can only come from free markets. For this, it is necessary for property rights to be clearly established and fully guaranteed. Nonetheless, for many goods in an economy, such property rights are not readily established and for this reason the market fails in providing such goods. In the case of most common property natural resources access if free to any user and this lack of definition of property rights is at the root of environmental problems. Fishing resources

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are a class of resources widely used in discussing property rights. The fact that they are commonly owned and freely accessed resources makes a market solution difficult, such that it is necessary for the government to intervene or the concept of *communal property* to be adopted.

Theories of collective action, property rights and commons developed up to the mid-twentieth century, notably the work of Garrett Hardin on the "Tragedy of the Commons" (Hardin, 1968), emphasized that the over-exploitation of common natural resources is inevitable, the most viable alternative being privatization or state control (Poteete, Janssen & Ostrom, 2011). These approaches did not recognize the possibility that resource users could have collective rights to control resources in a sustainable manner. Hardin (1968) was consistent with the economic theory of property rights. However, his analysis improperly equated common property with the absence of unique and effective rights, which inevitably leads to inefficient use, degradation or depletion. Furthermore, with regard to collective action - strongly supported by Mancur Olson in his 1965 work titled "The logic of collective action" - the management of shared natural resources evinced a social dilemma. In these circumstances, each individual expects to limit her costs while benefiting from the contributions of others, which Olson termed "opportunism". If a person cannot be excluded from obtaining the benefits of a collective good, once the good is produced, she will have little incentive to cooperate voluntarily toward the provision of this good. In Olson's words (1965, p. 1)

> *The view that groups act to serve their interests presumably is based upon the assumption that the individuals in groups act out of self-interest. ... In other words, if the members of some group have a common interest or objective, and if they would all be better off if that objective were achieved, it has been thought to follow logically that the individuals in that group would, if they were rational and self-interested, act to achieve that objective.*

Such situations are dilemmas because at least one of the results generates higher profits for all participants, but nothing guarantees that all participants will achieve this result. Thus, social dilemmas involve a conflict between individual rationality and the best results for a group. Despite this mainstream analysis, case studies challenged the conventional wisdom and inspired theoretical refinements related to property rights and the prospects for collective action, Poteete, Janssen & Ostrom (2011, p. 54). This refinement pointed out that collective action can be effective given relevant contextual conditions, ecological factors affecting resource productivity, the socio-political and economic structure and institutional arrangements.

Even so, management of resources through common property rights does not emerge spontaneously; rather, it is a social construction, an institutional arrangement among the interested parties. Elinor Ostrom (1990) stresses that there is collective action behind each 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 is and how it can be exploited, and who participates in the key decisions regarding these issues and the transfer of rights and duties with respect to others. The stimulus for changes in institutional arrangements has frequently been 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 distribution conflicts.

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 established and the distribution of ownership rights among users.

The management of commonly owned resources is capable of requiring effective answers for collective action. Hence, the larger the physical space occupied by the resource is, the greater the number of users dependent upon the benefits of using such resource, the spatial effects of the technology applied to such resources and the externalities caused, both positive and negative caused, will all be. Under such circumstances, the requirements for collective action strategies intended to foster the adoption of large-scale technologies, for example, and the practices for management of the natural resource are generally greater. Institutions for collective action cannot only facilitate the management of common resources but also 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*"Based on this conceptual review, we apply these concepts to the case of the Marine Extractive Reserves (Resex-Mar) - sustainable use protected areas that represent an institutional arrangement for co-management of fisheries resources in Brazil. Given the characteristics of Resex-Mar, it is believed that the establishment of well-defined rules are critical to the successful management of this type of protected area.

2. 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 that control 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 the 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 depends on a set of rights of different degrees (guaranteed by common law, or 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 buttressed by 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.

In the case of the Marine Extractive Reserves in Brazil, legal property rights in these territories are well defined in state hands. However, their management is through a process of co-management, where management decisions are carried out not only by the state (via the Chico Mendes Institute for Biodiversity Conservation-ICMBio) but take into account the voice of the various segments of those communities who use these natural resources. Despite this co-management format having superseded the "top down" approach that reigned in the country up to the 1990s, observed in the case studies reviewed here, this strategy has been insufficient to ensure the sustainability of the commons. This is true because the Brazilian state does not have enough resources to provide for their technical infrastructure, as well as insufficient financingto ensure the adequate surveillance of these areas.

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.

2.1 Common property[4]

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 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

[4] This items 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.

future in operational level rights is what makes the rights to collective choice powerful. In 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 in a limited zone several types of fish-catching activities for distinct areas 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.

The case studies have shown the critical importance of the rights of exclusion, and taxes for the sustainability of shared natural resources. Conflict and environmental degradation generally reappear in the absence of effective rights of exclusion, even when users have formal rights of withdrawal or management (Agrawal, 2000; Goyal & Agrawal, 2001; Banana, Gombya-Ssembajjwe, Bahati, 2001; Twyman, 2001 apud Poteete, Janssen & Ostrom, 2011).

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.

As Poteete, Janssen & Ostrom (2011) suggest, although groups which enjoy rights of access, withdrawal or exclusion tend not to have rights of alienation, the absence of "full" rights does not preclude sustainable management. Comparison of various forms of local management of natural resources in India and Nepal suggest that effective management can occur in the absence of rights of alienation, since communities have duties imposed on withdrawal, management and exclusion, Agrawal & Ostrom (2001) apud Poteete , Janssen & Ostrom (2011).

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. Baskets of rights may vary both in extent between goods or products, or in scope as related to any particular product or good. Furthermore, the nature of who owns the rights can vary independently of a bundle of rights.

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.

3. THE CONTEXT OF FISHING

In recent decades insights regarding the degradation and depletion of coastal and marine areas has increased worldwide. International organizations such as FAO and international events such as the 10th Conference of Signatory Countries of the Convention on Biological Diversity which took place in 2010 in Nagoya - Japan, show worrisome data for these regions in relation to fisheries and their impacts.

According to FAO (SOFIA Report, 2012), around the world millions of people depend directly or indirectly on fisheries and aquaculture for their livelihoods. It is estimated that fishing and aquaculture provided livelihoods to about 54.8 million people in 2010. Of this total, it is estimated that 3.6% are in Latin America and the Caribbean. In terms of contribution to food

security worldwide, FAO estimates presented by the Ministry of Environment (MMA, 2010, p 7), show that over the past 50 years, the amount of food drawn from the oceans quintupled, while the world population doubled. Today, 10% of the calories consumed by mankind are removed from the sea; of the 200 species most suitable for human consumption, 120 are being overexploited, while 80% of major fish stocks are at the maximum exploitation level, or are depleted, overexploited, or recovering from a near collapse condition (FAO, 2009). In Brazil, this situation is no different.

Dealing with aspects linked to poverty, according to FAO (2012, p 100.): it is important to recognize the importance of small scale fisheries to food security and in reducing and preventing poverty in the developing world. However, the lack of institutional capacity and the non-inclusion of the sector in national and regional development policies hinder the possible contributions of artisanal fisheries to economic growth, poverty reduction and rural development. According to latest data, the livelihoods of about 357 million people depend directly on small-scale fishing, which generates employment for over 90% of the fishermen catch the world.

The coastal and marine constituting the Brazilian marine biome zones extend over an area of 4.5 million square kilometers, accounting for over 50% of the Brazilian territory, (ICMBio, 2012). According to the Ministry of the Environment:

> *it is an area of variable relief where you live, according to the Interministerial Commission for Sea Resources (CIRM), approximately one quarter of the population, resulting in a population density of about 87 inhabitants per square kilometer, five times the rate average of the national territory. This narrow continental shelf covers 17 states, and also concentrates 13 of 27 Brazilian capitals, some of which, metropolitan areas where millions of people live, an indicator of the high level of anthropogenic pressure on natural resources that are subject, (MMA, 2010 , p.12).*

The Convention on Biological Diversity (CBD) in 2010, of which Brazil is a signatory, established that 10% of coastal and marine areas should be on some form of protection by the year 2020. Today Brazil has only 1.54% of the marine area under some form of protection through conservation units.

The coastal region of Brazil is becoming an important area of food production through farming, fishing and aquaculture; is the focus of industrial development and transport; significant source of mineral resources, including oil and natural gas.

> *increasing human populations who live, work and enjoy these natural resources causes pressures, along with other natural character, deserve to be monitored and understood for the*

preservation of that environment and to maintain the quality of human life. Evidence of the adverse effects of human pressures is the loss of habitats, such as intertidal areas, salt marshes, mangroves, coral reefs, and other ecosystems, decline in coastal water quality and ground water, algal blooms, declining commercial and artisanal fishing, decrease in inventories of living and non-living resources of beaches, increased erosion and coastal flooding, and other pollution. Pressures integrity and environmental balance of coastal regions, due to the large use conflicts, make these one of the most endangered on the planet and conservation of these resources tends to be increasingly problematic and costly, both politically as environmental. (MMA, 2007, p. 107).

The range of activities that increasingly compete for space in the coastal zone generates great pressure on communities of artisanal fishermen along the Brazilian coast. Problems, conflicts and threats are diverse, we relate below the most recurrent in field research and bibliography: real estate speculation; urban sprawl; tourism; outdated legislation and / or deficient; conflict between fishing arrangements with unequal powers of arrest: industrial fishing and artisanal fishing, eg .; ports; oil and gas companies; navigation; lack of institutional coordination between government agencies; lack of supervision on the existing activities as well as protected areas.

The marine and coastal biome of Brazil is home to a diverse fauna, with nearly 1,300 species of fish, 19 of which are threatened with extinction and 32 in decline (ICMBio, 2012). The protected areas in Brazil are called Units for Conservation of Nature (UCs) and are managed by the Union, through organs of the Ministry of Environment. The type of UC that we analyze in this work is called Marine Extractive Reserve (Resex-Mar). Today Brazil has 22 Resex-Sea along its coast. Under Article 18 Law, Marine Extractive Reserve is:

area used by traditional extractive populations whose livelihood is based on the extraction and, additionally, in subsistence agriculture and the creation of small animals, and has as primary objectives to protect the livelihoods and culture of these populations, and to ensure sustainable use of natural resources unit (Law 9985).

As stated by PRATES (2007, p 32),

implementation of marine Resexs-Sea is related to the "empowerment" of populations of artisanal fisheries. This is because the yield using the domain part of the Union to a group of the population, the state is supporting an entirely new process of creation of public spaces and the creation and application of rules for their use. For both the fishermen are taken to prepare, in assembly, implementing rules for the use of resources, which become binding on everyone,

including the rest of the population, to be published in the Official Gazette. Actually are rules locations, but the federal level there that apply to everyone equally, unlike the legislative-judicial tradition of preparing general rules whose application always, therefore, must be adapted for each case (Kant, 1998; Brito, 1998 apud Prates, 2007).

Despite this innovative format management, the blurring of Property Rights has generated several problems in the Brazil Resexs-Mar. The pressure that have suffered the geographic regions where they operate the Resexs-Mar in the country, tends to increase due to several factors. Today, about 25% of the population lives in the coastal region of the country. In addition, the coastal economic activities are responsible for about 70% of the national GDP (MMA, 2007 apud MMA, 2007, p. 103).

Pressures integrity and environmental balance of coastal regions, due to the large use conflicts, make these one of the most threatened regions on the planet and conservation of these resources tends to be increasingly problematic and costly, both politically as environmental. Besides the environmental and political issues, add the social problems faced by fishermen in these regions resulting from use conflicts in a space where various economic activities compete.
Among these "external" to fisheries conflicts are: close to beaches real estate speculation; tourism (especially nautical tourism); port activity (for project expansion throughout the Brazilian coast); activity offshore (primarily in the Southeast), industrial activity (pollution emission of toxic tailings in estuaries, rivers and ocean); increase the cost of living with urban sprawl; urban sanitation (lack of sewage treatment); social exclusion - exclusion (violence, drugs, prostitution).

In addition, other issues that are recurrent throughout the coastal region of the country refer to "internal" to fisheries issues: low level of income and formal education: social exclusion; lack of representation by the colonies of fishermen and other organs from category: welfare More reivindicatório that character; problems with the marketing of fish / adding value to the product: lack of infrastructure for storage and / or processing of fish; dependence on middlemen: for not having adequate infrastructure for storage of fish or even financial resources to cover the costs of fisheries (the middleman in many cases they own the means of production: boats, nets, etc.); access to public sector policies (National Program to Strengthen Family Agriculture - PRONAF fishing; subsidies to diesel fuel, insurance closures, etc.): levels of requirements as guarantees of payment and required documentation impede access to public resources.

Added to this, the discontinuance of these programs occurs; dispute use of territories between modalities fishing: artisanal industrial x; lack of control of access to the use of these

territories by local artisan fishermen, causing serious conflicts between fishermen, including destruction of fishing tackle and threatens the physical integrity of artisanal fishermen; absence in some RESEX Concession Real Right to Use - CDRU.

4. FINAL COMMENTS

Although the Union has the rights of ownership of the Marine Extractive Reserves in Brazil, this category of conservation property rights are more flexible and linked to the form of co-management planned for these areas. According to the Protected Areas Law, "Extractive Reserve is in the public domain, using the traditional extractive populations granted." Thus, when analyzing the Brazilian context of Resexs-Sea on the analytical contribution of "bundles" of rights, we find that traditional communities involved in the collective management of Resexs-Mar may exercise the rights of access and withdrawal, management and exclusion. Have the right to alienation can only be exercised by the State.

However, despite the improvement in terms of management of resources for common use - as is the case of artisanal fisheries exercised in the areas of Resexs-Mar - passing the historical model "top down" to a more democratic form of management, practice so that these advances are perceived not only in terms of environmental and social and economic benefits, an effective improvement is needed in the definition of property rights, in turn generating greater institutional stability.

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