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***TRADITIONAL SEA TENURE AND COASTAL FISHERIES
RESOURCES MANAGERMENTS BRAZIL***

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INTRODUCTION

In many places in the ocean, in estuaries and bays, Brazilian artisanal fishermen of the Brazilian coast have marked pieces of the sea that "belong" to them as long as they occupy them for fishing activities. In their territories they build their large bamboo traps (cercos), "caiçaras" (brush parks) and "viveiros" (extensive aquiculture ponds). Far from the coast, the fishermen are able to discover and retrieve highly productive rocky bottoms, through a complex system of navigation without compass, locally called "caminho e cabeça" (path and rocky bottom). Some of these rocky habitats are very rich in fish species and are kept in secrecy by their "owners". These "territories" have no visible marks and borders but are respected by the other fishermen. The "respeito" (respect) is the basis of this sea tenure. They work well as long as the traditional social structure functions. Nowadays, the disorganization of the community life of artisanal fishermen often leads them to abandon the system. In many cases however, traditional sea tenure is still operational and plays an important role in the conservation of fish resources and in the livelihood of fishermen.

This system is based on a long tradition and knowledge of the sea (currents, winds, etc), of the feeding, migration, spawning of fish and other aquatic species. This knowledge is not evenly distributed among artisanal fishermen but is concentrated in the hands of the "mestres" (boat captains).

In the case of Brazil, traditional sea tenure and fisheries management only now are receiving some attention from scholars, scientists and fisheries managers. One reason for this lack of interest is that extensive areas of the Brazilian space such as Amazonia and the sea were treated by powerful industrial and urban elites as "empty spaces". The traditional population of Amazonia, particularly the Indians and the riverine populations were "invisible" until recently. This "invisibility" served the ideological purpose of the elites of "occupying Amazonia as only uncivilized people" were living there. The same biased view was applied to artisanal fishermen and their communities. When these populations started to react to outsider intrusion, often by force and near-wars, they became "visible", as well as their rich culture, knowledge of the ecosystems and management techniques.

As in other parts of the world, in Brazil sea waters are considered "common property" and the access to them (and their living resources) is free. During the establishment of the fisheries legislation, particularly in the 1960's "common property" and "free access" became the basic assumptions for the building up of a "modern fishing industry" based on industrial and entrepreneurial activities (Diegues, 1983). The highly subsidized trawler fleet invaded areas traditionally used by artisanal fishermen, disrupting the existing seat enure. Conflicts became serious in some parts of the coast, particularly in the Northeast with the lobster fishing. Fishery managers simply ignored the traditional fishing tenure as it was largely invisible to outsiders and overimposed formal regulation that only favoured the newly created and inefficient fishing industry.

1. SOME HISTORICAL FEATURES OF THE TRADITIONAL SEA TENURE SYSTEMS IN BRAZIL

As it has been mentioned before, traditional management is imbedded in the culture of artisanal fishermen in Brazil. Before the arrival of the Portuguese, most of the Indians tradition was to fish in rivers and lakes and few of them had a maritime culture. Even today, some Indian tribes, such as the Desana in the Amazon have a complex calendar of fishing related to the position of stars in the sky and to the lunar cycle (Ribeiro, 1992). Archaeological research shows that since 2,260 BC a few tribes such as the Tupis fished seasonally in the lagoons of São Paulo and Rio de Janeiro (Diegues, 1983, Costa, 1992). The famous "jangada" (raft) was used by the Indians in the Northeast by the time the Portuguese arrived. During the colonization period several fishing techniques were brought by the Portuguese. They also improved existing ones, as when they added the sails to the "jangada". (Selling Jr, 1976). African slaves were also used in whale fishing during the XVII Century (Silva, L. G. 1991). Most of the Portuguese fishing tradition came not only in the first decades of the colonization but after Independence as well. Most of the fishing tradition in southern Brazil was initiated by Portuguese migrants from Azores by the middle of the XIX Century.

Two types of relations with the sea were developed. In the provinces of São Paulo and Rio de Janeiro, small farmer-fishermen associate fishing with agricultural activities (Mourao, 1971; Diegues, 1988). In the Northeast, coastal communities have developed a long tradition of coastal fishing, separated from agriculture (Silva, 1992) One explanation for this difference, in addition to cultural factors, relies on the fact that the continental shelf is narrower in the Northeast than in the South and that most of the fish species live in rocky habitats further from the coast, requiring a better navigational and fishing knowledge from the fishermen. The sandy coast of that area also inhibited intensive agricultural activities. In this connection one could conclude that artisanal fishermen in the Northeast have a strong tradition in dealing with the open sea. Recent studies have analysed the question of tradition within the framework of so-called maritime anthropology (Diegues, 1989; Maldonado, 1992). Most of the fishing was done within the system of the petty mode of production, where part of the fish caught was used for subsistence and part as commodity.

Legislation on coastal land has contributed (but also interfered negatively) to the development of traditional sea tenure. Since the middle of last century a stretch of 33 meters of land measured from the 1833 highest tide belongs to the State (Terras de Marinha). This means that this area cannot be privately owned and no permanent construction can be made in that area without State permission. Small-scale fishermen, although not having legal titles, occupy these areas. In this sense, they have customary rights of occupancy ("posse") to live in those areas, where they build their thatched roof houses. The same right (posse) is transferred to the nearby coastal waters when they occupy a place in the estuaries and lagoons to build their fixed traps (cercos).

The State, through the Navy, also tried to control the artisanal fishermen through forced drafting. As a result, some fishermen rebellions occurred in 1903 in Rio de Janeiro and Ceara (Silva, 1992). To control these rebellions the Brazilian Navy created, in 1991, the first fishermen guilds (Diegues and Silva, 1992). According to the guilds regulations all fishermen should be registered in order to get permission to fish. In practice, each coastal municipality has its own guild that regulates the fishermen life. According to the new Constitution (1988), however, fishermen can organize their own free associations.

Statistic data show (Diegues, 1983) that until the 1960's most of the fishing was undertaken in an artisanal way. In spite of the importance of the contribution of artisanal fisheries (over 70 %) considering the whole country), Sudepe (Superintendency for Fisheries Development, now incorporated by IBAMA, the National Environmental Agency) decided to create a large programme of "fisheries development" based on highly capitalized industries. They have received huge subsidies and the artisanal fishermen were simply forgotten.

For the Sudepe bureaucrats artisanal fisheries did not exist as an economic activity and traditional management was ignored by them.

The strongest reason to ignore traditional management lays in the fact that artisanal fishermen are socially "invisible" and marginal (Maldonado, 1992). Cordell (1983) argues that artisanal fishermen are marginal, isolated and powerless. "Marginality of the sort that plagues traditional small-boat fishing peoples in Brazil has its sources in more than spatial and cultural isolation, comparatively low earnings from less capital intensive fisheries and competing interests. It also stems from a whole complex of prejudiced perceptions and classifications related to the nature of the fishery as a resource, inshore seas, tropics and perhaps the sea itself as contrasted with the land." (p. 11). Cordell also develops the idea of "taxonomic barrier" as one reason for the "invisibility" of artisanal fisheries. Although fish is at the heart of some of Brazil's internationally

acclaimed regional cuisines and is vital to tourism, artisanal fish production and the fishermen themselves are not acknowledged by the state bureaucracy.

The same view of "marginality" still exists within the State bureaucracy and among many conservationists when proposing the creation of national parks and other types of "ecological reserves" in wild coastal areas as mangroves, coral reefs, sand barriers and oceanic islands. Most of these habitats have been traditionally used by artisanal fishermen, where they have developed sophisticated traditional management. In most cases, it can be said that these areas were ecologically protected not in spite of artisanal fishermen but because of their traditional way of life. In practice, the first step to establish a "national park" is to expell traditional fishermen from their subsistence territory and ancestral land. Estuaries, lagoons and islands are viewed as "empty spaces" but in fact, they are marked by several types of "sea marks" and management structures set up a long time ago by artisanal fishermen. Some recent studies, however, have shown (Cunha, 1989, 1992; Diegues, 1992, 1989) that ill-conceived conservation, like uncontrolled "development", can be a pathway to increasing marginality of local coastal populations.

2. SEA TENURE AND TRADITIONAL MANAGEMENT SCHEMES IN THE BRAZILIAN COAST

Traditional management by artisanal fisheries is closely linked to coastal (lagoons, estuaries, mangrove, etc.) and sea tenures. Sea tenure regulates the access of fishermen to coastal/sea spaces. Traditional management is a set of customary regulations that regulates fishing itself, i.e. the amount and type of fish to be caught aiming to conserve the reproduction of natural resources and the fishermen's communities. It is based on a deep knowledge of the physical and biological characteristics of habitats and living resources. There are no written laws but oral regulations that are transmitted from generation to generation. Very often they are loaded with myths and social symbols. The transgression of these regulations is met with social disapproval and loss of "respeito" (respect).

Examples of sea tenure and traditional management:

2.1 Caiçara

It is a brush-park built with mangrove poles making a circle or a rectangle (see figure 1). Inside it the artisanal fishermen lay branches. It is similar to the "akadjás" described in Dahomey by Bourgoignie (1972) and more recently by Kapestky (1981). The similarity between the Brazilian "caiçara" and the African "akadjá" was first mentioned by Diegues(1983, 1988).

It is not yet known whether this technique was brought from West Africa by the African slaves or developed locally. "Caiçaras" are mainly used by the fishermen of Mundaú-Manguaba lagoons in the state of Alagoas. They are settled in shallow places with weak water currents. Fishermen have a deep knowledge of the fish species that are caught in the brush-parks. Marques (1991) has recently studied the "caiçaras" from an ethnoictiologic point of view. He mentions that the fishermen distinguish fish which live in the caiçara more or less permanently such as the "mero" (*Epinephelus*), "carapeba" (*Eugenes brasilianus*), "camurim" (*Centropomus spp*), "caranha" (*Lutjanus cyanopterus*)

and from those which temporarily seek protection in the brush-parks such as the "salema" (*Archosargus* sp) and vermelha (*Lutjanus* spp).

The fishermen have also a good perception of the "caçara" as an artificial habitat created by them. The ecological succession is also noticed: first comes the macroalgae ("cabelo"), then the periphyton (limo), the Terrinidae ("buzame"), *Mytella charruana* ("sururu") and the *Crassostrea rizophorae* ("ostras"). Each stage is associated with a specific fauna. When the climax is obtained the fishermen start fishing in the "caçara" with nets.

Summarizing, the "caçaras" are:

- A system of sea tenure. Local fishermen consider the "caçaras" as their "posse" and territory. Access to the newly created habitat and its resources is determined by the law of respect (lei do respeito). As the fishermen say: "We cannot forbid other fishermen to fish in the caçaras, but they respect our place as we respect theirs";

- A unit of resources: the fishermen have a notion that the "caçara" concentrates biomass;

- A fish aggregating device: fish species find a new habitat and a feeding place in the "caçara". Local fishermen say that "fish goes to the" caçara "to get protection" (Marques, 1991);

- A fisheries management technique: local fishermen utilize these new habitats in a wise way, using appropriate nets that catch only adult fish. In a broad sense the "caçara" can be also considered an extensive aquaculture technique, as it was mentioned by Kapetsky (1981).

The brush-parks of Alagoas State, however, are now suffering from the overall degradation of the Mundau-Manguaba lagoons. Tons of wastes from sugar-cane alcohol production are being thrown in the lagoons. The urbanization of the state capital, Maceio, is also responsible for the overall degradation of the estuarine area and contributes to the disorganization of the fishermen communities. As local fishermen say: "Outsiders who are not local fishermen lack respect and take fish from our "caçaras" in the night."

2.2 The "Calão" Fishing of Southern Bahia

This type of fishing was thoroughly described by Cordell (1983). It is a type of shallow-water purse-seining in which an eight-man crew works in six-to ten-meter canoes. Purse seining is well adapted to the intricate tidal changes along Bahia's estuaries and creeks that wind back into the mangrove swamps. "Lunar tide reckoning coordinates all fishing activity. It enables those most adept at net-casting-the "mestres" or canoe bosses-to monitor closely the behaviour, migratory routes and life cycles of fish. Because the fish movement is predictable, they concentrate in certain areas depending on the tide, weather, and other natural cycles-seining operations are markedly specialized in terms of suitable environment (Cordell, 1983).

Cordell (1983) also explains that the "mestres"¹¹ have consolidated control over premium waterspace, which has distinctive spatial limitations within the lunar-tide cycle, providing territorial foundation for the marine tenure system. Names are given by the "mestres" who exercise exclusive rights and priorities over these tiny lunar-tide fishing spaces. He has also observed that the "mestres" give names for the traditional casting spots "pesqueiros" that are micro-environmental units for fishing. They are subdivided for a particular fishing technique into "lanços" (castings) or minimal waterspace as determined by fort-nightly current changes, daily tide-level changes, light conditions during different phases of the moon, bottom conditions, etc.

Cordell (1983) also mentions that fishing rights and property exist as spatial points in the context of the lunar calendar." Seining and nearly all canoe fishing move in a circuit of areas bound cyclically by the tide, which has a variable impact along the course of the estuary and mangrove channels. At neap tide, fishermen concentrate along the northeastern shores: as the tide begins to rise they move inward into the main body of the fishing grounds. At spring tide, activity shifts to the southern reaches and finally, as the tide falls, boats move back up into the main channels." (p.27)

How is access to these spots restricted or permitted to other fishermen? First of all, this tenure system is supported by cooperative ethics rooted in the notion of "respeito" (respect), a code of personal conduct requiring honor and deference." Respeito" is a cognitive reference point linked to the community's collective conscience. It influences how fishermen evaluate each other's action both on and off the fishing grounds. Fishermen reputation rise and fall in terms of "respeito". As Cordell (1983) mentions: The epitome of this ethical code in fishing is the recognition and respect of traditional territorial-use rights.

One captain deferring to another in a situation of potential conflict over a fishing claim upholds "respeito" and sets up a debt of gratitude to be paid at a **later date**. **Failure to** honor this type of reciprocity and related personal commitments can be much more devastating for a fisherman than breaking a law. "(p. 29)

Access to others can also be granted by the "mestre" in the context of godparenthood (compadrio), networks, rituals and obligations. When an outsider fisherman wants to fish in the estuary he usually takes along a crew member who has a local godfather (compadre) or friend. It is a precaution to ensure that his crew will receive good treatment if they have to go ashore and thus avoiding the threat of competition during net-casting sequences.

As it happens with the Mundau-Manguaba lagoons, the estuaries of Southern Bahia are suffering from outside interference, mainly incursion of industrial fishing boats that do **not** have the "respeito" and started "pirating" **in** the customary territory of traditional fishermen.

2.3 The "Caminho e Assento" Fishing of the Northeast

"Caminho e assento" (marcação) is a fishing system in which the fishing ground is discovered and retrieved in the ocean through a complex method of mentally constructed reference points. The fishermen use no compass but still through crossing imaginary lines (caminho), taking for reference geographical landmarks such as the top of mountains in the continent, they are able to retrieve small fishing grounds made of rocky bottoms (cabeços) several miles away from the continent. These fishing grounds are "owned" by the "mestre" (boat captain) who discovered them. Other fishermen do not know where these grounds are located. Some boats might follow the lucky "owner" of the fishing ground but when the "mestre" perceives it, he changes the routing. After some years, some of these productive fishing grounds might be made public but keep the name of the "mestre" who discovered them. The secrecy of the "cabeços" are transferred from the father to his children.

This system was firstly described by Galvao (1968) in the state of Rio Grande do Norte. Later on, Forman (1970) analyzed the system in the state of Alagoas. According to Forman, the secrecy is the core of that type of fishing and it is a way of diminishing

competition on scarce resources. The "segredo" (secrecy), based on traditional knowledge, is a sign of authority of "mestres" over the other fishermen. The more "cabeços" he discovers and keeps secret, the more fish he lands and the more "respeito" he gets within his community. As a fisherman from Galinhos (Rio Grande do Norte) points out: "The sea has plenty of marks that nobody sees". The "caminho e cabeço" demonstrates territoriality and functions also as a means of controlling the availability of scarce sea resources in the Northeast.

2.4 The "Viveiros"¹¹ (aquaculture ponds) in the Estuaries

One method to increase fish productivity in the Northeast is the construction of "viveiros" in the inner parts of the estuaries. As mentioned before, estuarine water bodies belong to the State, but in some cases are appropriated by local fishermen through the "viveiros". They are built by closing of part of the estuary through a barrier of wood and clay. Only one gate is left open during the raising tide, through which salty water enters into the enclosed area, also bringing along small fish and shrimps. The "viveiro" is owned by those who build it. The number of "viveiros" has decreased in the region because of the expansion of sugar-cane plantation and the increasing pollution produced by the dumping of alcohol production waste, as well as because of urban expansion. The "viveiros" are also a type of extensive aquaculture.

2.5 "Cercos" and "Currais" (large fishing traps)

These are fixed traps built in many estuaries and lagoons all over the Brazilian coast (see fig.3). They were first built by the Indians in order to catch migratory species such as mullets. They are made of local material as bamboo poles. They have one entrance that allows only big fish to get in, as the small ones escape through the fence. The "owner" of the "cerco" rebuilds it every two years when the bamboo poles decay, and when it is abandoned, another fisherman can build his own cerco. "No other fisherman will dare to

take fish from somebody's trap as long as the law of respect (respeito) prevails. At present, however many "intruders", mainly recreational fishermen, fish in the "cercos".

2.6 Restricted Access to Fishing Grounds

According to the Brazilian law, fishing is open to all fishermen registered in fishermen guilds ("colonias"). However, in some places, local communities have reserved specific areas for the use of their fishermen. That is the case for example, of the Restinga of Pombeba, in Sepetiba bay near Rio de Janeiro, where traditional fishermen expelled outsider large trawlers that came to fish in their area. Artisanal fishermen used only small nets to catch shrimp and felt that their fishery was being damaged by boats from industrial companies. Today the area is used only by the traditional community as the trawler owners are afraid of entering into the restricted area and being attacked by the canoes (Costa, 1992).

A similar situation is described by Hartman (1992) concerning the conflicts between subsistence and commercial/industrial fishermen in the Amazonian Lago Grande de Monte Alegre. In the late 60's, traditional subsistence fishermen who fished in that lake on a communal way started facing the competition of the outside commercial fishermen who used large gill-net that blocked the entrance of the lake. Fish productivity declined rapidly and threatened the survival of the local fishermen and the control over their commons. In 1966, after demanding the prohibition of the predatory fishing, over 100 fishermen destroyed the gill-nets and two commercial fishing boats. Since then the conflict became permanent and in 1980 the Fisheries Management Authority intervened, reserving the northern part of the lake for local fishermen (Hartman, 1992).

2.7 Organized and Sequential Net Casting

Artisanal fishermen are often accused of being disorganized, anarchic and not receptive to management. The opposite is most often the truth as in many cases they get organized by themselves. That is the case in the fishery of

"manjuba" (*Anchoviella hubsi*) along São Paulo coast. Due to the construction of a barrier in the Ribeira River, the migratory movement of that species changed. As a result, fishing concentrated at the mouth of the river. Hundreds of canoes are now massed during the short fishing season in a narrow area. In order to avoid confusion, fishermen organized a system in which after each net casting the canoe returns to the end of the queue.

Disputes are solved by the fishermen and their organization is probably better than any other proposed by the fishery management authorities. (Lima, K. 1979)

3. THREATS TO TRADITIONAL MANAGEMENT

Artisanal fisheries face today strong competition from the so-called modern fisheries and from the destructive use of the coast. Local fisheries are being flooded with large industrial boats using inappropriate gear. Social, spatial and technological competition is taking place between locals and outsiders. Since 1967, industrial fishing has been established using tax incentives and suspension of import tariffs on fishery technology. These incentives have benefited mainly industrial groups. The result of this "fishery modernization" has been widespread destruction of fish habitats, overfishing and marginalization of artisanal fishermen (Diegues, 1983, 1992).

At the same time, from the 1960's onwards, uncontrolled use of land and sea resources reached a critical intensity. Large chemical and petrochemical plants, nuclear power stations, dredging of harbours, oil exploitation, coastal mining and tourism have threatened extensive areas along the Brazilian coast. Urban expansion and tourism have targeted biologically rich habitats such as mangroves, sand barriers and islands. One of the most affected ecosystems are the mangroves, from which an estimated two thirds of the fish caught in Brazil feed or breed during their life cycles.

In addition to these impacts on artisanal fisheries, there has been a dramatic increase of demand for fish in the growing urban centers. Fishing has become increasingly selective and some valuable fish species such as shrimp and lobsters were more intensively exploited. Most of the industrial fishing, when profitability decreased, started exploiting fish resources with no respect to existing traditional regulations. In some cases, artisanal fishermen started using the same forbidden fishing gear in order to survive.

In many cases, traditional management techniques have been abandoned as a result of the impact of the activities described earlier as well as because of an increasing desorganization of the fishermen communities.

Traditional sea tenure is also threatened everywhere, not only by the so-called modern activities but also by ill-conceived environmental and aquaculture plans that in principle should benefit artisanal fishermen. Government institutions are encouraging aquaculture but very often traditional extensive aquaculture systems already used by artisanal fishermen are not considered. As a result, in some cases capital owners and outsiders are the only ones who benefit from these initiatives. The government also

promoted the cultivation of species already managed by artisanal fishermen. The adoption of these techniques does not necessarily lead to an improvement of the wellbeing of local communities. One example was described by Costa (1992): the Government planned to introduce mullet cultivation through floating nets (*cercos flutuantes*) instead of supporting the existing technique of the traditional "cerco" made of bamboo poles. In fact, floating nets are more capital intensive, less labour intensive and would disrupt the existing social organization. In the end, the new technique was eventually rejected by the artisanal fishermen.

Another threat exists when environmental protected areas are planned and established. Some of the coastal national parks are being set up in areas traditionally used by artisanal fishermen. The well-conserved areas of the Atlantic Forest and associated coastal systems have been used by traditional communities for centuries. Due to their isolation as well as to the existing social structure of these communities, those areas remained well-conserved. However, due to existing legislation, the traditional population cannot live in the regions that became protected and have to be transferred to other areas. Highly conflictive situations are being created in almost all protected areas and local communities resist eviction from their traditional land. (That is the case in the Ecological Station of Jureia, the Biological Reserve of Guaraqueçaba, etc.) When eviction of traditional people occurs, environmentally protected areas are more easily invaded by commercial fishing, logging and the overall situation becomes even worse.

Instead of using traditional knowledge, some environmental agencies are in fact destroying a suitable basis for environmental and social planning. The present situation is gradually changing in favour of traditional communities, particularly due to the fierce resistance of the traditional peoples of Amazonia. Rubber tappers and Indians succeeded in convincing the federal government to create extractive reserves through which the traditional use of forest products is ensured. Other traditional populations of the coastal areas are now requesting the same treatment granted to the rubber-tappers. Now the concept of extractive reserve is by law applicable to other ecosystems where local population live out of extractive activities, such as oyster and mussels extractivism (Cunha, 1992).

4. COMMON PROPERTY, OPEN ACCESS AND LIVELIHOODS

The various forms of territoriality, communal use of the commons and traditional management along the Brazilian coast described earlier should be understood within the specific historical evolution and social contexts of the local communities involved. As is mentioned by Me Cay and Acheson (1987):

"One cannot properly generalize from the tragedy-of-the-commons model without incorporating contextual factors (Ayda 1986) such as, for example, the presence or absence of rules about uses of the commons, alternatives to exploitation of common resources, Means of monitoring and controlling the behaviour of others in a commons, and so forth", (p.6)

Each of the systems described should be analyzed in the context of specific modes of production and their interrelationships with the dominant, capitalist mode of production. This analysis, however, is out of the scope of the present paper and should be the object of further research. There is a common feature in the systems described: they are part of the petty-mode of production as artisanal fishermen produce part of the fish for subsistence and part as commodities. Most of the production is done by family members and sharing is more usual than wages. The surplus is relatively small and capital accumulation is virtually non-existent. The links with markets are also strong in some situations (as it is the case in Sepetiba Bay) and weak in others (in the "cercos"). The importance of each of the traditional management systems described earlier is dependent on various socio-economic factors, but it seems that the more the area and its economy is integrated into the capitalist system, the higher is the degree of its desintegration.

In this connection the processes described earlier are not simply traditional management techniques that can be directly translated into modern/western management practices. The territoriality involved in the "caiçaras" of the Mundau-Manguaba coastal lagoons is a result of a complex process of social and cultural reproduction of the local communities. The "caiçaras" are in fact a way of ensuring access to scarce fishing resources within the broader context of the livelihood of the fishermen communities. The growing number of "caiçaras" should be understood within the context of the expansion of sugar-cane plantation and urbanization that expell a larger number of peasants to the

"commons": the lagoon is the last resource space from which the newcomers can get their livelihood. However, the system will survive as long as the "caiçaras" owners respect the territories of others, and the socio-cultural values associated with them. It is obvious that the socio-economic reproduction of the fishermen communities is linked also to the maintenance of the law of "respeito" as well as to the overall ideology that ensures the social integrity of the local communities, including myths that explain the biological reproduction of fish species, described by (Marques 1991).

A different situation is represented by the earlier described sequential net casting in the "manjuba" fishing and in the closing of part of Sepetiba Bay for traditional fishing as a measure against outside trawling. In these cases, particularly in the last one, local communities have taken steps to assure their traditional rights over a territory that according to the present Brazilian law is "common property" in Hardin's terminology. It is a reaction against a changing biological (less fish available) and social (presence of outsiders) situation.

In this context, in the past, the coastal ecosystems in Brazil were not "a common property" of free access as described in Hardin's model (1968). They were ecological and social spaces marked by territorialities, communal, family and also private property. They became in fact "common property" in Hardin's meaning by the expansion of capitalist accumulation in the fisheries industry, tourist and urban expansion, etc. As was mentioned earlier, the planned intervention of the State through the creation of capitalist fishing companies in the 1960's needed an "open sea" with no traditional rights, territories and management schemes. It was in fact a condition for the capitalistic accumulation of industrial fishing. As Johannes (1977) points out also in Brazil, forms of marine tenure other than open access suffered attrition due to the effects of modernization and the imposition of the western tradition of coastal marine resources open to all citizens.

As Me Cay and Acheson (1987) properly argue, the thesis of the tragedy of the commons fails to distinguish between common property as a result of a specific evolution of Western laws and regulations, in which there were not relevant institutions and common property as a social institution.

Like in many situations of Third World countries traditional territorial use rights are an indispensable condition to achieve and maintain sustainable livelihood security. (Chambers, 1987). As the Advisory Panel on Food Security, Agriculture, Forestry and Environment to the World Commission on Environment and Development (Food 2000) points out: "Security refers to secure ownership of, or access to, resources and income-earning activities, including reserves and assets to offset risk, ease shocks and

meet contingencies. Sustainable refers to the maintenance or enhancement of resource productivity on a long term basis" (p.3).

The maintenance of sustainable livelihood is central also for environmental purposes, so as to ease the increasing pressure on common resources. As Chambers points out (1987), sustainable livelihoods in those resource-poor areas are ecological and political safeguards against pillage and degradation by commercial interests and the rich. When poor people have secure rights and adequate stocks of assets to deal with contingencies, they tend to have a long-term view and protect their resources. In this respect their time perspective is longer than that of commercial interests concerned with rapid and easy profits. Secure tenure and rights to resources and adequate livelihoods are prerequisites for good husbandry and sustainable development.

The question of equity can also be seen within the framework of livelihood. As can be inferred from the lunar-tide fishing described by Cordell (1983) in Bahia, the access to scarce resources by outsiders is regulated by social rules such as godparenthood (compadrio). An outsider can have access to the fishing resources of the Valença estuary seeking the favour of a "godparent" (compadre) in the village. Rights to waterspace are created, extended and transferred in ritual contexts particularly through godparenthood and long-term apprenticeships. Limited entry principles are contained in the operation of the local apprenticeship system, which governs access to lunar-tide fishing space. Fishermen's own version of the law of the sea exists in the form of voluntary organization, cooperative ethics and collective policing of territories.

The solidarity and conviviality that frequently exists among artisanal fishermen in Brazil does not mean that the community is a homogeneous entity. To ignore conflicts within the community is to open the way for the notion of a romanticized village life. This idea does not fit in today's Brazilian fishermen villages. They are not isolated entities but part of the present Brazilian conflictive capitalist society. One can hardly speak of a "subsistence" fisherman community in Brazil. Virtually all of them are articulated with the national capitalist formation through a series of mechanisms such as the selling of the fish to middlemen, the establishment of purchasing branches of fishing firms within fishermen communities, hiring of traditional boat captains as industrial boats crewmen, etc. (Diegues, 1983)

In this connection, as Me Cay and Acheson (1987) point out, the common property status of resources is neither a necessary nor a sufficient explanation of resource depletion and economic impoverishment. These problems may be more closely related to capitalism and other manifestations of a colonized and industrialized world than to common property per se.

5. POTENTIAL FOR INTEGRATING TRADITIONAL MANAGEMENT SCHEMES AND SEA TENURE IN MODERN COASTAL MANAGEMENT IN BRAZIL

As Cordell points out (1983), "Sea rights in traditional fishing are hard to defend, because they are hard to define outside a total social context. In Brazil, fishermen's highly developed, culturally-shared sense of marine property cannot be mechanically legislated. The configuration of fishing territories can be mapped and legalized, but only the ideology of sea rights, consensual agreements, and reciprocities make the territorial system work. Sea tenure patterns along impoverished tropical coasts often embody elegant and proven spatial solutions for fishery management problems. Together with traditional systems of ecological knowledge of the sea, they are valuable resources in themselves, worthy of preservation. They could be used to enhance marine protection if, for instance, customary fishing rights were officially recognized where biological data are too fragmentary to build a case for conservation solely on the fluctuation of fish populations."

In spite of the threats described above, traditional management and sea tenure still have an important role to play in fisheries and environmental management. These structures, however, cannot be transposed mechanically into the so-called modern fishery management. As Stocks (1987) points out, resource management can be seen as human behaviour that has the effect of controlling natural resources in such a way as to meet human objectives. Most modern fishery management includes sustainable yield and economic efficiency and profitability. Traditional management has a broader set of objectives and very often economic efficiency is not the most important one. As mentioned before, it functions in such a way as to include the maintenance of a certain way of life and sociability. Most of the regulatory measures proposed by the Brazilian Fisheries Management Authority (IBAMA) (quotas, licencing) are a mechanic transposition of those existing in Northern countries, where the ecological and social context is radically different. They, in fact, aim at controlling the fishing effort of the industrial fleet, maintaining or increasing economic profitability without taking into account the social, economic and cultural contribution of small-scale fisheries to the regional economy, such as employment generation, environmental conservation, etc. The result of the present management legislation, based on controlling the catch of commercial species and not on

social and natural ecosystem analysis, leads to a situation of total confusion. More serious than that is the fact that traditional fishermen are punished when they break the "modern regulations" as they fish closer to the coast and industrial boats fish out of sight of the IBAMA authorities.

Cordell (1983) advocates the integration of the traditional management schemes and sea tenure into the official fishery administration. According to him, "Traditional sea-tenure systems in Bahia provide the historical, ideological, and organizational framework to initiate low-cost marine conservation reforms in coastal waters. Home-sea territories are manageable units of ecosystems and fishermen's own residential work groups, kinship networks, cooperatives and professional societies are a ready-made context for stewardship of resources. Limited entry principles are contained in the operation of the local apprenticeship system which governs access to lunar-tide fishing space.

As a result conflicts exist all along the coast. In some cases however, the situation is changing.

First of all, this change is due to the fact that artisanal fishermen themselves have been able to make their management system be respected by other groups including the government. This has happened in Sepetiba bay as described earlier. In some rivers, such as the Rio Cuiaba (Mato Grosso State), artisanal fishermen have created their own fishing reserves, imposing their regulations over other groups of commercial and recreational fishermen. In fact, outsiders were using inadequate nets and motorboats, spoiling traditional hook fishing. Fisheries management authorities (IBAMA) intervened to transform artisanal fishermen territories into special fishing reserves administered by fishermen organizations.

As Anderson (1987) points out in his case study in Malaysia, the near wars that ensued the conflicts among artisanal fishermen and industrial trawlers can be interpreted as steps in the process of working out a way of managing the inshore and nearshore commons.

Second, the government is recognizing the role of traditional populations in environmental conservation. This recognition came after the fierce resistance of the rubber-tappers and the creation of the extractive reserves, administered by rubber-tapper organizations. IBAMA has recently created (1989) the Center for Traditional Populations in order to stimulate the participation of local communities in environmental planning and conservation. In May 1992 IBAMA created the first extractive reserve in the coastal region of Santa Catarina through which local fishermen have exclusive rights to exploit mussels and other fish resources.

Third, scientists and conservationists (including some bureaucrats from IBAMA) are now recognizing the importance of incorporating traditional management and sea tenure regulations in sustainable development and conservation plans.

Some shortcomings, however, do exist in order to integrate traditional management in to modern legislation in Brazil.

Very little research has been done so far on sea tenure and traditional management. The main cause of this lack of research is the "invisibility" and social marginality of traditional fishermen and their knowledge. Interest of researchers in these issues had increased in the last few years but is still limited.

The social and economic structure along the Brazilian coast is far more complex now than two or three decades ago when artisanal fisheries were one of the most important economic activities. Traditional sea tenure and management have to face today not only the threats of industrial fishing but also those originating from rapid urban expansion and other modern activities that compete for the same coastal space. On the other hand, when a decision has to be made on how to use a specific coastal space, other interest groups have more power to impose their views than the artisanal fishermen communities. Artisanal fishermen lose very rapidly the control of their traditional territory and are forced to migrate to urban centers where they live in slum areas.

Artisanal fishermen organizations are still weak, although an important step forward was taken as strong social movements occurred since the beginning of the 1980^fs, particularly reacting against coastal pollution. Artisanal fishermen also have actively participated in providing inputs for the Constitution (1988). The subsequent creation of the Monape-National Fishermen organization (1989) has reinforced the fishermen movement.

As social inequality is growing faster than in the past in Brazil, artisanal fishermen suffer the same consequences of this process as any powerless group. Losing their traditional territory and the space where resource management was implemented, cornered by a price system that only benefits the middlemen, they become even poorer. In this sense the assurance that they can continue using their traditional territories and their resource management might become a condition for achieving greater social equity and environmental conservation along the Brazilian coast.

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