

ITIONAL SEA TENURE AND RESOURCE MANAGEMENT IN BRAZILIAN COASTAL FISHING
ITS TRADITIONNELS D'EXPLOITATION DE LA MER ET GESTION DES RESSOURCES
HALIEUTIQUES SUR LES COTES DU BRESIL

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ABSTRACT

In seeking sustainable fisheries in estuarine and near-coastal areas in developing countries, it is often assumed that the existing traditional fisheries are unmanaged and that the resources are overexploited. Centralized regulation is the management scheme which is thus usually adopted. This paper illustrates how traditional fishermen's communities in Bahia, Brazil, have accomplished efficient resource management without resort to centralized state control through the evolution of informal institutions, norms, and cooperative structures which allocate resource use in a tenure system while minimizing conflicts. Prospects for integrating such traditional sea tenure in a wider, more formal management context are discussed.

RESUME

Quand on cherche à obtenir des rendements soutenus dans les estuaires et les zones littorales des pays en développement, on part souvent du principe que les pêches traditionnelles ne sont pas gérées et que les ressources sont surexploitées. On adopte alors généralement un système de gestion centralisé. Le présent document illustre comment certaines communautés traditionnelles de pêcheurs de Bahia au Brésil sont parvenues à gérer efficacement leurs ressources sans recourir à l'Etat, mais en créant des institutions, des normes et des structures coopératives non officielles qui permettent d'organiser l'utilisation des ressources suivant des droits d'exploitation, tout en évitant les conflits. On envisage également ici comment il serait possible d'intégrer ces droits traditionnels dans le contexte élargi d'une gestion officielle.

INTRODUCTION

In many developing countries methods are being sought to establish sustainable fishery resource use in coastal areas. In doing so, the assumption often is that traditional fisheries are unmanaged and the resources overexploited. The first inclination is to impose approaches which limit fishing effort by restricting gears, boats, catches, seasons, or occasionally the numbers of people who may fish. However, in most instances, developing countries cannot begin to underwrite, implement, and enforce such centralized fishery control (Nietschmann, in press). Yet, many of these countries are eager to find ways to sustain or improve their small-scale fisheries which remain the nutritional and economic backbone for the coastal poor as well as the source of some luxury seafoods. Where do we look for low-cost, socially non-disruptive, logistically feasible means to preserve the local ecology and enhance the productivity of indigenous fishing?

One such place is Bahia, Brazil. Bahia harbours, some of the most culturally unique fishing sites in the tropical South Atlantic, stretching down to the Abrolhos Banks (Fig. 1). Within a maze of mangrove, estuarine, and coral reef habitats, traditional fishermen have perfected distinctive property systems to regulate seaspace and fishing activities. Fishermen have enclosed waterspace under their own restricted-access tenure arrangements. Also, on principle, and more so when food supplies and income are scarce, fishermen cooperate both on shore and on water to pool resources, spread risk, and support each other in elaborate personal and kin networks. One of the ironies of poverty is that it can foster this type of innovative collective action, creativity, and adaptability among the poor (Lobo, 1982; Lomnitz, 1977; Pearlman, 1973).

Fishermen have developed many positive adaptations to improve their circumstances through cooperation and reciprocity. The fact that they are socially "nowhere", stranded between worlds of colonial and industrial Brazil (Forman, 1970) does not mean they see themselves as social outcasts or that they identify with all the negative connotations of poverty in Brazil. Instead, fishing provides them ways to create additional identities and customs unique among Brazil's backland peoples.

Within the framework of the struggle to "be somebody" and to look out for family and friends, fishermen have evolved an elegant, complex, workable way to claim and allocate rights to the sea's resources. The canoe fishermen of Bahia, as well as sailboat and raft fishermen farther north, are extremely conscious of the sea as space, and reckon all the major events in fishing through a spatial lens. They speak of "windspace", "lunar-tide space", and "fish space", all of which are mentally mapped. Marine property rights have evolved according to these perceptions. Rights to waterspace are created, extended, and transferred in ritual contexts, particularly through god-parenthood and long-term apprenticeships. Rights are legitimized, in the absence of formal legal sanctions, through codes of honour, ethics, and cooperation and within the social hierarchy of fishing captains, crew and kin.

In the generations since Portuguese settlement, fishing grounds close to the shore have been used intensively. They have seen periods of commercialization and decline. Fishermen have had to contend with actual or potential overfishing of some species, with technical change, with immigrants, and with various incursions on their territories by outsiders -- nearly universal problems of fisheries. Sea-tenure systems adapted precisely to micro-environmental requirements for gear, transport, biological seasonality, and boat concentrations have proven to be a durable and integral aspect of fishing. One major reason is that tenure distributes people and activities in non-competitive fishing space.

Among these fishing patterns is one of the places where the search should be conducted to solve the problems of overfishing and environmental degradation that are now starting to develop along much of the world's coastlines. This requires further perspective on fishermen's laws of the sea and sea-tenure ecology as viewed from within.

The following pages stress how rural fishermen's communities accomplish fishery resource management -- by means that are not vested in the state or its bureaucracies, but in the informal institutions, norms, and cooperative structures of local communities. This paper also examines prospects for integrating customary sea-tenure in a wider, more formal management context.

2. THE SEA-TENURE TRADITION IN BAHIA

In recent years ethnographers have furnished a considerable number of descriptive accounts of sea tenure (Acheson, 1975; Alexander, 1977; Anderson, 1976; Carrier, in press; Forman, 1970; Johannes, 1982; McCay, 1982; McGoodwin, 1979; Stiles, 1976), documenting where it occurs, the forms it takes (private ownership, communal ownership, closed access, seasonal, open access, limited entry), and speculating about what it does. Does it promote conservation? Does it ease competition? Is it a self-regulating mechanism? Does it facilitate acquisition and defense of territory? Overall, conclusive answers to these questions await further field studies. As McCay (1978) and Cordell (1979) have pointed out, research to date often involves teleological explanation. As to the functions of sea tenure, it is interesting to note that fishermen do not have to be physically present to defend their territories or to make them real. How, then, do people come to honour each other's claims?

Calao fishing, a type of shallow-water purse-seining in which 8-man crews work from six to 10 m canoes, is the historic focus of the rural maritime economy in southern Bahia. It illustrates how seaspace is named, owned, partitioned, and governed by ethical codes, which are reinforced from day-to-day by consensual agreements and reciprocities. In short, this tradition shows how the marine environment is socially constituted and transformed into property. The forms and mechanisms of tenure in any specific location depend partly on how the inshore waters are zoned and partly on the local ideology of resource use.

Purse seining is finely adapted to the intricate tidal changes along Bahia's estuary and creeks that wind back into the mangrove swamps. Lunar-tide reckoning coordinates all fishing activity (Cordell, 1974). 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 fishes' 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. Favourably located waterspace becomes valuable and net-casting spaces are ranked according to criteria such as ease of access during foul weather, distance from port, past production history, and so on.

Over the history of canoe fishing, the mestres have consolidated control on premium waterspace, which has distinctive spatial limitations within the lunar-tide cycle, providing a territorial foundation for the marine tenure system. Fishing grounds range in size from 400 km² to 600 km². Area is restricted by how species are distributed close to shore, by the fact that the sail canoes, even those that are motorized, cannot effectively carry much ice or manoeuvre at sea, and by the rhythm of markets in local ports and the hinterland, where consumers demand a daily supply of fresh fish.

The northern portion of the fishing environs attached to the port of Valenca (Fig. 2) shows the names and locations of traditional net-casting spots (pesqueiros) the way fishermen break them down by season and tide cycle. Because the contours of the estuary are affected by currents, a spring tide in the inner reaches of the fishing grounds is like a neap tide in the outer reaches, and vice versa. The result is that fishermen can use most of their techniques every day, as long as they choose fishing spots appropriate to the day's current regime.

Pesqueiros are the micro-environmental units of fishing. However, each one usually accommodates a range of methods (handlines, trot-lines, set nets, traps, seines). Pesqueiros are thus subdivided for a particular technique into lancos, or minimal waterspaces as determined by fortnightly current changes, daily tide-level changes, lighting conditions during different phases of the moon, position of the lanco relative to the shore slope, bottom conditions, and the interaction of wind and current. Because of zoning considerations within a pesqueiro, lancos do not overlap. They also have distinctive names taken from boundary indicators, fishing events, or other characteristics. Names are bestowed by fishing captains who exercise exclusive-use rights and priorities over these tiny pieces of lunar-tide fishing space.

Fishing rights and property exist as spatial points in the context of the lunar calendar. Seining and nearly all canoe fishing moves 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.

It is impossible to determine with any finality how and when sea tenure evolved in Bahian canoe fishing. Like the territorial systems in other tropical small-boat fisheries, it is covert. There are no court records or laws to support fishermen's claims. Yet, sea tenure in the form of space controlled by the community, by individuals, and by social networks has existed over the span of the oldest net bosses' memories, including their knowledge of fishing in previous generations. It is a century-old tradition at the very least.

Knowledge of how to fish under this system is passed on in a limited number of apprenticeships, which can last up to ten or 15 years. Not all apprentices become proficient net-casting specialists and equipment owners, who inherit rights of access to the most valued fishing grounds. Since fishing spots are stratified by preferred location, sea tenure definitely minimizes conflict in the use of limited waterspace. Marginal areas of the fishing grounds also include areas of essentially unclaimed seaspace, where new fishing spots are discovered and staked out from time to time. There is also a series of inter-village buffer zones, where rights are defined loosely, if at all. Yet even in the most marginal waters, special agreements exist for exercising well-ordered, sequential, temporary claims to net-shooting areas.

Although the shore is interrupted by features such as estuaries, swamps, sedimentary reefs, and coral reefs, which are conducive to enclosing seaspace, and although the proximity of fishing grounds affords a high degree of territorial surveillance, these conditions alone do not explain how sea tenure is legitimized. This issue leads away from ecology and into the realm of the social contract and what constitutes "socially acceptable" fishing.

Fishermen, like other traditional groups in Brazil, place a high emphasis on cooperation and sharing. This smoothes work relations, but it is not motivated simply by the economics of scarcity or the mechanics of fishing. The sea-tenure system is supported by cooperative ethics, which flow from the concept of respeito, a code of personal conduct requiring honour and deference. Respeito is manifested in a wide range of social contexts. It is created, bestowed, and reaffirmed through what otherwise may appear to be trivial or sometimes substantial acts and gestures of self-sacrifice and generosity. Purse-seining offers maximal opportunity for display of respeito which helps forge cohesive bonds between potentially competitive fishermen. Territorial encroachment and destructive spatial competition in fishing ensue without respeito as recent fishery modernization events demonstrate (Cordell, 1978).

Respeito is a cognitive reference point linked to the community's collective conscience. It influences how fishermen evaluate each other's actions both on and off the fishing grounds. It is a yardstick for measuring the justice of individual acts, especially in conflict situations. It resembles the moral-ethical standard in Palauan fishing reflected in the title of a recent book, "Words of the Lagoon" (Johannes, 1981). Reputations rise and fall in terms of respeito. Social rewards from following it are not exactly immediate and tangible; however, they may often be converted to long-term economic and social gains.

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 honour this type of reciprocity and related personal commitments can be much more devastating for a fisherman than breaking a law.

Economically necessary activities on shore -- marketing fish, obtaining bait, building canoes, borrowing and lending equipment, mending nets and sails -- continually reinforce cooperation by creating the opportunity to perform small favours, building up dependencies for future exchanges.

For Bahian purse-seiners, the ultimate test and strongest demonstration of the cooperative ethic occurs in the context of godparenthood networks, rituals and obligation (compadrasco). The rainy season tapers off in November, ushering in a hot, summery net-casting season and opening up the outermost ocean-beach fishing spots. As boats from ports upriver and in the swamp fan out to the ends of their territories, intervillage conflicts over net-casting space and schools of fish can arise. One strategy to gain access to new territory and to fish safely in the waters of an adjoining community is to become a godparent.

The first step is to arrange to sell a catch to pataqueiros, fish hawkers (who often operate illegally outside the local market system), in neighbouring territories, to make gifts of fish all around, and if the outsider's catch is good, to pay for a beer-drinking session. After initially displaying good will, the visiting captain may volunteer or be asked to godparent. These relationships are frequently established after only a brief acquaintance, and a major benefit is to confer ongoing fishing rights. These summer rights may endure for years, reinforced by other types of cooperation.

Alternatively, a captain planning to fish close to another community's seaspaces will arrange to take along a crew member who has a local compadre or friend. This is a necessary precaution to ensure that his crew members will receive good treatment if they have to go ashore, and to avoid the threat of competition during net-casting sequences. Some people will only venture in interstitial areas to fish when they have a network of compadres or actual kin in adjoining villages.

The phenomena of becoming a godparent and establishing networks of contacts to ensure sea-rights result in wide-ranging circles of fishermen bound by respeito. They are also responsible in part for the cooperative extension of sea tenure within a community. Canoe fishermen, purse-seiners in particular, have huge personal networks in which there is a high incidence of godparent connexions, often cross-cutting a series of villages. The procedures used to acquire sea-rights and secure tenure restore an element of flexibility where waters are otherwise exclusively used and claimed by single villages.

Knowing how fishermen are socialized in respeito (and how comparable cooperative codes function in other traditional societies) is a key to understanding how sea tenure works without more overt controls or government intervention. However, the fact that tenure is only legitimized by these internal means also suggests how easily it may be subverted by market expansion and fishery modernization, which cannot be controlled within the confines of national common property-oriented fishery codes and conditions. All that is required to shatter the sea-tenure balance is for an external power to establish domain, or for a local enclave to form around competitive technology. Then, in either case, there is little to be gained through cooperative fishing or respect of traditional authority and autonomy.

3. THE ROLE OF TRADITIONAL SEA TENURE IN RESOURCE MANAGEMENT

The developments in Bahia's fisheries, by no means unique in the tropics, are testament to the inability of traditional fishermen to hold their own or compete for future markets and fish in territorial seas where tenure of fishing grounds is now openly contested at the level of traditional rural fishing. The emergence of open-access conditions and importation of 20th Century technology is a hazardous mix. Yet, at this point, Brazil is not equipped to administer costly, sophisticated, centralized systems of licensing or quotas in its fisheries along the lines used to control open-access, common-property fisheries on mid-latitude coasts.

Such centralized alternatives can place the burden of biological monitoring and enforcement exclusively in the hands of outside administrators. Fishermen can often end up without an effective voice in decisions about standards of resource use and the benefits of various management options. In small-scale tropical fishing, there is a critical need for a decentralized approach to control fishing pressure by returning the brunt of responsibility for resource management to local communities.

Traditional sea-tenure systems in Bahia provide the historic, 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. A traditional canoe fisherman spends most of his life in about 800 km² of intimately known waterspace. He knows what boats move in and out of his seaspace day and night. He is the resident natural historian and expert ecologist. He has a strong personal identification with the fishing environment and a clear perception of limits to the expansion of production. 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, collective policing of territories, and an informal council of older, respected fishermen who help resolve disputes.

Elements of this fishing system are still functioning despite recent upheavals. The calao fishermen (purse-seiners) mentioned earlier, for instance are not "culturally frozen" by tradition, but are continually using tradition to adapt (Nietschmann, in press). They have not abandoned fishing or their homes, but have shifted to subsidiary methods (traps, trotlines) to wait out the current phase of a "boom-bust" cycle. They need outside support, however, to regain and secure their customary estuarine and nearshore rights and to legitimize their knowledge and authority in a modern social context.

A plan for harbour-based, territorially-regulated fishing in Bahia that incorporates the central features of pre-existing sea tenure would have several essential parts and various advantages.

The morphology and ecology of southern Bahian waters contribute to a natural territorial division of inshore and offshore fleets. Small boats (canoes, rafts, and saveiro sailboats) fish optimally in depths which range up to 20 to 30 m. Trawlers, rollers, seiners and caciqueiros (mother ships) operate more safely and effectively in deeper water. Official promulgation of depth boundaries between inshore and offshore fishing would help provide protection for fragile shallow-water habitats. In turn, the mechanized fleet would be free to diversify and augment its catch in waters farther offshore, which are currently underfished.

Inside the 20-m mark, a different set of enclosure principles should formally segregate different types of gear, allowing for seasonality, lunar-tide changes, and related criteria, which fishermen recognize as critical to partitioning space in their traditional tenure system. This micro-zoning should conform to the existing configuration of port-centered fishing territories in southern Bahia (Fig. 1), including buffer zones between communities, which fishermen designate essentially as open-access. The one- to two-day trip limits of fishing boats and the coastal fish marketing system, which have foci in each municipality, create these interstices of lightly fished waters.

A third designation where commercial fishing is off limits must be added to the zoning system to preserve unique marine habitats. Conservation zones need to be implemented for portions of the mangroves that are critical spawning and nursery areas and for valuable coral reef areas. There is now a precedent for marine reserves and parks in Brazil. In April 1983 the government set aside two small islands in the Abrolhos as the first marine national park. This is a step in the right direction. If reserves or parks are to have any real lasting impact on sea life in this region without dispossessing local fishermen, they must be integrated in a wider system of territorially-regulated fishing.

Building official resource-management zones around traditional sea tenure requires a provision to limit participation in fishing to the residents of specific communities. Customary fishing rights are established through long-term residence, apprenticeships, in-marriage, and social networks. It is crucial to preserve these ways of assimilation of new generations of fishermen.

This consideration, however, raises perhaps the single most complicated issue in attempting to codify the original informal territorial systems. No formal institutional apparatus yet exists for legitimizing locally-managed and tenured fisheries. How is it possible to bridge this gap and establish an effective, modern tenure-holding unit? One promising strategy, which does not require modifying fishery laws is to work within the historic network of fishing guilds (colonias) created by federal fishery laws in 1938. The evolution of the colonias and their local political organization is traced in detail by Forman (1970).

The distribution of traditional sea territories in southern Bahia coincides almost perfectly with existing municipal boundaries extended seaward. In each municipality there is a fishing guild that could be reoriented to serve as a custodian of exclusive communal rights to bounded seaspace. Such an arrangement would consolidate traditional local authority over the rights to use waterspace. Fishermen, as well as non-fishing owners of boats and equipment, would be required to register with the local guild to gain access to a given gear-restricted territory. Anyone living in a particular municipality would be free to fish there, but it would not be possible to register in more than one municipal fishery management zone. If these formalities were enacted, they would replicate almost exactly the way the traditional sea-tenure system limits entry.

The foregoing proposals are part of the five-year experimental plan for territorial regulation in Bahia's inshore fisheries now being explored by the University of California Berkeley, anthropologists in conjunction with Brazilian fishermen, municipal authorities, SUDEPE, naval officials, and university researchers. The suggested transformations in sea tenure are essentially a scaffolding for future marine resource management to build on -- whether in the form of specific restrictions such as closed seasons and quotas, or in some variation on these themes. The system is designed to focus attention on problems and to act as an organizational stimulus for local fishing guilds and SUDEPE.

The point is to strike a balance between centralized and decentralized administration of the tenure system. There is no way at this point that management could be put exclusively in the hands of locals or that would directly curb investment opportunities in coastal fishing, regardless of the extreme need in some areas of the Northeast. Establishing an official system of sea tenure cannot, by itself, control levels of capitalization (Johannes, 1981). But it does have the potential to foster self-regulated fishing indirectly by taking advantage of social pressure; it uses the perception of people restricted to fixed territories that it is in their best interest not to overfish. An official system of sea tenure can encourage fishermen already territorially-committed to remain so, and immigrating fishermen to become committed.

Adopting a marine tenure plan does not mean that "ecological" fisheries will evolve overnight. Many questions remain in terms of legal procedures and understanding the long-term functions of traditional tenure and sea rights. In Brazil, it is unlikely that these systems originated to serve explicit goals of biological conservation, though unintentional curbs of fishing effort may have produced that result in some places. Canoe fishermen in Bahia use their tenure practices as a defense against encroachment, as a way to accommodate new generations of fishermen, and for smooth positioning of gear. This structure, however, is well suited to take on modern conservation functions as well. The complex formal regulatory system for Japan's inshore fisheries -- probably the most sophisticated anywhere -- incorporates elements of traditional sea tenure spanning many generations (Ruddle and Akimichi, 1983; Short, in press). While the Brazilian situation is somewhat crude by comparison, and has much less depth in time, and is far removed in cultural history from Japan, the principles of sea tenure and their potential applications to the modern situation are strikingly similar.

CONCLUSIONS

Nations which seriously undertake to manage their nearshore marine resources must take into account a wide range of customary rights and claims to the sea, many of which, officially, never have been recognized.

Sea rights in traditional fishing are hard to defend because they are hard to define outside of a total social context. In Brazil, fishermen's highly developed, naturally-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 -- the tradition of respeito -- can make the territorial system work.

Sea-tenure patterns often embody elegant and proven spatial solutions to current fishery management problems. Together with traditional systems of ecological knowledge of the sea and its resources, they are a valuable heritage 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 design alternative management schemes. Reciprocally, creating marine reserves and parks to encompass indigenous fishing communities could help these peoples defend their sea-rights. It is often extremely difficult to argue that such rights should be honoured on political and ethic grounds or economic dependence alone.

A concerted effort to recover and sustain these sea-tenure systems should be undertaken. Otherwise the art, science, and, in many locales, the resource base of traditional fishing will vanish.

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