

# Thalassorama

## Individual Transferable Grounds in a Community Managed Artisanal Fishery

### Introduction

Current schemes to manage high exclusion-cost resources often contemplate two basic approaches: (i) privatization of the resource (*e.g.*, allocation of individual transferable quotas), and (ii) government intervention through regulation of size and composition of the catch using a variety of policy instruments affecting fishing effort (Pearse, 1980; Anderson, 1986, 1992). A third approach in the literature is the community-based management of marine resources (Smith and Berkes, 1991; McCay and Acheson, 1987). Berkes (1989) argues that traditional community-based systems are underestimated in their potential role in resource management. For some fisheries, however, combinations of these three approaches may prove most effective for management. To explore this proposition, I apply the context-structure-performance paradigm of the neoinstitutional school of economics (Schmid, 1987; Wilson and Lent, 1992) to explain the behaviour of the collectively-managed spiny lobster fishery of Punta Allen, Mexico. The human interdependencies that exist in the use of a high exclusion-cost good like lobsters, together with the presence of high transactions costs (contractual, information and enforcement costs), seem to have motivated this coastal community to adopt institutions such as collective voluntary organizations and informal privatization of fishing grounds to sustain resource rent over time.

### Context

In 1969 a group of 49 fisherfolk from a nearby community called Vigia Chico, formed a cooperative and settled in an isolated site establishing a new fishing village in Punta Allen in the southeastern part of the Yucatan Peninsula. The purpose of this settlement was to facilitate their harvesting operations of spiny lobster and reef fish species, and to have access to fresh water (Salasar, 1981). Three aspects characterize this fishing community: (i) lobster fishing is the only significant economic activity, (ii) the relatively small continental shelf forces fishermen to harvest mostly juveniles and young adults in the back reef and inner Ascension Bay area, (iii) a high degree of isolation from the rest of the world has motivated a self-help approach to community development (Seijo and Fuentes, 1989).

One of the main features of the lobster (*Panulirus argus*) fishery in this area is the use of artificial habitats, or "sombras", to facilitate and increase harvesting rates. It should be pointed out that these man-made shelters may enhance recruitment by mitigating predation mortality by other species besides humans. By 1988 there were 14,210 artificial habitats and 55 small-scale boats (25 feet length with outboard motors and an average of two fishermen per boat). One of the main

characteristics distinguishing this lobster fishery from others in the area is the informal allocation of property rights that cooperative members have achieved by dividing up in 150 lots the lobster fishing grounds. These fishing lots have an area ranging from 0.5 to 3 km<sup>2</sup> and are located in both inner-bay (Ascension Bay) and back-coral reef areas within a depth interval of one to four fathoms (Miller, 1982). Since the beginning of the fishery, the fishing grounds (of varying sizes) have progressively been allocated over time to fishermen as they have entered the cooperative. The number of members has stabilized since 1986. Before every new fishing season starts, bargaining for grounds and existing artificial habitats (renting and exchange) takes place among cooperative members.

### Structure

The spiny lobster fishery of Punta Allen, Mexico moved from an open access (*res nullius*) to a common property resource (*res communes*) in 1947 when the State granted to fishermen organized in cooperatives the exclusive property rights to harvest a number of high valued species, including lobsters. Regarding resource use and conservation, there are two fishery regulations: a four-month closed season, and a legal minimum size restriction. Internally, the cooperative has implemented a number of rules and enforcement mechanisms.

The temporary (renting) or permanent (selling) transfer of individual rights to fishing grounds involves very simple artisanal transactions. If a fishing ground rental agreement takes place, a fisherman agrees to periodically pay the fishing ground "owner" a specific amount in accordance to ground size, number of artificial habitats lying within it, and its perceived relative productivity in previous years. Permanent transfer of fishing grounds among cooperative members may involve monetary payments and/or barter transactions.

The cooperative's internal rules are rigid and designed for both individual and collective behaviour that seem to assure healthy and stable community development. Some of these rules include applying a variety of penalties for unacceptable behaviour, and others involve the immediate exclusion of a cooperative member. For instance, a member found harvesting lobsters in someone else's ground, or violating the lobster closed season, loses his cooperative membership. This is equivalent to the loss of community respect and may be a motive for leaving Punta Allen (Canto *et al.*, 1988). Interviews and observations suggest that effective application of the rules is the result of good leadership nourished by a highly democratic process within the cooperative. Information costs have been mitigated during the last 10 years because fishermen have participated in, and directly benefited from, research efforts (*e.g.* the geographic specification of grounds provided by Miller (1982)).

### Performance

The market mechanism (*i.e.*, implicit privatization of a common property resource) within a voluntary collective organization seems to have led to a sustainable resource allocation in the community. Contrary to other lobster fisheries of the Yucatán, where free rider behavior is very common (*e.g.*, the trap fishery of Isla Mujeres), the presence of non-contributing fishermen is reported as very limited in Punta Allen (Seijo and Fuentes, 1989). Olson's (1965) and Ostrom's

(1990) hypothesis of the dynamics of group size seem to be consistent with what is observed in this small-scale fishery. The relatively small size of the group (107 fishermen) harvesting this renewable resource, together with strong community rules and self-policing strategies, may cause the relatively low level of free-rider behaviour. Because of the degree of isolation of this community, and high opportunity cost of State enforcement (Sutinen, 1987; Anderson, 1989) in the area, external enforcement is basically absent. Therefore, whatever is achieved in terms of current regulations is the result of community voluntary behaviour. The rules concerning allocation of fishing grounds and artificial habitat ownership are essentially respected by the fishermen involved. According to community leaders Pereyra, Cime and Salasar (pers. comm.), the rules have contributed substantially to discouraging non-contributing behaviour (free riders) among cooperative members and protecting the resource, and have enhanced the benefits of voluntary collective action in the community on a number of other resource related issues.

Concerning Government regulations, the closed season is basically respected, but the minimum size restriction is not. Length frequency analysis during the 1987–1988 season of lobster tails harvested by the four fishing methods used in the Yucatan showed that the artificial habitats used at Punta Allen involved the highest incidence of juveniles and young adults (Seijo *et al.*, 1991). This seems to be the result of the spatial allocation of effort. Artificial habitats have been introduced in the shallow waters of Ascension Bay close to the postlarvae settlement area. Even though fishermen, when harvesting, can discriminate against smaller than authorized sizes, two factors motivate them not to do so. First, there is a market for lobsters smaller than the minimum size restriction, and second, fishermen have a general understanding of the life cycle of *Panulirus argus*. They are aware that because of long larval stages, the resource is at the mercy of currents from 6 to 9 months. Therefore, it is believed that postlarvae settling in the area in subsequent periods will be not only the result of how many juveniles were protected by Punta Allen fishermen to become spawners, but also how juveniles and adults in other areas of the Caribbean basin are being exploited.

Even though fishermen from Punta Allen are able to avoid, at least at community-ecosystem level, the fisheries social trap of inconsistent micromotives with desired macroresults (Schelling, 1978), in the long run, they may become unwitting free riders by not knowing the overall shared stock effect of their fishing effort, and therefore unwillingly contribute to the destruction of this resource. The transboundary nature of the spiny lobster population introduces other types of human interdependencies which may require complex bioeconomic analysis and international cooperation to avoid dissipation of economic rent.

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## References

- Anderson, L. G. 1986. *The economics of fisheries management*. Revised and enlarged edition. The Johns Hopkins University Press, New York. 214p.

- Anderson, L. G. 1989. Enforcement issues in selecting fisheries management policy. *Marine Resource Economics* 6(3):261-277.
- Anderson, L. G. 1992. Fundamental issues in the design of ITQ programs. Paper presented at the VIth IIFET Conference, Paris, France, July 6-9. 11p.
- Berkes, F. (Ed.). 1989. *Common property resources: ecology and community-based sustainable development*. Belhaven Press, London, England. 302p.
- Canto, E., D. Naal, and J. Ramirez. 1988. *Reglamento interno de la sociedad cooperativa de producción pesquera "Pescadores de Vigia Chico", S.C.L.* Punta Allen, México.
- McCay, B. J., and J. M. Acheson (Eds.). *The question of the commons: the culture and ecology of communal resources*. University of Arizona Press, Tucson, Arizona. 439p.
- Miller, D. 1982. Construction of shallow water habitats to increase lobster production in Mexico. *Proc. Gulf. & Carib. Fish. Inst.*, 34:168-179.
- Olson, M. 1965. *The logic of collective action*. Harvard University Press, Cambridge, Mass.
- Ostrom, E. 1990. *Governing the commons: the evolution of institutions for collective action*. Cambridge University Press, Cambridge. 250p.
- Pearse, P. H. 1980. Regulation of fishing effort. *FAO Fish. Tech. Pap.* (197):82p.
- Salasar, C. 1981. *Relato de la fundación de la Sociedad Cooperativa y de la comunidad Colonia Javier Rojo Gómez*. Punta Allen, México. 10p.
- Schelling, T. C. 1978. *Micromotives and macrobehavior*. W. W. Norton, New York.
- Schmid, A. A. 1987. *Property power and public choice: an inquiry into law and economics*. Second edition. Praeger Publishers, New York. 332p.
- Seijo, J. C., and D. Fuentes. 1989. The spiny lobster (*Panulirus argus*) fishery of Punta Allen, Mexico. In: Tietze, U. and P. Merrikin (eds.). *Fisheries credit programmes and revolving loan funds: case studies*. FAO Fish. Tech. Pap. 312:89-100.
- Seijo, J. C., S. Salas, P. Arceo, and D. Fuentes. 1991. Comparative bioeconomic analysis of the spiny lobster (*Panulirus argus*) small scale fishery of the Yucatan shelf. *FAO. Fish. Rep.* (431):39-58.
- Smith, A. H., and F. Berkes. 1991. Solutions to the "tragedy of the commons": sea-urchin management in St. Lucia, West Indies. *Environmental Conservation*, 18(2):131-136.
- Sutinen, J. 1987. Enforcement of the MFCMA: An economist perspective. *Marine Fisheries Review*, 49(3):36-43.
- Wilson, J. R., and R. Lent. 1992. The new institutional economics applied to fisheries: the role of information in the (continuing) solution of resource problems. Paper presented at the VIth IIFET Conference, Paris, France, July 6-9. 17p.

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