



# Institutional design of small-scale fisheries in marine protected areas applied to sustainable territorial development on the Brazilian coast



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## ARTICLE INFO

### Article history:

Received 28 June 2016

Received in revised form

13 September 2016

Accepted 5 February 2017

### Keywords:

Territorial development strategies

Design principles

Marine protected areas

Institutional analyses

## ABSTRACT

On the Brazilian coast there are many conflicts between Marine Protected Areas (MPAs) and fisher's communities. This research used institutional analysis to integrate studies of sustainable territorial development with coastal fishing in three Brazilian MPAs: the Canavieiras (Bahia) and Itaipu (Rio de Janeiro) Extractive Reserves and the Ecological Station of Tamoios (Rio de Janeiro). Ostrom's Principles (1990) - reviewed by Cox et al. (2010) - were contrasted with the situation of fishing in MPAs in the period of analysis and the fishers' demands for institutional changes. Principles analysis indicated structural weaknesses of the state to promote continuous actions of monitoring resources and users, as well as in the application of graduated sanctions. The design principles most closely associated with the construction of territorial development strategies were related to the rules of appropriation and provision, and nested enterprises. MPAs, as institutional innovations, can act on territorial development dynamics to provide systemic responses capable of preventing the degradation of fisheries resources and marginalisation of users. The sustainable territorial development approach introduces innovative issues for MPAs management, such as territorial identity, integrated production systems and innovation. The perspective on MPAs presented aims to contribute to a quality based fisheries management model, rather than the usual productivity focus.

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## 1. Introduction

Protected areas are commonly associated with discourses of economic stagnation, where the costs of conserving biodiversity are mainly supported by locals (Kaimowitz and Sheil, 2007). There are many conflicts between Marine Protected Areas (MPAs) and Brazilian traditional coastal communities, especially those that depend directly on common use of natural resources to survive, such as the fishers (Vivacqua and Vieira, 2005; Diegues, 2008; Almudi and Kalikoski, 2009).

MPAs are "A clearly defined geographical space recognized, dedicated, and managed, through legal or other effective means, to achieve

the long-term conservation of nature with associated ecosystem services and cultural values." (WCPA, 2008). In Brazil, MPAs are legally considered as "Conservation Units", which are Protected Areas primarily focused on biodiversity conservation (SNUC, 2000). As institutional innovations, MPAs can act on territorial development dynamics to provide systemic responses capable of preventing the degradation of fisheries resources and marginalisation of their users. This research has employed institutional analysis to integrate sustainable territorial development studies (Carrière and Cazella, 2006) with small-scale coastal fishing in MPAs.

The specification process promoted by territorial development includes, not only raising the products price, but also the marketing of the product, the inclusion of socially fair tourism and other forms of plural economy (Andion et al., 2006). Through this mode of production, the territory will receive a reputation that reinforces the sense of identity with the place and the strengthening of cooperative relations between the members involved. This is not a

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“given” process, but built through negotiated dialogue between the actors in the territory (Pecqueur, 2005).

The design principles proposed by Ostrom (1990) explain, under which conditions of trust and reciprocity the collective action may be possible, in this way avoiding the deterioration of common use resources (Ostrom, 2005). Robust institutions are those in which the rules are devised and modified, if necessary, over time according to collective choices (Ostrom et al., 1994), which gives them an adaptive character (Ostrom, 2005). In their original work, Ostrom (1990) analyses eight design principles for common use resources, related to: well-defined boundaries, congruence between appropriation and provision rules and local conditions, collective-choice arrangements, monitoring, graduated sanctions, conflict-resolution mechanisms, minimum recognition of rights and nested enterprises. The original design principles application were analysed in 91 studies (Cox et al., 2010) and expanded to eleven.

This paper uses Ostrom’s design principles (1990) reviewed (Cox et al., 2010) to examine three case studies involving small-scale fishing and MPAs in Brazil, guided by the following questions: do the changes generated by the creation or implementation of MPAs promote increased institutional robustness in the fishing areas studied? Can increased institutional robustness promote sustainable territorial development and strengthen collective actions of the territory? Our results reinforce the hypothesis that the analysis

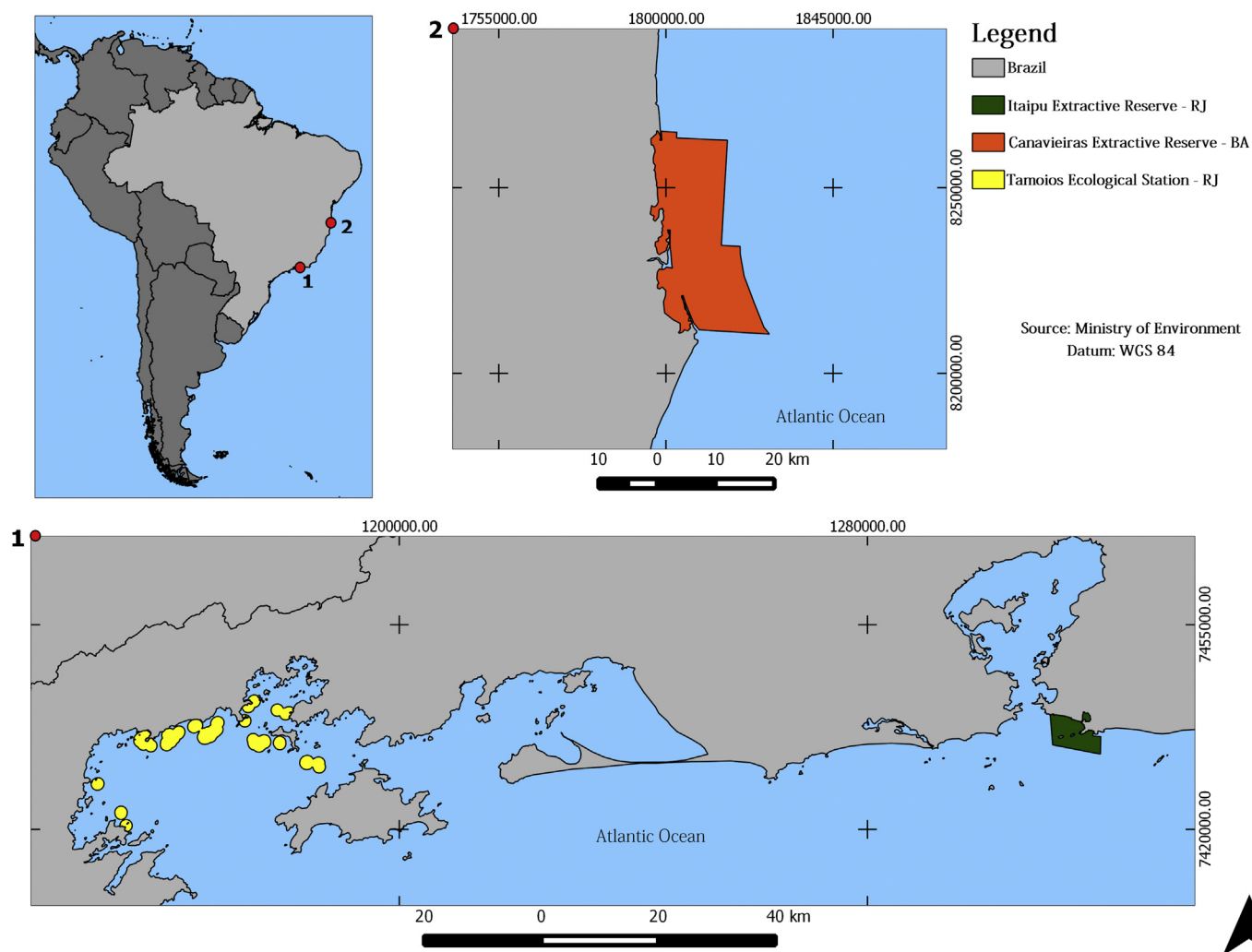
of the design principles in the fishing, practiced in different categories of MPAs, contributes to building sustainable territorial development strategies for the coastal zone.

The methodology and analysis model adopted are based on the design principles for robust institutions (Ostrom, 1990; Cox et al., 2010). Robust institutions are the result of the combination of social and ecological factors that can be achieved by integrating MPA network design with the planning of sustainable territorial development strategies in the coastal zone. The perspective presented is unconventional and seeks to elevate the management of MPAs, markedly sectoral and technocratic, and also fisheries, focused on productivity, to a quality model.

In next section, we describe the management of the small-scale fisheries and the history of the MPAs in three socio-ecological systems of southeastern and northeastern Brazilian coast. The design principles were compared with the present situation of fisheries resources management and the demands of the fishers in the case studies. Lastly, we discuss the role of MPAs in increasing institutional robustness and their relationship to sustainable territorial development in coastal areas.

## 2. Methodological approach

Our research was conducted in three MPAs (Fig. 1): one of



**Fig. 1.** Location of three Brazilian Marine Protected Areas: 1. Canavieiras Extractive Reserve (RESEX) in Bahia State; 2. Itaipu RESEX and Tamoios Ecological Station in Rio de Janeiro State. The distance between Canavieiras and Itaipu RESEX is 745 miles.

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