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Livelihood strategies in a marine extractive reserve: Implications for conservation interventions

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ABSTRACT

The marine extractive reserve (RESEX), a sustainable use and co-management conservation instrument, is increasingly being established in coastal Brazil because of international and national pressure to protect coastal–marine environments. RESEX establishment is producing ambiguous outcomes despite claims of protecting rural livelihoods. This paper presents the case of the Cassurubá RESEX and demonstrates that a recent fishery agreement contradicts with fisherfolk livelihood diversification strategies and produces differentiated impacts on households. The findings are drawn from mixed methods adapting a household livelihoods approach to develop household typologies. Three household typologies emerged: (1) high market orientation, high income, (2) low market orientation, low income, and (3) high market orientation, low income. Low income households are the most impacted by new institutions that contradict with temporal and spatial livelihood diversification strategies of resource users. Also, they have lost fishing grounds, material assets (gear), and access to subsistence farmland. These findings support claims that sustainable use conservation agendas need to better consider the differential livelihood strategies of fisherfolk, and other resource users, or efforts for livelihood protection and improvement will be undermined.

1. Introduction

1.1. The marine extractive reserve

There is political momentum to establish marine protected areas (MPAs) in Brazil, as the country has made an agreement with the CBD to protect 10% of its marine waters by 2020 [1]. Less than 2% of Brazil's marine waters are protected and the number of MPAs and their sizes are considered by government and NGOs as inadequate to sustain marine resources [2]. There is also pressure to create marine extractive reserves (termed marine RESEX or MERs) and the Secretariat of the Convention on Biological Diversity reported in 2010 [3] that potentially 60 MERs would be established in the country and Glaser and Oliveira [4] claimed there was a "policy initiative to create 500 RESEX" in Brazil. Of the 151 MPAs documented in Brazil, 18 are MERs [5]. Although it is a bottom-up approach to conservation and resource management, it is not uncommon for government officials to promote RESEX establishment to local resource users [4].

MERs, termed the "second generation RESEX" in Brazil's coastal regions, have gained popularity as an alternative to "strict" protected area models that historically have displaced or removed resource users from access to resources. The specific aim of MERs, as a sustainable use conservation unit, is to protect traditional communities, their livelihoods, the resources on which they depend, and biodiversity [6,7], or "win–win" outcomes. The MER is based on the terrestrial extractive reserve (RESEX) model which developed from the social movement led by Chico Mendes aimed to protect rubber tapper laborer rights, and their access to resources and land, from logging and cattle ranching encroachment [8–10]. The Chico Mendes RESEX was established in his name, in 1990, following his murder, and conservation and development actors have heavily endorsed the RESEX model ever since [9,11,12].

Several claims support MER creation including protection of traditional fishing communities, their livelihoods and the resources on which they depend, and biodiversity [6,7]. Federal institutions are in place that responds to "local" demand to create MERs, often in cases of resource conflict [4]. Many MERS were established because of conflict between "local" fisherfolk and "outsiders," between fisherfolk and MPA authorities, and because of the depletion of local marine resources by industrial fishing fleets [3,6,8]. Scholarship suggests MER establishment is participatory, empowers and promotes active citizens (through participatory decision-making), and results in economic improvement (through government incentives), and co-management of natural

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resources [4,8,13]. MERs are also claimed to empower women who are typically excluded from participatory processes in decision-making [13].

Contrary to positive claims, several scholars have questioned the feasibility of MERs as a conservation and development mechanism [4,6,8,14]. Participation in MER establishment has been stated as weak and livelihood outcomes poor. Conflict from MER establishment has been categorized as economic and political and even NGOs are fighting for "NGO 'territories'" [4]. Stronger interest groups have monopolized forums, and social conflict among fishing communities ensued where traditional structures based on class and local norms were barriers to equity in decision-making and economic benefits [6,14]. Da Silva [14] has shown how the first MER established in Arraial do Cabo resulted in "negative social capital" because imposed MER institutions did not account for existing social differences between fishing communities. Unintended consequences occurred with establishment of the Corumbau MER. Although planning was a participatory process, MER authorities failed to define "traditional population" beneficiaries early on which resulted in inherent conflict between locals for rights to MER resources [6]. Following resolution of beneficiary definition and plans for economic development, exclusive rights to the MER did not result in improved income or livelihoods [6,15]. Di Commo [8] further argues that exclusion of women from participatory decision-making hinders successful collective action and the ability of MERs to meet efficacy or equity goals. The overall resulting co-management regimes of these MERs (Corumbau and Arraial do Cabo) are stated as ineffective as not all stakeholders were included in planning or decision-making, were not aware of their responsibilities, and they lack state and financial support. Further, most MERs lack management plans making it difficult to measure their effectiveness [16].

This paper responds to these concerns of MERs and recent work by scholars who examine rural livelihoods in conservation settings. Previous studies of MERs [4,6,8,14,17] have mainly focused on governance and participation and they demonstrate the social conflict that ensues from MER establishment. However, the actual livelihood practices and strategies of MER resource users have not been examined and the effects of MERS on livelihoods remain unclear. A sustainable use conservation instrument with goals of protecting livelihoods necessarily demands an examination of livelihood strategies in place. The case of the Cassurubá RESEX is analyzed here through investigation of the household livelihood strategies of resource users and intersections between new institutions and livelihoods, leading to conflicting outcomes. It is argued that new institutions should be better aligned with the differential livelihoods strategies of resource users or goals of protecting livelihoods will not be reached.

1.2. The livelihoods approach

Livelihoods here are defined as "the ways in which people transform several types of household capital assets (natural, human, financial, physical, cultural, and social) into livelihood outcomes" [18,19] (p. 1962), and the ability to prevent, or recover from, exogenous "stresses and shocks" [20]. An adapted capital assets approach, or livelihoods approach, is applied here in which household assets are examined through the relationships between them and among households and broader processes and networks of governance [18,21–24]. As King [24] (p. 298) posits, "capital assets, social relations and organisations, institutions and access are identified as important variables to most livelihood analyses." In this way, the flaws of simply documenting assets without addressing issues of social inequality [25], and divorcing household material assets from social processes and networks [21,24] is avoided.

Several studies have shown how the household livelihoods approach is key for understanding resource user livelihood strategies, and the implications of these strategies for conservation and development agendas [21,24,26–33]. More specifically, the approach is a basis for examining livelihood processes and provides insight into how new resource management policies may differentially affect households. For example, in Honduras, household social capital through kinship networks and informal institutions shaped marine resource extraction that conflicted with management spaces of an MPA and "fails to find expression in the management plan" [30] (p. 49). Walker and Robinson [33] found that 87% of fisherfolk in an MPA study in French Polynesia lost access to prior fishing grounds and resulted in differential social consequences as younger fisherfolk with fewer assets were unable to travel as far for fishing in open areas. King [24] demonstrated that livelihoods are spatially produced from historical, cultural, and social processes with implications for conservation and development policy.

Analytical techniques have been applied to develop household typologies based on patterns and correlations among household asset variables. For example, in the Peruvian Amazon, constraints to resource extraction and handy-craft production were differential between households; younger households lacked access to the resource with a land constraint whereas older households had land but lacked time [26]. Another study showed charcoal dependent households lacked land and labor whereas charcoal specialized households were "older, larger and wealthier" and had more communal labor and land [27]. McSweeney's [29] study in Honduras showed household assets such as household age, access to labor and land not only determined household dependency and specialization in forest products but also their ability to overcome risks and shocks by commercializing products. Finally, in Mexico, Chowdhury [32] developed household typologies based on land use strategies and argued that environmental policies and land use incentives may not succeed if differential household land use strategies are unaccounted for.

In short the household livelihoods approach, emphasizing nuances in rural livelihood production, is fundamental for informing policy in achieving livelihood goals of conservation and development agendas in coastal–marine and terrestrial environments [34]. It is particularly intuitive where livelihood strategies are diverse and constituted within marine and terrestrial spaces as is the case presented here.

2. Study area and methodology

2.1. Study area and context

The region of southeastern Bahia, Brazil is a priority area for terrestrial and marine conservation in Brazil. The terrestrial landscape is within the Atlantic Forest (Mata Atlântica) Biodiversity Hotspot. The coastal and marine biodiversity include extensive coastal mangroves, among the most intact in the country, that serve as nurseries for species that inhabit the most biodiverse reef system, the Abrolhos Bank (or Arquipélago de Abrolhos) in the Southern Atlantic [35,36]. Accordingly, the establishment of terrestrial and marine ecological corridors, or protected area networks, is a major goal of the government and non-government organizations (NGOs) working in the region.

The Cassurubá RESEX was created in 2009 by presidential decree. The RESEX is comprised of 100,687 ha of coastal, mangrove, estuary and marine habitats [35,36] with the majority of the polygon overlapping with the municipalities of Caravelas and Nova Viçosa (populations 21,437 and 38,537, respectively) [37]. A small portion overlaps with the municipality of Alcobaça to the north (Fig. 1). The RESEX is comprised of marine and terrestrial spaces