

RESEARCH BRIEF

Spatial decisions and livelihoods of small-scale fisheries in Costa Rica

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Small-scale fishing constitutes the main source of marine products and a central component of local livelihoods for poor families in coastal areas of Costa Rica. This country has been defining marine reserves, and fishermen are believed to be amongst the most prominent opponents of such policies, given the potential costs that entails the lost access of fishing areas of traditional use. However, it seems that this potential economic impact would depend on the livelihoods diversification, and the spatial definition of closures, among others.

The evidence of depletion of fish population in many parts of the world is overwhelming (MEA 2005; Worm et al., 2009). The overexploitation of small-scale fisheries affects the ecological process of marine ecosystems but also threatens the livelihoods of many people in coastal communities (Berkes et al., 2006). Marine protected areas (MPA) and other forms of spatial-temporal fishing closures are increasingly used as a tool to manage and protect marine resources worldwide (Suuronen et al., 2010). Nevertheless, it seems that fisherman knowledge and their responses to MPAs implementation has not been effectively utilized in fisheries research and management (Lédée et al., 2012). Some of these initiatives fail to achieve social objectives because of a poor understanding about the complex livelihood strategies and socioeconomic conditions that characterize fishermen (Cinner et al., 2010).

This research aims to achieve the following objectives. First, to identify local capabilities, assets, and activities that characterizes the livelihoods of small scale fishers in two communities of the Caribbean Coast of Costa Rica. Particularly important, is the extent to which these livelihoods have been affected by spatial and gear regulations on fishing. Second, to identify the spatial distribution of effort by local fishers. As a complement, we want to determine the relationship between the spatial decisions of fishers and their individual socio-economic characteristics and the existence of MPAs and other regulations on fishing.



Tortuguero's canals

We collected data from 125 surveys with fishers, in depth interviews with local leaders and focus groups in two main small-scale fishing communities in the Caribbean Coast of Costa Rica. These communities are Colorado (next to Barra del Colorado National Wildlife Refuge) and Tortuguero (adjacent to Tortuguero National Park). These communities are similar in size; being Barra del Colorado the biggest with 350 households approximately. The types of regulations for fishing are different between Tortuguero National Park and Barra del Colorado Wildlife Refuge. In the former case there is an absolute prohibition (no-take zone) to fish in all areas of the park (ocean and canals); however, non-consumptive uses are allowed for guided tours after paying an entrance fee. For the case of Colorado, most of the regulated area is located in rivers and canals but fishing in these areas is allowed using certain types of gear. There are no entrance fees for the case of guided tours in this area.



Data gathering process

Our results indicate that different income generating activities characterize the livelihoods of fishermen in both communities. According to interviews with local leaders and key stakeholders, two thirds of Colorado villagers can be categorized as fishers (either commercial; sport or for self-consumption). Within the group of fishermen in Colorado, the surveys revealed that 97% of the 70 active fishers can be categorized as commercial, 53% of them have this activity as their main source of income and about a quarter dedicate exclusively to this economic activity throughout the year. In addition, about three quarters of commercial fishers in Colorado complement this activity with fishing for self-consumption and sport fishing, agriculture and construction activities. In these cases, fishers tend to accommodate their activities according to fishing seasons of targeted commercial species. Noteworthy, only a quarter of fishermen in Colorado, those that dedicate exclusively to this activity, would find their single source of income severely disrupted with the creation of a MPA in the region. The others, and particularly low impact artisanal fishermen have a more diversified portfolio of income activities, and stand to lose less from the restriction.

On the other side, the dependency of villagers on fishing in Tortuguero seems to be different than in Colorado. According to local leaders in Tortuguero, only one third of local livelihoods can be associated with fishing. Further, the information from the surveys revealed that despite 89% of fishers can be categorized as commercial; only 13% have this activity as their main source of income. In contrast, for most fishers, this activity complements the income generated by the tourism industry, which is the main economic activity for 71% of them. This latter activity includes jobs as guides (some bilingual) for spotting diverse wildlife within the Tortuguero National Park or as service staff in local hotels and restaurants.

It is interesting to note that different incentives have reduced the dependency of local villagers on commercial fishing in recent decades, especially in Tortuguero. The establishment of the National Park in Tortuguero in 1979 helped to attract tourism and private entrepreneurs investing in lodging and other facilities. Nowadays, Tortuguero National Park ranks third as destination among all National Parks in Costa Rica, hosting 100,000 foreign visitors and 25,000 locals approximately per year (MINAET-ACTo 2012). The visitation to Tortuguero National Park peaks approximately, during the second semester of the year, because of the nesting of green turtles (*Chelonia mydas*) and leatherback turtles (*Dermochelys coriacea*). This has also attracted volunteers and scientists working for turtle conservation (Campbell & Smith, 2006).

In addition, 80% to 90% of fishers in both communities indicated that fishing was much better 10 years ago when the number of fishers was relatively small and fish stocks were more abundant. Among the most important reasons argued by former fishers to quit fishing was the

reduction of the profitability of fishing due to a higher competition from newcomers, combined with the legal exclusion from some of their traditional fishing grounds due to spatial regulation. Interestingly, the large majority of former fishers nowadays to tourism, consider the establishment of the Tortuguero National Park as positive. In fact, they do not consider as desirable the option of going back to commercial fishing given the actual context.

Fishers in these communities (for commercial and self-consumption) use different areas for fishing. With the help of printed maps and reference points, fishers indicated their preferred areas for fishing. The zones included the rivers and its mouths, and zones separated by an imaginary border of 5 km from the coast and beyond. This imaginary border coincides with a sea cliff that is commonly used as reference point among local fishers.

Regarding the spatial allocation of labor it is noteworthy that fishers in Colorado and Tortuguero tend to concentrate their efforts to fish near the mouth of Colorado River and Tortuguero River respectively. These areas are also located closely to the home ports or communities from which fishers depart. The incentives faced by fishermen to allocate their labor to these specific areas is the result of a complex interaction of variables associated to their livelihoods, assets and capabilities; further affected by the spatial regulations on fishing imposed by the government.

Despite this complexity, some characteristics of those who fish exclusively in rivers and canals are different from those who fish in the coast (including river mouths) and farther in the sea. The first distinction relates to the characteristics of the livelihoods of each group. Regarding income diversification, fishers from Colorado that tend to fish in the sea (i.e. near the coast and beyond) have commercial fishing as the principal component of their livelihoods. In contrast, fishers in rivers and canals from Colorado tend to have more diversified livelihoods. In fact, they complement commercial fishing with other activities, especially occasional jobs in agriculture, construction and tourism (including sport fishing). Further, a relatively large proportion of these fishers own land for cattle and agriculture, which gives them a relatively stable source of income and a lower dependency on fishing for their livelihoods. On the contrary, fishers from Tortuguero that fish either in the sea or in rivers and canals have tourism as their main economic activity but there is tendency of those who fish in the sea to combine it with commercial fishing. When it comes to Colorado, the imposition of restrictions associated to the creation of a MPA will affect fishermen's livelihoods more severely the farther the extension of the MPA into high seas. Although most fishermen fish within a 5 km distance from the coast, those tend to have a more diversified income portfolio than those who fish beyond 5 km.

We also found differences on boat specifications (size and power) and crew size depending on the area of fishing and the community. In general, fishers in Colorado that tend to fish near the coast and beyond the imaginary line of 5 km, have larger boats, more powerful engines and larger crews compared to fishers in any other area, including Tortuguero. Additionally, results show a relationship between fishing gear use and the fishing spot selected. Hand fishing accounts for 58% of the total gear used in rivers and canals but rod with fishing line (with one hook) and fishing nets are the most important gear in the sea. Fishers indicated that the most important criteria for gear selection are effectiveness for fishing the species targeted and the cost of acquisition. As one could expect given these differences in capital investment and technology, fishers in the sea report larger catches.

Key Points

- MPA could generate new "off-sea" opportunities instead of besides the spillover effects of protection of fish stocks
- These benefits could exceed the costs due to precluded options to fish

Conclusions

Despite the small size of the Caribbean Coast of Costa Rica there are significant differences in livelihoods, fishing spots and technology among the main communities of fishers in the area. These disparities need to be taken into account to minimize the potential negative impacts of MPAs expansion and to increase its effectiveness. The characterization of the assets of small scale fishers and their associated livelihoods would help to decipher how resilient these fishers are against a potential fishing ban in their traditional fishing spots.

Given the imminent expansion of MPAs there is great need for fishers to identify economic alternatives if access to marine resources is limited under new schemes of protection. The creation of a MPA will severely limit the livelihoods of fishermen that fish farther into the sea, particularly if the area extends beyond 5km from the coast. Regarding fishing restrictions closer to the coast, authorities could reduce opposition and illegal activities if reduced impact fishing is allowed.

From the data, a clear distinction appears between, artisanal and small commercial fishermen that fish in rivers, river mouths and within 5 km from the coast, and commercial fishermen that tend to fish farther into the sea. The former group is much larger and most importantly has a diversified portfolio of income sources. The latter group dedicates exclusively to fishing. Particularly, most fishermen in Colorado have commercial fishing as their main income generating activity and in some cases as the only source of income. However, it seems that Tortuguero's fishermen have less dependency on commercial fishing, mostly due to the existence of tourism activities –including sports fishing– which can be reinforced by MPAs expansion. An open question remains about the possibilities of Colorado's fishermen and other villagers to reap the benefits of increasing opportunities in the tourism industry due to MPAs expansion and calls for the potential need of specific training programs for facilitating the transition from fishing to tourism services.

ABOUT THIS BRIEF

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