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Social perceptions of Colombian small-scale marine fisheries conflicts: Insights for management

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ABSTRACT

There is limited information about Colombian fisheries available from government sources. In consequence, as is the case for many artisanal or subsistence fisheries, fishermen, local leaders, and fisheries experts become a primary source of data for identifying priority issues for management attention. This study describes the problems that currently affect small-scale fishing activity and fishery resources in Colombia, based upon data collected from these main stakeholders. Data from extensive interviews and community meetings were carefully coded to produce a quantitative picture of the conflicts in these artisanal fisheries. Identified issues applied in three ways; across all communities, germane to one coastal area, or peculiar to individual communities. The results present the opportunity to focus management attention on key issues that can be addressed with co-management by communities in cooperation with government.

1. Introduction

Most countries worldwide with marine small-scale fisheries activity share similar difficulties in resource management [1–3]. This paper exemplifies the tropical developing country, Colombia. Columbia's multi-species and multi-gear artisanal fisheries consist of a highly variable number of fishers, depending upon the season and hour of the day, with weak labor rights, minimum control and management rules, and low participation in decision-making. In addition, there is little information regarding the socio-economic context of fishing that affect the process of decision making [4,5]. In Colombia, these conditions are exacerbated due to internal national conditions such as displaced people (who become novice fishers) due to violent events, conflicts in the fishing territory and fishers' culture with drug trafficking activities, and fishery administration instability (over the last decade five institutions have been in charge). Since most government efforts are concentrated on Colombia's internal war against drug trafficking, paramilitaries, and guerrillas, the environment is not considered a national priority, and the capacity to enforce fishery regulations is limited [6].

At the same time, fishing activity is suffering the effects of multiple direct drivers of change, including (1) pollution in rivers and along the coast [7,8]; (2) urban sprawl and displacement from rural to urban areas [7,8]; (3) climate change [9,10]; (4) loss of biodiversity [9,11]; (5) invasive alien species [12,13]; and (6) the destruction of coastal, estuarine, and marine habitats [14,15]. Artisanal fishing activity has been neglected due to its insignificant contribution to foreign exchange, and there is little incentive to manage it, even though subsistence fishing activity alleviates unemployment and bad nutrition [16].

There is an institutional and legal vacuum for the management of marine resources including the establishment of protected areas as a buffer against overexploitation [17–21]. These factors underlie the deterioration of Colombia's coastal and marine environments [22]. Several reports describe the overexploitation of different important fishing species such as *pargos* (*Lutjanus* spp. and *Ocyurus* spp.) on the Caribbean [11,23–25], and *piangua* (*Anadara tuberculosa* and *A. similis*) on the Pacific coast [26–29]. Lack of management is risking not only fisheries resources but also human well-being in local communities due to the deterioration of ecosystem services [30]. Despite the complex relationships between the ecological and socio-economic factors that affect fisheries in Colombia, no previous studies deal with the problems associated with small-scale fisheries from an integrated and interdisciplinary perspective.

The main objective of this research is to analyze social perceptions of problems and conflicts in Colombian small-scale marine fisheries. In order to do so, it specifically aims to (1) explore differences of social perceptions among different stakeholders—i.e., fishermen, local leaders, and fishing experts, (2) analyze existing relationships between stakeholders' perceptions of fisheries problems within marine ecoregions,

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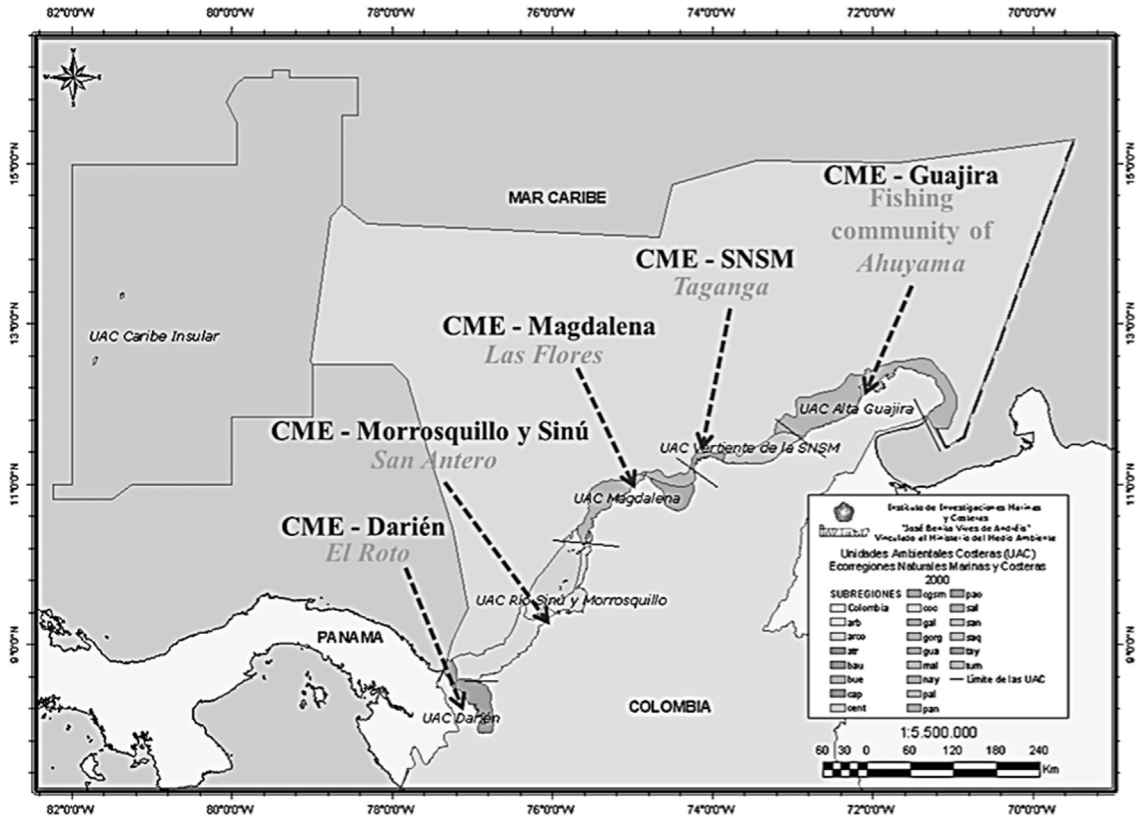

Fig. 1. Map of the chosen fishing community per each coastal and marine ecoregions (CME) on the Colombian Caribbean coast (Taken and modified from [8]).

and (3) offer insights for the management of small-scale marine fisheries on both the Caribbean and Pacific coasts of Colombia.

2. Materials and methods

2.1. Study area

The Colombian Caribbean coastline stretches for 1642 km (Fig. 1), the Pacific coastline for 2188 km (Fig. 2), and island coastlines for a total of 52 km. The Caribbean coast supports 2919,348 inhabitants, while the Pacific coast supports only 543,594 [31]. The coast is divided into six coastal and marine ecoregions (CMEs) on the Caribbean coast (Fig. 1) and four CMEs on the Pacific coast (Fig. 2). CMEs are distinguished by different environmental characteristics such as geomorphology, hydrography, sedimentology, and coastal and marine ecosystems [8]. State and CME boundaries are relatively similar, in some cases nearly overlapping. Since the present study focuses on environmental conditions, CMEs provide spatial orientation.

Caribbean coast fishing communities selected in each CME for this study include *Ahuyama* in the Guajira CME, *Taganga* in the Sierra Nevada de Santa Marta CME, *Las Flores* in the Magdalena CME, *San Antero* in the Morrosquillo and Sinú CME and *El Roto* in the Darién CME.

Pacific coast fishing communities selected in each CME are *Bahía Solano* in the Alto Chocó CME, *Pizarro* in the Baudó CME, *Juanchaco* in the Málaga–Buenaventura CME, and *Tumaco* in the Llanura Aluvial del Sur CME.

In 1996, FAO estimated around 150 coastal fishing communities located on the Caribbean coast and 144 on the Pacific [32]. In 1997, there were approximately 12,000 small-scale fishermen communities on Colombia's Pacific coast and 12,000 on the Caribbean coast [33]. Some Colombian marine fisheries experts suggest that there are a total of around 40,000 fishers, with 19,000 living on the Caribbean coast.

2.2. Data sources

Primary sources of information are local ecological knowledge (LEK) and "work-experience knowledge" (WEK). Information was collected from three groups: fishermen, local leaders, and fisheries experts. LEK was provided by the first two sources, fishermen and local leaders. Fishermen is defined here as coastal marine small scale fishermen and fisherwomen, including a great variety of racial and ethnic groups. Local leaders include presidents of local fishing associations or persons recognized as influential members of the fishing community. Finally, fisheries experts are scientists and technicians from Colombian fisheries institutions and administration, and their WEK is acquired via a mixture of educational background and work experience in Colombian fisheries management.

In order to collect both LEK and WEK sources as well as the perceptions of fisheries challenges, semi-structured interviews of 304 people were conducted. Participants came from three stakeholder groups; fisheries experts in regional environmental institutions, local leaders, and marine artisanal fishermen. The same semi-structured interview was used with the three types of stakeholders in order to explore the different perceptions about fisheries problems and conflicts. Table 1 shows the number of interviews performed in the Caribbean and Pacific coasts per stakeholder group.

The behavior and knowledge of Colombian coastal fishermen has recently been recognized as an essential element for improving fisheries management [34]. In fact, communities have compiled their LEK through decades of experience fishing in local marine environments. Currently, many studies around the world