



Fishery cooperatives in Cuba: Potential benefits, legal feasibility, and governance pre-conditions

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ABSTRACT

Currently there is a strong interest in Cuba in improving the performance of the fisheries sector with respect to social, biological, and economic outcomes. Many important fishery resources appear to be overexploited, and previous fishery regulations have had mixed success in restoring fishery stocks. The current fishing pressure could also have adverse impacts on other valuable ecosystem services that support economic activities such as dive tourism and recreational fishing. A new State policy to expand cooperative enterprises to non-agricultural sectors provides an opportunity for fishery cooperatives to be created for the first time since the early years of the Cuban Revolution. This paper explores the potential ecological, social, and economic benefits of adopting fishery cooperatives as a co-management scheme for Cuba's marine fisheries. It concludes that well-designed fishery cooperatives can offer substantial benefits to the management of the fishery sector. Based on an analysis of the relative success of fishing cooperatives worldwide, guidelines are provided for the design of fishery cooperatives in Cuba.

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1. Introduction

1.1. The current state of Cuban fisheries

The health of Caribbean fishery stocks varies by species and region, but most coastal Caribbean fisheries are considered over-exploited [1]. Reef fish populations in particular have suffered severe declines in recent years (see [2] for a meta-analysis), and overfishing has played a major role [3].

Cuba is an archipelago whose main island is the largest in the Caribbean (Fig. 1). Cuba's marine-fishery landings peaked in the 1970s and 1980s, increasing to a maximum of about 210,000 MT in 1986, mostly as a result of catch outside of the Cuban Exclusive Economic Zone (EEZ) [4]. Recent catches have been about 30,000 MT annually, almost all from domestic waters – an 86% drop from peak landings. Most industrial fishing takes place in the four areas (Fig. 1) considered of “great economic interest” [5].

There are indications that approximately one-third of Cuba's marine fishery stocks are overexploited, and one-half are being exploited at maximum sustainable levels [6,7]. Catches of smaller species have increased while those of larger species have decreased, suggesting that Cuban fisheries are “fishing down the food web” [8].

Some species could reportedly be exploited at higher sustainable rates, such as the turkey wing clam (*Arca zebra*), mojarra (*Gerres* spp.), sardine (*Clupeidae*), deep-water snappers (*Lutjanus vivanus*, *Lutjanus buccanella*, *Rhomboplites aurorubens*) and groupers (*Epinephelus mystacinus*, *Epinephelus flavolimbatus*), yellowtail snapper (*Ocyurus chrysurus*), mackerels (*Scomberomorus regalis*, *Scomberomorus maculatus*, *Scomberomorus cavalla*) and tunas (*Katsuwonus pelamis*, *Thunnus atlanticus*) [9]. Fish communities in the coral reefs of the Gardens of the Queen (*Jardines de la Reina*) – the largest marine protected area in the Caribbean – are among the healthiest in the Caribbean [10], and high densities of spiny lobster have been reported in protected areas off of Guanahacabibes Peninsula [11].

The two overarching policy objectives for Cuba's marine fisheries are achieving sustainable exploitation [4,12] and maintaining the fishing sector's workforce (Garcia, personal communication). Specific objectives for the sector include contributing to national food security by providing a dependable supply of high-quality and affordable seafood, and increasing revenues from the export of seafood ([13] cited in [4]). As a step towards these goals, in 2009 the Ministry of Fisheries was eliminated and its agencies, research institutions, and responsibilities were assumed by the Ministry of the Food Industry (MINAL). The renewed focus on marine fisheries as an economic driver is also reflected in Cuba's new national economic and social guidelines [14], which refer to fisheries as an important source of food and foreign currency.

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Fig. 1. Cuba and its main fishing zones (in light gray).

Despite efforts to manage fisheries for high fishery yields, fishery regulations have only been able to partially address the decrease in landings [15]. The spiny lobster fishery, which generates 75% of the industrial sector's revenues [16], reached peak annual landings in the 1980s. A substantial reduction in fishing effort occurred in the 1990s due to the Cuban economic crisis that followed the dissolution of the Soviet bloc. The reestablishment of fishing effort to pre-crisis levels and the introduction of stricter fishing regulations did not result in an increase in mean annual landings, which could be an indication that overexploitation combined with habitat degradation and climatic changes have affected the productive capacity of this fishery [16].

Shrimp landings declined sharply during the early 1980s despite the increased effort resulting in part from the return of Cuban fishing vessels to Cuban waters after their exclusion from Mexico's newly created EEZ [17]. This was addressed with a variety of regulatory actions in the late 1970s and early 1980s, including the protection of nursery areas, establishment of seasonal closures, reduction of allowable fishing days by 75%, and the removal of 40% of the vessels in the fleet, which was possible to achieve rapidly because the State owned the fleet [17]. These measures apparently contributed to the short-term stabilization of shrimp landings, but in the 1990s mean annual landings declined again. By 1995, landings were only 26% (1651 MT) of the mean landings from the period of maximum mean landings, 1976–1980 [7], and in 2001–2005 mean annual landings were only 1454 MT [18]. Recent decreases in shrimp landings seem to be related to a reduction in nutrient levels in estuarine waters caused by nutrient accumulation in a large number of new freshwater dams [19].

Given the failure of past management measures in tackling decreasing fishery yields, the currently stated policy goal of increasing fishery landings could exacerbate overexploitation. It could also have adverse effects on other valuable ecosystem services, such as those provided by coral reef ecosystems that support subsistence fishing, sports fishing, and dive tourism. Subsistence fishing contributes to the livelihoods and food security of coastal communities in parts of the country [20,21]. Recreational activities in marine protected areas such as *Jardines de la Reina* attract foreign visitors, and are sources of jobs and foreign currency.

1.2. The Cuban fisheries system, and recent policy changes

At the onset of the 1959 Cuban Revolution, the majority of Cuba's commercial fishing fleet consisted of small wind- and

oar-powered boats [21]. The new government took swift measures to improve the livelihoods of fishing communities and to transform the artisanal fishing fleets into a modern industrial fleet. This included the construction of shipyards and living facilities for fishermen, and the organization of fishermen into fishery cooperatives. In 1968, the government launched a program to nationalize small businesses not owned by the State [22], which led to the elimination of many small businesses run by private fishermen. At the same time, cooperatives were converted into State-controlled harvesting and processing enterprises called *combinados* [17]. New *combinados* with integrated fishing ports and shipyards were constructed. Presently, *combinados* and newer fishing enterprises that are also run by the State form the backbone of Cuba's industrial fisheries.

Species-specific fishing quotas are determined by MINAL on the basis of recommendations made by MINAL's Fisheries Research Center (based on MSY calculations) and the proposed production plans of the fishing enterprises. MINAL then assigns a fishing quota to the fishing enterprises, which are responsible for harvesting within the limit of their quota, although for some species of finfish overproduction beyond the quota is accepted.

Notwithstanding the intensive industrialization and nationalization of Cuba's fisheries over the past 50 years, there exists a private commercial sector that is comprised of fishermen who own and operate their own vessels. These fishermen are responsible for paying for fuel and other expenses, and receive no government subsidies. Boats in this sector are smaller than the industrial fishing vessels, varying from 2 to 9 m in length. Until 2009, licensed private fishermen were allowed to harvest fish for personal and domestic consumption. However, unlicensed fishing and a black market have existed for years, and there have been reports of coastal overfishing by the private subsector [20,21]. In 2009, with the aim of addressing food security and stemming seafood sales in the black market, the Cuban government began to authorize the sale of the private catch to State-owned enterprises, officially creating the private commercial fishing sector.

In 2011 Cuba began an unprecedented updating of its economic model, designed to increase economic productivity while achieving a number of social goals and adhering to the principles of the Cuban revolution. These profound reforms are detailed in the Guidelines of the Economic and Social Policy of the Party and the Revolution, adopted at the Sixth Congress of the Communist Party of Cuba in April 2011 and ratified by the Party Conference held in February 2013 [14]. One of the most fundamental reforms is aimed

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