

JOSÉ MANUEL CRESPO GUERRERO & ALBERTO FUENTES BERNAL

Universidad Nacional Autónoma de México

Territorial structure and impact of commercial inshore fishing in the ports of the State Reserve El Palmar, Yucatán (Mexico)

The United Nations Food and Agriculture Organisation (FAO) indicates that to achieve the Sustainable Development Goals and Targets (SDGs)—inscribed in the 2030 Agenda—current food systems must be transformed toward alternative agroecological models, leaving behind others of the agro-industrial type propelled by the Green Revolution (INTINI, JACO & TORRES, 2019). In this context and in a population scenario that currently greatly exceeds the 7500 million people in the world, the Blue Revolution—understood as a process of technological change that modified traditional socioeconomic and cultural structures for others managed from global markets—increased the productivity of water bodies, but as a counterpart, also drove outstanding negative socio-environmental impacts (MORALES, 1978; LEÓN & GÓMEZ, 2004; VELA & OJEDA, 2007). The World Food Summit already showed in 1996 the urgency of a change in the productive model “to help sustain the cultural and biological diversity of the planet and to create the sustainable use of terrestrial and marine ecosystems” (GORDILLO & MÉNDEZ, 2013:4).

In 2012, the United Nations Conference on Sustainable Development Rio+20 incorporated the sustainable component into Blue Growth; this addressed the environmental, social, and economic concerns of the present societies (RONCO, 2020). At the 2018 World Ocean Summit, once SDG 14 had been set—related to the conservation and sustainable development of the oceans, seas, and marine resources—Sustainable Blue Growth was linked to the Blue Economy (this refers to all the economic activities that depend on the sea and are interdependent).

To strengthen strategies toward a new Blue Economy, the FAO approved the Blue Growth Initiative, which would inevitably involve the sustainable development of fishing and aquaculture, while maximising economic and social benefits, and “minimising the degradation of the environment caused by these sectors” (FAO, 2017, p. 3).

Marine ecosystems in general, and in particular the future of fishing activity, are threatened by illegal, undeclared and unregulated fishing (IUU fishing), in addition to pollution. Developing countries have become suppliers of fish and shellfish to developed countries, impacting them socio-economically. It should be noted that, in 2018, 69% of the value of fish imports went to developed countries (FAO, 2020). The 2006 World Forum of Fishermen and Workers (WFF) had already denounced the unequal access of the people of producing countries to the consumption of fish and shellfish: “the countries of the South fish more, but consume less” (AVENDAÑO, 2006, p. 9).

The asymmetries of supply and demand for fisheries products are very marked between developed countries and those on development tracks: “of the 120 million people that depend on fishing, 116 million are from developing countries and more than 90% work in small-scale fishing” (FAO, 2020, p. 190). However, this coastal population, for the most part, finds itself in the dimness of poverty and marginalisation. As a result, coastal fishing plays a fundamental role in sustainable Blue Growth to achieve the SDGs in marginalised societies that live on hydrobiological resources.

In the case of Mexico, coastal fishing is a source of well-being and economic development for coastal zones

and interior waters: it affords employment to 223,000 fishermen, which usually represents something more than 2% of the employment in agricultural and fishery activities (DOF, 2020, December 30; SADER, 2021). At the global level, Mexico ranks 15th in fisheries production (SAGARPA, 2020). The Mexican fishery economy is based on four species: shrimp (it represented 45% of the value of the catch in 2019), jolthead porgy (8%), tuna (5%) and octopus (4%). The most outstanding international markets to which Mexico's fisheries production are targeted (especially shrimp, tuna, octopus, and lobster) are the United States of America, Japan, Canada, the European Union, China, and Hong Kong (CRESPO & JIMÉNEZ, 2021).

Mexico, favoured by free trade agreements—it has signed 14 with 50 countries (GOBIERNO DE MÉXICO, 2022a)—has increased its commercialisation of fish and shellfish, generating various types of impacts. Despite the importance of fishing in Mexico, there continue to be few geographic works that are concerned about the territorial impacts caused by it. This investigation is concerned specifically with revealing the structure and impact that the economic fishing activity generates in the Yucatan ports of Sisal (municipality of Hunucmá) and Celestún (municipality of the same name). A part of its activity is carried out in the waters of the State Reserve of El Palmar (SREP), of 47,931.45 ha, and its surrounding area.

To reveal the structure and territorial impact of coastal commercial fishing in the SREP, office and fieldwork was conducted. In the office, physical and electronic bibliographic sources of a geographic, economic, environmental, and legal nature were consulted, in addition to statistical and cartographic sources from public institutions. For the compilation of qualitative information, three trips to the field were carried out (between 2019 and 2021) to the localities in Mérida (the administrative capital of the state of Yucatán), Celestún, Sisal and Progreso—the latter, the industrial fishing centre of the peninsula. During the fieldwork, by way of interviews, two types of questionnaires were applied: one semi-structured (SE) — constructed for the fishing population — another one non-structured (NE) or free — directed toward cooperative leaders, governmental officials, businesspeople, and academics. The analysis of qualitative information was based on the “constant comparison” methodology proposed by Strauss and Corbin (2002).

The investigation demonstrates that commercial fishing is the most important economic activity in the study locations, coastal fishing being the predominant one —

Celestún has medium-height boats. The dominant type of fishing economic units (FEU) is the physical person with a permit to fish, although the cooperative fishing society of up to 10 workers is also notable. Therefore, the small family company dominates, specialising in bulk extraction and sale, but not in processing or marketing. This fact means that Sisal and to a smaller extent Celestún — this location has four important FEUs specialising in processing and marketing — supply raw material to the fishing and industrial node of Yucalpetén-Progreso.

Access to commercial hydrobiological resources is provided by a fishing permit, which must be renewed every two or three years: a situation which creates uncertainty among fishermen, due to their not having the certainty of renewal, which can contribute to overexploitation of species. Practically, all permits are attributed to species of high and medium-high commercial value: lobster (*Panulirus argus*), sea cucumber (*Isostichopus badiotus*) red grouper (*Epinephelus morio*) and octopus (*Octopus maya* and *Octopus vulgaris*). The means of legal fishing are traditional and selective for the most part; nevertheless, illegal methods are noted such as the use of unauthorised compressor and chlorine. The closures of the most requested species by international markets occur in the first half of the year, which concentrates fishing activity from July to December. A fact which generates migratory movements of foreign workers and other economic activities toward fishing, above all octopus.

Socially, tensions and conflicts have been observed between legal fishermen and those that fish in an irregular manner, i.e., lacking a permit, violating closures, using illegal means, catching unregulated sizes, or cloning vessels. Among the local population, outsiders are often blamed for illegal practices, although the trade union recognizes that the breaking of norms doesn't escape the local fisherman. Likewise, the free fisherman—who lacks means of production and provides labour—is the actor who benefits least and is the weakest in the value chain: their activity is not registered with social security, which impedes their access to all labour rights. Then, the small fisherman has a permit and means of production, lacks the capacity for storage and perishability of fish, forcing them to a rapid sale with little capacity for price negotiation.

The commercial species of the highest economic value having the most concerning biological viability are sea cucumber, closed *sine die*; red grouper, considered endangered; Mayan octopus, at its maximum sustainable level of catch. Only the common octopus and the Caribbean lobster escape this delicate situation. In addition,

other species are recorded like the hogfish (*Lachnolaimus maximus*), the flying fish (*Exocoetidae* family) and the white grunt or common grunt (*Haemulon plumieri*) of which little enough is known about their population dynamics, they could be fishing resources with greater commercial development.

To the tensions between legal/illegal and local/foreign fishermen, other negative territorial impacts are added such as the unauthorised change of land use, this is found in the proliferation of self-construction and irregular trash dumps. Proper management of trash and greywater produced by fishery activity continues to be an ongoing subject. Chemical spills of products associated with the maintenance and cleaning of boats and motors end up in the sea, contributing to the acidification of water. Finally, a risk to human health is the presence of feral animals, which are attracted to ports and warehouses by biological residues from the gutting and cleaning of fish.

Since 2016, the state of Yucatán has a master plan for the development of fishing and aquaculture that was preceded by an assessment and a strategy proposal. Nevertheless, this effort that should be applied by means of effective management of the activity, up to now, has fallen on deaf ears. Fishing management has as an outcome the conservation of fishery resources which necessarily happens through the balanced development of the sector. All of that would contribute to the reduction of negative impacts. Management should keep in mind other kinds of impacts, such as those generated to the sector by climate change: increase of sargasso episodes, red tides and adverse hydrometeorological events (hurricanes and cold fronts) as well as the possible increase of non-native hydrobiological species (potentially commercial) and the loss of others with a consolidated commercial niche. The

possibility of legalising current fishermen that fish without a permit shouldn't be excluded, which would require broad social consensus. The legal framework should continue reinforcing its orientation toward responsible fishing. Possible spatial compatibilities with other economic activities, such as tourism — with very positive growth prospects — and construction should not remain in the pipeline.

The lack of management capacity by authorities with training in commercial fishing hinders inspection, surveillance, facilitation of administrative processes..., accentuates the problems of the activity, creates others, and constructs a dangerous sensation of abandonment in a socioeconomically strategic sector. The FEUs encounter continuous challenges such as insecurity, coexistence with IUU fishing and irregularity (in which they sometimes participate), delays in export certifications, the difficult biological situation of some highly valued species, the repercussions of climate change and the absence of active resource management and protected natural areas, to list the most outstanding. The nonexistence of fisheries management is undoubted in the study area and its negative territorial impacts are evident. All this, despite the multitude of nature conservation tools and territorial management plans that come together in the SREP.

To start on the road toward other more sustainable productive models requires a sincere, collective effort, led by public administrations, with budgetary support and consensus with the sector. For that reason, modifying current food systems toward alternative agroecological models, in the capitalist economic system, implies more investment, development and innovation on the environmental, social, and economic components that concern commercial fishing: a truly titanic effort due to its complexity.