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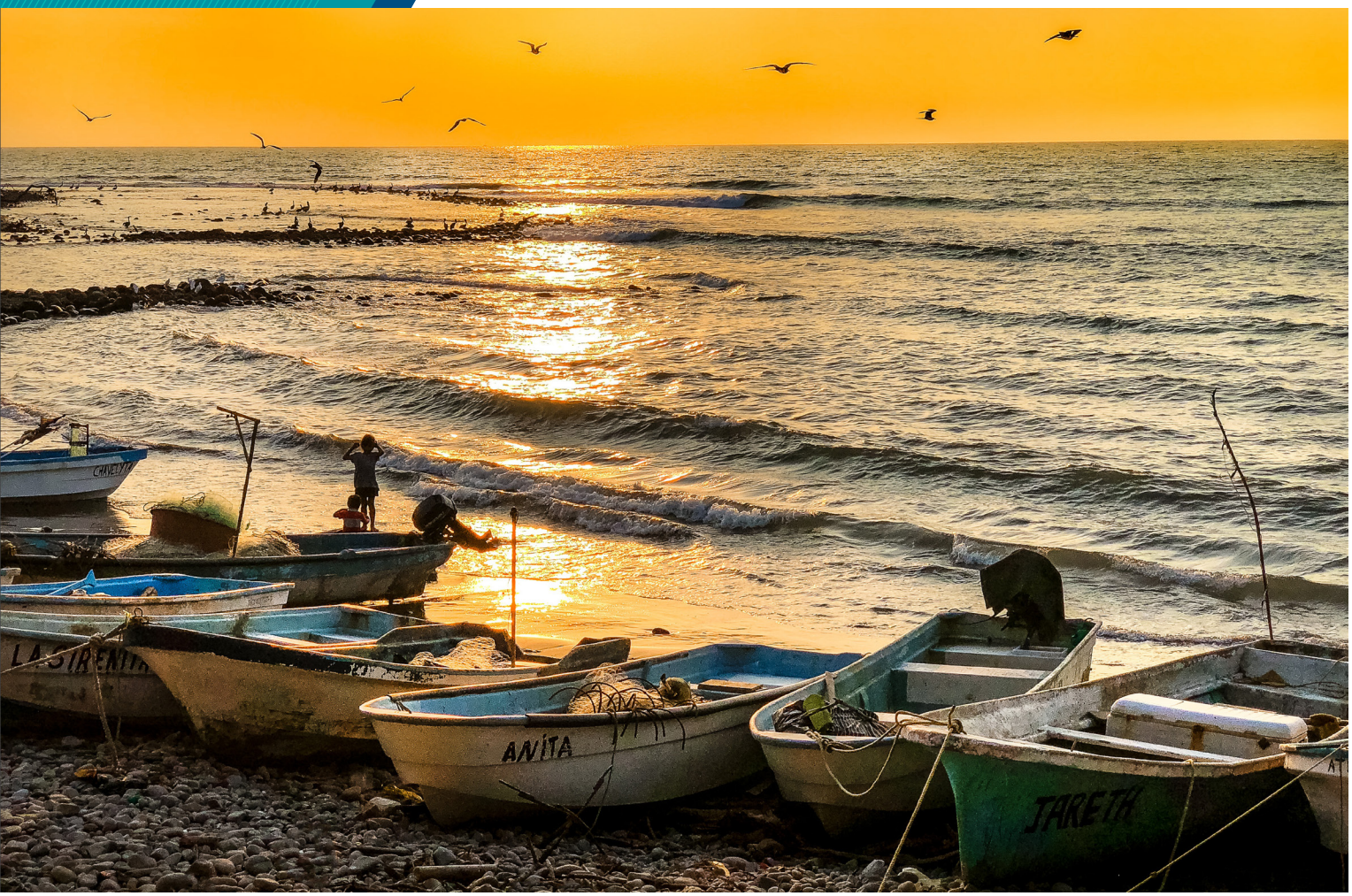

Small-Scale Fisheries in Latin America and the Caribbean: Sustainability Considerations

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Content

Acronyms

MPAs	Marine Protected Areas
FAO	Food and Agriculture Organization of the United Nations
IUUF	Illegal, Unreported and Unregulated Fishing
LAC	Latin America and the Caribbean
SSF	Small-Scale Fishing
MSY	Maximum Sustainable Yield
BRMEAs	Benthic Resources Management and Exploitation Areas
FEDECOOP	Regional Federation of Cooperative Societies of the Fishing Industry, F.C.L.

Introduction

Small-scale fishing (SSF)[1] is considered a diverse and complex socioeconomic activity (Chuenpagdee *et al*., 2019). Both with regards to understanding it and in terms of its operation and management. Ironically, the word "small" does not make justice to the important role it plays across the world nor to the problems it faces (FAO 2018; Jentoft *et al*., 2017). This is a sector that contributes to more than half of the world´s fish catch. Is this small? Probably not. The fact it is defined as "small scale fishing" or SSF overlooks the central role it plays by providing food and livelihoods to coastal villages, mainly in developing countries (Salas *et al*., 2011). This perspective often also underestimates the human and economic resources needed for its optimal management. Ironically, SSF does not face minor problems. In this regard, frequent difficulties presented in this sector include: the lack of information for decision-making, the sectors weak organization, its volatile and vulnerable features, including its to climate change, and a failed implementation of management tools which has had as a result, a reversal in the stock and populations of fisheries and marine biodiversity in general (Cochrane 1999; Jentoft 2000; Salas *et al*., 2007).

Latin America and the Caribbean (LAC) is not much different to this general description of SSF around the world. However, despite the challenges mentioned, SSF in this region has demonstrated through concrete actions and examples, to be a sustainable activity or on its way to being sustainable. This has been evidenced through the implementation of tools that promote conservation of fisheries, including through territorial use rights (Castilla, J.C. and Gelcich 2008; McCay *et al*., 2014; Parma *et al*., 2005), the use of inter-sectorial platforms and alliances that have strengthened the activity (Suárez-Castillo *et al*., 2016), and adaptable social and environmental management of fisheries (Cunningham 2013).

Addressing the issues of sustainability and environmental protection in the context of SSF is not an easy task. This is partly due to the broad nature of SSF as concept and diverse approaches to ensure that fishing satisfies present demands but does not compromise resources and future generations possibilities to enjoy and exploit these resources. Internationally, as shown in Box No. 1, some agreements and instruments have been adopted to inform and guide national and regional processes in terms of meeting and realizing sustainability objectives and principles.

Box No. 1:

International instruments with goals and principles for fishery sustainability

Instruments	Year	Synthesis
Code of Conduct for Responsible Fisheries[2]	1995	A collection of principles, objectives and elements for action that allow reaching global fisheries conservation and management goals.
Aichi Targets[3]	2010	Addressing the underlying causes from the loss of biological diversity through streamlining of biological diversity, including marine biodiversity, at all governmental levels and society.
Voluntary guidelines for securing sustainable small-scale fisheries[4]	2014	Guidelines in order to help governments and fisheries communities accomplish safe and sustainable small-scale fishing.
Sustainable Development Objectives (SDGs)[5]	2015	There are 17 goals to end poverty, protect the planet and ensure peace and prosperity for all. Goal 14 sets the baseline to ensure the conservation of underwater marine life.
Paris Accord[6]	2015	Each country established a series of National Determined Contributions (NDCs). In Latin America, only 11 countries included fisheries as in issue in their NDCs.

The following sections in this paper emphasizes some important elements that have helped fisheries in LAC to approach sustainability and environmental protection levels and highlight some principles which are considered essential for sustainable development and sound management of productive activities.[7]

Small-scale fishing in Latin America and the Caribbean

Approximately 2.3 million people in LAC are directly or indirectly involved with fishing activities (Chuenpagdee *et al*., 2019; FAO 2014). The relevance of small-scale fishing or SSF in LAC becomes noticeable when we recognize that it contributes with over 10% of SSF catches at the global level (Salas *et al*., 2011). Moreover, the region is projected to economically grow considerably over the next decades, including in the fishing sector (+18%) according to the last report of the State of World Fisheries and Aquaculture – SOFIA (FAO 2018).[8] Despite this promising future, reality is that coastal communities depending on commercial fishing for their livelihoods require extra attention due to the vulnerability they present in a context of rapid economic and climate related changes, as well as from diverse human induced pressures such as marine pollution.

Unquestionably, climate change will have a direct effect on fisheries, both on stocks and distribution of species, and thereby on the overall livelihood of coastal communities. Change in temperature and rising sea levels might be a motive to redefine the coverage and extension of marine protected areas and invest in coastal communities. Climate change also poses a risk in terms of diseases for marine species and humans (Lu y Li 2014; Westland *et al*. 2007). Uncertainty as to where and how dramatic effects will be remains an issue. Impacts may be negative, but could also be positive in some cases. Increase in temperatures of the oceans for example, brought an increase in biomass of certain species in the Galapagos during the Niño Phenom of 1997 and 1998; at the same time many other species were lost due to this same process (Castro-Ortiz y Guzman del Proo 2018).

Likewise, growing pollution (i.e. plastics and sewers), mainly in coastal zones where most of SSF is undertaken, is generating difficulties for fishing activities and may compromise future projections to some extent. Further human induced activities such as cattle grazing near coastal areas, agriculture and even aquaculture and their discharges, are also adding to the pressure on marine environments. Coral reefs, mangroves and other coastal ecosystems are especially vulnerable (Kappel *et al*. 2008).

In addition, problems for SSF intensify when considering the so-called "Illegal, Unreported and Unregulated Fishing" (IUUF). Marine pollution is a particularly critical concern. It affects greatly affects resources and marine biodiversity that constitutes a true "system of life." A recent report from the International Panel on Biodiversity and Ecosystem Services -IPBES- recognized that the loss of marine biodiversity is double than that of land biodiversity. Species recruitment and their recovery are two aspects continuously being impacted due to marine pollution (Lluch-Cota and Hernández Vásquez 2006).

It is evident that only with these problems, the challenges for SSF are huge. While the outlook may seem grim and frustrating, there are also positive examples of efforts that provide expectations and motivate the implementation of actions to protect the marine ecosystem and at the same time, continue to maintain and enhance SSF activities. Among examples are the nations of Belize and Chile that in recent months passed decrees to increase their marine protected areas by 10% and 25.3% respectively. In 2017 Mexico created the Revillagigedo National Park, presently considered the largest protected marine archipelago in North America. These countries and other such as Peru, Colombia and

Costa Rica have undertaken similar efforts to improve and extend the coverage of their marine protected areas (MPAs). These actions respond to international commitments to the Aichi Biodiversity Targets (2010) and Sustainable Development Goals (2015), aimed towards the protection of at least 10% of the marine surfaces that contribute to maintaining marine biodiversity and in turn reduce poverty based on the sustainable use of this natural marine wealth.

Fisheries management perspectives in Mexico, Chile and Peru: a brief overview

On the coasts of Mexico, if you ask a fisher: what are you going to fish today? He will generally have a clear idea on the fishing area and species he plans to capture. It can be safely said that his *objective,* his fishing trip and operation for that day is clear. The process of managing any fishery is based on the knowledge of the goal you want to reach, in other words, be clear about the main objective. Major objectives for those investing efforts in fisheries management include: maintaining the ecosystem, reducing or reverting the impact caused by fishing and improving the economy or social aspects of coastal communities.

Few organizations or communities are clear on "where they are heading" with regards to well-defined fishing standards under which they manage their fisheries. It is not easy to reach this point, as fisheries management has a lot to do with understanding the motivation of individuals. It is said that "managing fisheries is managing people" (Hilborn 2007b).

The situation is complicated when you want to reach a single objective and several fishers in different communities, states or countries were asked the same question: what would you like to see in fishing? There were diverse answers revolving around the issue on how to undertake fishing (type of fishing gear and area of fishing), and what is required (generally permits and surveillance). Some responded and highlighted "the lack of the sectors organization and making us heard". All the answers are valid and justified, but probably lack a common target or vision.

For example, in Mexico, the legal framework might be useful in the process of defining a management objective but is still void of certain basic definitions and is lacking certain regulatory instruments. To date, the General Law for Sustainable Fisheries and Aquaculture (LGPAS) of Mexico does not define the concept of "fishery sustainability" and fails to mention an objective (SAGARPA 2007; Fernandez Rivera Melo *et al*., 2018). In another example in the region, the Fishing Law of Chile, includes definitions for "sustainable use" or "Maximum Sustainable Yield" (MSY) that help to better understand what to expect from fisheries management. The General Law on Fishing of Peru and a series of regulations and amendments over time, also addresses "sustained development" and "rational use" as concepts which provide general guidance as principles for fisheries management and administration.

With a clear understanding of the direction of resources management, a management tool can be chosen to achieve an objective. Mexico is one of the few countries in LAC that has implemented a wide range of management tools in order to maintain and manage its fisheries (Salas *et al*., 2007, 2011). Nevertheless, the tools and instruments used (e.g. regulations, management plans and permits) are insufficient to satisfy and guarantee sustainability of fishing activities (Salas *et al*., 2011). Chile has another set of diverse instruments such as fishing quotas, management areas and areas for the exploitation of benthic resources (AMERBs), the protection of coastal and marine spaces of indigenous peoples, among other tools. Again, in spite of their diversity and novel nature, resource management still confronts challenges in terms of administration and marine biodiversity conservation in general.

As mentioned previously, one of the difficulties SSF faces is the sectors lack of organization and efficient representativeness. A strong social base is required with an organization grounded

on transparent regulations and a common vision. There is no need to think of a traditional scheme of fisheries organization. The fisheries sector may be organized in different ways (Ostrom 2005), under formal schemes such as cooperatives (in the case of Mexico) or unions (in Chile) or informally such as groups or organizations of fishers in Peru and other LAC countries.

Several ecological and social challenges for SSF have also been mentioned, which reflect the complexity of fisheries. However, this does not mean that the task to achieve sustainability is impossible. Over time, elements have been identified that allow SSF to proceed towards a balance that allow it to continue to undertake activities in the foreseeable future. Several of these elements or criteria have been considered in certification processes like the Marine Stewardship Council (Fernandez Rivera Melo *et al*., 2018).

Some of the main elements to achieve sustainable and healthy fishing practices include:

Systems that promote the custody of fishery resources

Fishing permits are the most commonly used fisheries management tools. They are used in Mexico and the majority of countries in the region.[9] This document allows the permit holder to access fisheries or undertake aquaculture activities, but does not provide legal certainty on the use of the resource or area of work, or promote a sense of ownership or responsibility over management and administration of the specific fisheries. These characteristics have been identified as essential for the adequate management of common property resources (Ostrom *et al*., 1999). To this effect, access and property rights have played a key role in countries where they have been implemented, as they grant privileges to communities or fishers, making them responsible for their actions in resource management. In Mexico, Peru and Chile for example, the tool that provides this privilege are the concessions.[10] In the specific case of Mexico, concessions have been granted mainly for benthic or sessile resources, whose beneficiaries have been able to: a) reconstruct their fisheries, b) organize the distribution, c) enhance the economic profitability of their fishery, and d) help to ensure food security (Sociedad de Historia Natural Niparajá, A.C. and EDF of Mexico 2018). The commitment made by beneficiaries for obtaining a concession is to maintain the resources at an optimum level in exchange for exclusive use. These rights granted to the users have generally helped to maintain healthy fisheries (McCay *et al*., 2014). Natural protected areas in Mexico can also be considered a tool to motivate and above all, strengthen a sense of ownership and empowerment. An example of this can be observed at the Arrecife Alacranes National Park where only cooperatives with a concession and working in the zone may capture lobster[11]. This is regulated in the National Park Management Program.

Clear and effective regulations which can also adapt to changes in fishing

The laws and regulations which help fisheries management, whether industrial or river fishing, will be effective provided they are clear, include a strict compliance system and have a degree of adaptability that responds to dynamic marine environments and changing situations. Clarity is necessary in order to reduce confusion among users. For example, it is easier for fishers and authorities that manage resources to have a non-fishing area. This minimizes confusion: if someone were found fishing in this area, he would be violating the regulation.

One good example is Belize and its management areas. These include access controls, no take zones, and restrictions on the use of certain fishing gears. Users must register their captures and landings, which has become surprisingly effective as 80% of users comply with these conditions (Fujita *et al*. 2019; Martinez *et al*. 2018).

Compliance with regulations can become difficult, an even generate grey areas, when requirements increase and, for example, call for zoning according to fishing gear. These cases require further information to design and establish regulations and thereby more resources (both human and economic), in order to implement and monitor them. Regulations must also consider and allow updates to adapt to the current and changing situations. The regulations must emerge and if so, be modified when required or agreed upon, taking into account the ecology of the target species and ecosystem conditions. At present, the lack of flexible instruments to adapt to environmental or social changes is also a challenge for fisheries management. Therefore, the existence of regulations allowing adjustments over time, in the face of environmental and economic changes (OECD 2011a) can help towards appropriate management of natural conditions of marine resources, mainly at present, when climate change unpredictably affects fisheries worldwide (OECD 2011b).

Organization of the sector and social resilience

"Get properly organized" is one of the constant petitions by governments and ministries to the fishing sector and SSF in particular. This same sector can frequently be heard saying: "we need to better organize ourselves". These demands can be strongly justified, but the route to achieve this may not be very evident. It has been found that organizations with a solid structure often ensure: clear regulations, sanctions due to non-compliance, decision-making spaces, commitment by members and strong leadership (Ostrom 2005). Having a strong and functional organization allows them to plan and anticipate future events that could undermine the organizations operation and production. Likewise, organization is essential as fishing depends on common property resources. In Mexico for example, some cooperatives, members of the Regional Federation of Cooperative Societies of the Fishing Industry of Baja California (FEDECOOP), agreed to create saving funds for emergencies if their production was affected by a change of temperature or a drastic reduction of income. The saving funds allows them to face similar events in the future: this can only take place with good organization (Finkbeiner 2015).

Co-management of fisheries

As a final point, co-management also needs to be considered. This has briefly been defined as shared responsibility between the government and fisheries organizations (Jentoft, McCay and Wilson 1998; Kaplan and McCay 2004). This may happen at different levels, from an advisory level for decision-making, to the active participation of actors involved in order to reach agreements (Berkes *et al*., 2001). What is crucial in this system of sharing responsibilities is that each group or actor undertakes their role in the best possible way. For this to happen, two situations need to occur: the existence of property rights granted to fisheries organizations and demonstrable levels of functionality and maturity that allows them to manage these rights.

In a cross-cutting manner, these four elements have common factors that should not be overlooked: the role of the State, compliance of regulations and the need to face social conflicts.

Government interventions for fisheries management are necessary. There are complex situations that require the action of high-level authorities (Cochrane and Garcia 2009; Ostrom *et al*., 1999). The management of marine resources cannot rest alone on the coastal communities. The State will always play an important role, by monitoring compliance of regulations. Among the fisheries sector, one can often hear that "...more surveillance is needed". This goes in hand with enforcing regulations not only in fisheries management but also in the operation of fisheries organizations.

Finally, for each one of these elements mentioned, there will always be a group either excluded or affected. Regarding this, the lack of willingness, of strategies or capacities to face the social issue, will translate into weak fisheries management tools. Once again this leads to the issue on the definition of objectives. One must take into account that it may not be possible to reach two of the objectives addressed. For example, if one attempts to seek a job increase, this would not be compatible with the objective of reaching the point of fisheries maximum sustainable yield (MSY) (Cochrane 1999; Hilborn 2007a), as the MSY would have a maximum associated fishing effort. The issue with fishery management objectives is that defining them is not enough: they require the necessary actions to achieve them, even if it implies decision-making not necessarily approved by all participants engaged in the fishery.

Voluntary guidelines for sustainability

With regards to SSF the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries are an important tool in the arsenal. This represents the first consensus globally which establishes clear action lines to ensure poverty eradication (FAO 2015; Jentoft *et al*., 2017), by addressing other points of interest such as the management of aquatic resources and associated biodiversity. It also focuses on the existence of equitable property rights, socially and culturally appropriate. It is worth emphasizing that the content in the Guidelines aims to address several challenges SSF faces, considering the following factors: governance of land ownership, gender equality, social development and dignified work, fishery management, value chains and climate change (FAO 2015).

Final comments

Ironically, SSF faces large-scale problems. Additionally, it is considered a sub-sector of fisheries that plays an important role in the goals against poverty eradication as it provides food and jobs to millions of people.

It is not the exception in LAC, were there are examples allowing us to see the existence of ways to maintain this sector afloat and work on the necessary changes in order to reach fisheries sustainability.

SSF has the qualities to evolve and adapt very rapidly. Four elements can be identified to lead towards sustainability: 1) a system that promotes the custody of resources, 2) regulations with a certain degree of flexibility that adapt to the changes fisheries are faced with, 3) strong fishery organizations and 4) the existence of co-management between the government and fishers.

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1 The definition Small-Scale Fishing continues to be a subject of debate. However, in 2003, the FAO published in their SECOND SESSION OF THE WORKING PARTY ON SMALL-SCALES FISHERIES, a characterization of SSF. It included the modification of a description made previously where it mentions that it is: "...a dynamic sector in evolution..." (FA) 2003).

2 The Code has been approved by 33 countries in Latin America.

3 All countries in the region are parties to the Biodiversity Convention and subscribe to the Aichi Targets.

4 These are voluntary guidelines and all Latin America countries have approved them.

5 These goals were part of a United Nations led process and have been signed by all Latin American countries.

6 An analysis of the Paris Accord, its implications for Latin America and NDCs is provided in https://bit.ly/2BxUYF7.

7 Based on already documented research and initiatives, as well as on the experience and knowledge of authors in some Mexican coasts.

8 SOFIA (State of the World's Fisheries and Aquaculture) is the main yearly publication of the FAO in terms of fisheries and aquaculture matters.

9 Permits are authorized and granted by the National Commission for Aquaculture and Fisheries (CONAPESCA), based on technical opinion from the National Institute of Fishing and Aquaculture (INAPESCA) (SAGARPA 2007).

10 Maritime concessions can be to develop fishing or aquaculture activities.

11 Programa de Manejo Parque Nacional Arrecife Alacranes- https://bit.ly/2JOEsTQ

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