# Breaking paradigms: innovative, connected and scalable solutions for small-scale fisheries

*By: Fernández-Rivera Melo F.J., López-Ercilla I., Fulton S. and Espinosa-Romero M.J.*, **Comunidad y Biodiversidad A.C.**

According to the Food and Agriculture Organization (FAO), approximately 60 million people indirectly or directly work, either full or part-time, in the primary productive sector of fisheries and aquaculture worldwide. Small-scale fisheries contribute about half of global catches while employing about 90% of the people directly dependent on capture fisheries[1]. Strengthening small-scale fisheries has been recognized as an important strategy not only for employment but also for addressing food security and poverty issues. Mismanagement of small-scale fisheries has ecological, socioeconomic, and governance implications.

The FAO ranked Mexico thirteenth in the world in terms of seafood production[1]. According to the Mexican Ministry of Fisheries, small-scale fisheries account for 40% of total catch, including 74,055 registered boats and an estimated 222,165 fishers[2,3]. From the 571 species registered in the national inventory of commercial species (National Fishery Charter), all species are caught by the small-scale fleet, and 26 species (tuna, shrimp, small pelagics) are also shared with the industrial fleet. Small Scale Fishing is an important economic driver in the more than 11,000 communities (< 15,000 inhabitants) that can be found along the coasts of Mexico[4].

Fishing communities are particularly vulnerable to short-term and local problems (e.g. financial crisis, market changes, organized crime), and global changes such as modifications to large-scale natural systems (land, oceans, climate) including those

[1] FAO. (2020). The State of World Fisheries and Aquaculture 2020. Sustainability in action. Rome: Food and Agriculture Organization of the United Nations.
[2] CONAPESCA. (2013). Anuario estadístico de pesca y acuacultura 2013. México: SAGARPA.
[3] Moreno-Báez, M., Orr, B. J., Cudney-Bueno, R., & Shaw, W. W. (2010). Using fishers' local knowledge to aid management at regional scales: Spatial distribution of small-scale fisheries in the northern gulf of California, Mexico. Bulletin of Marine Science, 86(2), 339–353.
[4] Gabriel-Morales, J., & Perez-Damian, J. L. (2006). Crecimiento poblacional e instrumentos para la regulación ambiental de los asentamientos humanos en los municipios costeros de México. Gaceta ecológica, 79, 53–77.

caused by humans (e.g. climate change)[5,6]. However, fishers go fishing every day. They are flexible and make daily decisions to adapt, using their experience, and available information. Some of their choices move them towards sustainability and social benefits, others do not. Fishers are decisive and show adaptive capacity; they switch from one fishery to another, create new fishing techniques, and find new markets quickly. In addition, fishers are embracing new tools, including social media, mobile technologies, and other innovations for information sharing and decision-making.

Small-scale fisheries around the world face similar challenges in adapting to short-term problems and global changes. For example, fishers in northwestern Mexico observed in 2019 that the lobster they caught had softened shells, affecting the marketing of the product. Not understanding why it was happening, they talked with researchers. The researchers consulted literature and other experts and replied to the community a month later. However, when the problem was mentioned to another fisher in southeastern Mexico, he immediately commented, "Your lobster is soft, that happens when there is a lot of freshwater. We see it after heavy rains or hurricanes". A fisher from the southeast coast of Mexico resolved, in a matter of minutes, an observation of a group of fishers from the northwest coast; while it took researchers a month to get back to the fishers. This happened thanks to the fishers from these two communities connecting through a network developed in collaboration with a civil society organization.

[5] Badjeck, M.-C., Perry, A., Renn, S., Brown, D. & Poulain, F. 2013. The vulnerability of fishing-dependent economies to disasters. FAO Fisheries and Aquaculture Circular. No. 1081. Rome, FAO. 19 pp.

[6] Leitao, F., Roa-Ureta, R.H. and Canovas, F.. 2020. Vulnerability of Fisheries to Climate Change. Frontiers. doi: 10.3389/fmars.2020.613793

During the last two decades, small-scale fisheries in Mexico have made efforts to develop good practices related to conservation and sustainable fishing in collaboration with civil society organizations, academia, and the government[7]. These efforts are important contributions to international agreements such as FAO's Voluntary Guidelines for securing small-scale fisheries in the context of food security and poverty eradication (sustainability, tenure of rights, decent work, gender equality, value chain, adaptation to climate change), and Sustainable Development Goals (particularly gender 5, climate change 13, below water 14)[7, 8]. The sector has strengthened its capacities in matters of the common good, leadership, gender perspective, collaborative negotiation, fisheries management, ecology, and public policies. They have implemented fish refuge areas (2,000,000 ha) and voluntary reserves (500 ha) to recover populations of commercial interest[7]. In addition, three small-scale fisheries are certified: the red lobster fishery by the Marine Stewardship Council, and the shrimp and finfish fishery by Fairtrade USA, and 23 fisheries are on track to sustainability through fishery improvement projects[7,9].


Despite what was presented in the previous paragraphs, at present, fishers do not have a methodology to help them document the solutions they design or implement. We have identified that the majority of coastal communities are not connected to other communities in a structured way; the solutions that some find

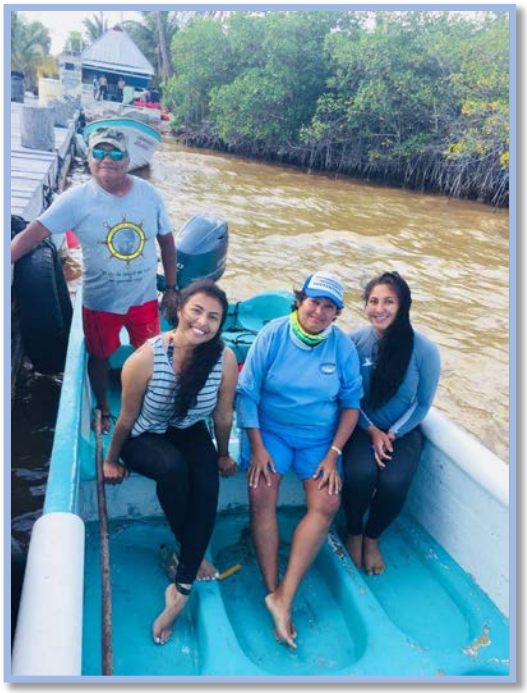
[7] Espinosa-Romero, M. J., Torre, J., Zepeda, J. A., Solana, F. J. V., and Fulton, S. (2017). "Civil society contributions to the implementation of the small-scale fisheries guidelines in Mexico," in The Small-Scale Fisheries Guidelines, eds S. Jentoft, R. Chuenpagdee, M. J. Barragán-Paladines, and N. Franz (Cham: Springer), 423–449. doi: 10.1007/978-3-319-55074-9_20

[8] https://chm.cbd.int/api/v2013/documents/7DFED332-8E25-6C00-8F1B-FD50DFBE5D54/attachments/Meta6-COBI%20PESQUERIAS.pdf

[9] https://fisheryprogress.org/directory?title=&field_species_tid=All&field_country_value=MX&field_listing_status_value_1%5B%5D=active&field_fip_type_value%5B%5D=basic&field_fip_type_value%5B%5D=comprehensive&field_participant_org_name_value=

are not helping to inspire other communities with similar challenges. This situation has been exacerbated in the last year due to the impact of the COVID-19 pandemic. In addition, the efforts and contributions of small-scale fisheries are not visible at the national and international levels.

Transformation of the sector into a digital world is being accelerated due to the pandemic. This is a great opportunity to facilitate systematization, connectivity and scalability; but it also poses a big responsibility in terms of design, digital security and data sovereignty. It is very important that the digital interventions consider a no-harm design.



Understanding the importance of small-scale fisheries, the challenges they face, and how they respond to these short-term problems and global changes. Comunidad y Biodiversidad (COBI) is collaborating with the small-scale fisheries sector for breaking paradigms, on issues of innovation, connectivity, and scaling solutions. The work includes three strategies: 1) co-creation of solutions, knowledge sharing, co-creation and testing of fisheries solutions to respond to global shocks and changes that are causing a rapid decline in ocean health and the social fabric of coastal communities; 2) social impact network, the network will be formed by fishers from Mexico and the LAC region, and will operate at both the digital and personal level, leveraging technology and trust to connect fishers and work collectively to create solutions; and 3) scaling, solutions will influence future generations and policy agendas. The next generation of fishers will seize opportunities to participate in fisheries, climate change, gender equality, and sustainable fisheries debates (e.g. national policy, SDGs, FAO's small-scale fisheries guidelines). This strategy is linked to the development of a digital infrastructure in collaboration with fishers. This digital tool, *Innovación Azul* (Blue Innovation), was developed to connect the fishers to mobilize information and innovations that can be adopted in Mexico, Latin American and beyond.

During the following years of implementation, this strategy seeks to balance capacities and opinions between those who have the power to influence the management of fisheries resources (natural, financial, human, among others) and those groups or people who are traditionally under-represented in the decision-making. We know that there is no simple recipe for meeting fisheries, environmental, social, and management challenges. However, collective action, a clear and shared vision, defined roles and responsibilities, inclusion of current and future generations of fishers (women and men) foster the design, implementation, and documentation of solutions to achieve resilient communities and healthy oceans.