

Part I: General information

Name of case study: Transdisciplinary path towards sustainable fishing.

Geographic location (including country): Puerto Libertad, Sonora, Mexico

Information about contributors (name, affiliation and contact information, including email):

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Role/involvement of the contributors in the case study

- Comunidad y Biodiversidad (COBI) is a Mexican Civil Society Organization that works to promote sustainable fishing and marine conservation. The organization has been working in the area and with members of the community since 2011.
- Center for Research and Advanced Studies of the National Polytechnic Institute (CINVESTAV) was established in 1961 by presidential decree to conduct postgraduate research and has 10 campuses throughout Mexico.
- The College of the Southern Frontier (ECOSUR) has five campuses in southern Mexico and was established to conduct and promote applied scientific research in southern Mexico, with particular focus on environmental, economic, productive and social problems.
- Comité de Pesca y Acuicultura de Puerto Libertad. The Fishing and Aquaculture Committee of Puerto Libertad is a self-organized group of cooperatives, permit holders and free fishers, formed in 2011 to promote the common good, through sustainable fishing and good governance.

Workshop development was designed and conducted by all team members at different stages through meetings (face-to-face and virtual), with additional contributions from TBTI Project Coordinator, Dr. Ratana Chuenpagdee.

The workshop was held from 17-20 October 2017. The workshop had a specific focus on the governance issues and interactions as well as to learn how both have changed through time.

Short description about the case study (about 100 words)

Puerto Libertad (2,700 inhabitants) is a fishing village in the Midriff Islands Region of the Gulf of California. Approximately 200 fishers target species like grouper, sharks, clams, and a range of other finfish species. Some fishers are organized in cooperatives, some work for permit holders, and other operate informally. In 2011 the Puerto Libertad Fishing and Aquaculture Committee, (Comité de Pesca y Acuicultura de Puerto Libertad) was integrated to unite the sector (cooperatives, permit holders, and free fishers); it aims to promote sustainable practices, good governance and work towards the common good.

Part 2: Wicked problems and stakeholders

List problems/issues facing SSF in the case study

In 2011 the main concerns in Puerto Libertad community, were associated with the interactions small-scale fishers had with the industrial fleet (the major concern, particularly shrimp boats fishing close to shore), lack of fisheries governance and policies, concentration of power into the hands of few people, high risk fishing operations (as they travel farther/deeper to reaching fishing grounds), and an increased in operating costs (Espinosa-Romero et al. 2014).

Perceptions about the problems have changed significantly since the committee was integrated. The principal issues identified by the fishers in 2017, during a Transdisciplinary Workshop, were: 1) the complex, slow, and bureaucratic processes to access or renew fishing permits, 2) corruption, involving the abuse from some authorities and a lack of knowledge about jurisdictional authority of different government agencies, 3) the difficulty to have access to subsidies, 4) the lack of unity among the fishers, and finally 5) the lack of innovation and training in new technologies that could improve catch selectivity.

For this case study, we will focus on problems #1 (the complex, slow, and bureaucratic processes to access or renew fishing permits) and #2 (the lack of capacity and technical knowledge that expose fishers to extortion and corruption) from the list above. These were the most important problems identified by the group and will be referred as #1 and #2 in the following sections.

- **For each problem, list stakeholders ‘involved’ (e.g. those creating the problem, those affected by it, and those attempting to address it)**

#1. The principal stakeholders are the legal fishers who operate in cooperatives (trying to access or renewing permit), permit holders (renewing permits) and irregular fishers (hopping to have access to fishing permits for the first time). The National Commission of Aquaculture and Fisheries (CONAPESCA), being the agency that authorize the permits is also a key actor. Other stakeholders include the National Research Institute of Fisheries and Aquaculture (INAPESCA) in charge of stock assessments, and civil society organizations (such as COBI) that have tried to facilitate processes.

#2. The fishing sector in general (all sectors) is affected by the problem. CONAPESCA, municipal governments (police), and organized crime were identified as a source of the problem.

- **For each problem, indicate the ‘level of severity’ of the problem (based on its perceived/observed effects)**

#1. Considered a severe problem by the fishers. The majority of fishers have indicated that they want to operate following the law, but get frustrated by overly bureaucratic processes. Some fishers have waited eight years to obtain their fishing permits. A lack of permits can expose fishers to extortion if they undertake fishing activities and excludes them from the possibility of accessing subsidies, training, and from receiving technical support from INAPESCA or other research institutes. For fishers, delays in renewing the permits result in lost of income, illegal fishing, and a loss of clients (as buyers find other sources).

#2. Considered a severe problem. The fishers report that CONAPESCA agents may not have the information nor understand the complexities of small-scale fisheries, including the names of the species being caught or the types of fishing gears being used, which can lead to misinterpretations of the law and bylaws and thus to unfair sanctions and bribes. The fishers identified apathy and corruption on the part of CONAPESCA officials. Administrative processes can be interrupted with no explanation, access to permits can be blocked, and bribes expected.

Similarly, fishers who transport products to market, have run into road blocks (by police or organized crime) as the sites that expose them to extortion. A lack of knowledge of the law (on part of the fishers) and a fear to the organized crime exacerbate the problem.

- **For each problem, indicate whether it is perceived differently or similarly by each stakeholders**

#1. The problem is perceived similarly by all fishers, although those with more experience trying to get permits are more aware of the problem.

#2. The problem is also similarly perceived by all fishers, but those who are more exposed to the problems, such as those in charge of moving and selling catches, accessing permits, and dealing with government officials and processes have more firsthand experience.

- **For each problem, indicate whether something has been done to address it, by who and to what outcome**

#1. Since 2011, the situation has improved somehow in the community. Previous to 2011 many more fishers were irregular than at present. Although access to permits has taken many years (5-8 years) to be handled, fishers have received them, and their relationship and interactions with CONAPESCA have improved. The local CONAPESCA office in Puerto Libertad, which the committee were able to help re-open has streamlined the processes as documents have to be validated locally before being sent to federal offices.

#2. Fishers (cooperatives, permit holders, irregular) have tried to become more organized to present a common front. The irregular fishers organized themselves into a cooperative, although they still struggle with organization and leadership. The fishers also understand that by being informed and respecting the rules they can also reduce the risk of being exposed to extortion or corruption.

- **For each problem, indicate whether it is part of a bigger problem**

#1. According to small-scale fishers in Puerto Libertad, Mexico's industrial fisheries draw much of the attention of the federal government, despite the importance of the SSF sector in terms of production, economy, and employment. Similarly, fisheries policy continues to be centralized, meaning that permits are authorized in federal offices, by staff that do not understand the local complexities of SSFs. Similarly, international commitments signed by the federal government try to ensure that fishing effort does not increase. Authorizing permits would result in IUU catch being regularized, and official catch data would increase.

#2. This problem is not restricted to the fisheries sector. Under-funding, under-capacity and inefficiency are common in the federal agencies responsible for fisheries and conservation. Budget cuts in recent years have exacerbated the problem. Corruption permeates at every level of society, particularly in government processes, and the fishing sector is not exempt. Whilst organized crime has not taken hold in the town of Puerto Libertad, other coastal communities in Sonora are known to be hotspots for such activities.

- **Once all problems have been evaluated based on the above, provide a rating of 1-5 to each problem in terms of 'relatively degree of the wickedness.' (1 = not very wicked, 3 = moderately wicked, 5 = very wicked)**

Both problems are considered *very wicked* as they involve the interaction of complex SSF with local, state, and federal bureaucratic systems and national problems such as corruption and organized crime. The problem does not have a "face". Some of the problems are not restricted to fishing and, in the cases where fishing is the main component, many of the bureaucratic systems that the fishers identify as problematic have been put in place with the aim of

increasing compliance and standardizing reporting. Unfortunately, the complexity of SSF (unique environments, plethora of target species) prevents the *one-size fits all* approach that government usually applies.

Part 3: System characterization

Describe the ‘natural system’ (that is being governed; N-SG) in terms of diversity, complexity, dynamics and scale (DCDS)

The system covers an area of approximately 14,027 km², which constitutes the fishing grounds of the Puerto Libertad fishers (Moreno-Baez et al. 2010) (see Figure 1). The natural system involves 37 main species or functional groups, of which 25 are target species. Fishers have previously identified the interactions of fishing activities with target species (Figure 2). When drawing food webs, fishers recognized the commercial and ecological importance of target and non-target species. For example, they identified sardine species as the basis for the ecosystem. Fishing seasons and species mobility have also been identified (Espinosa-Romero et al. 2014).

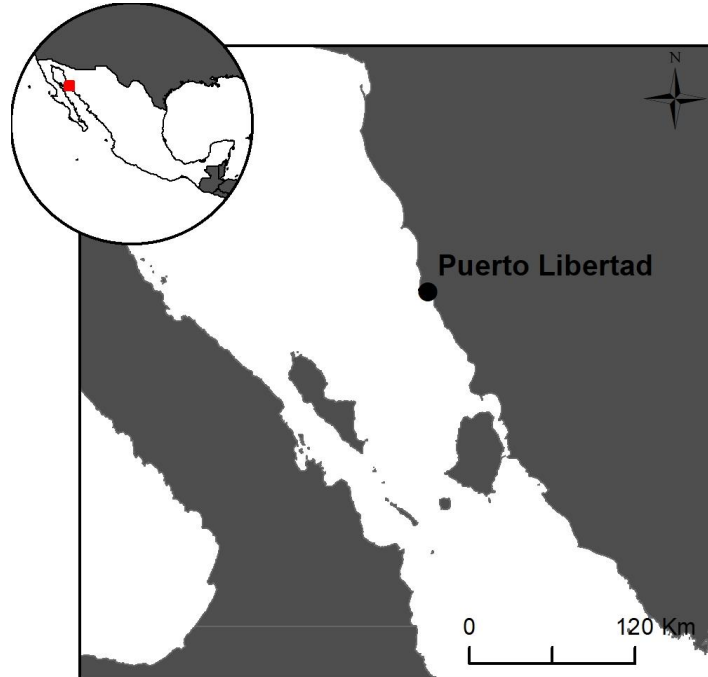


Figure 1. Location of Puerto Libertad.
Espinosa-Romero et al. 2014.

Describe the ‘social system’ (that is being governed; S-SG), in terms of DCDS

The main users of the system are small-scale fishers. According to Espinosa-Romero et al. (2014), there are 202 registered fishers and the small-fishing fleet includes 112 boats “pangas” (25 to 28 feet), with outboard motors from 80-200 horsepower (Torreblanca 2012).

Fishers are organized into a) cooperatives, b) those who do not have a permit and work for a particular cooperative or permit holder, and c) those who do not have a permit and work for different cooperatives and individual permit holders—called “free” fishers. Fishers and cooperatives generally sell their products to individual permit holders, who used to set the

price of the products. Now, cooperatives are negotiating the prices with the permit holders, and also looking for additional opportunities directly with the market.

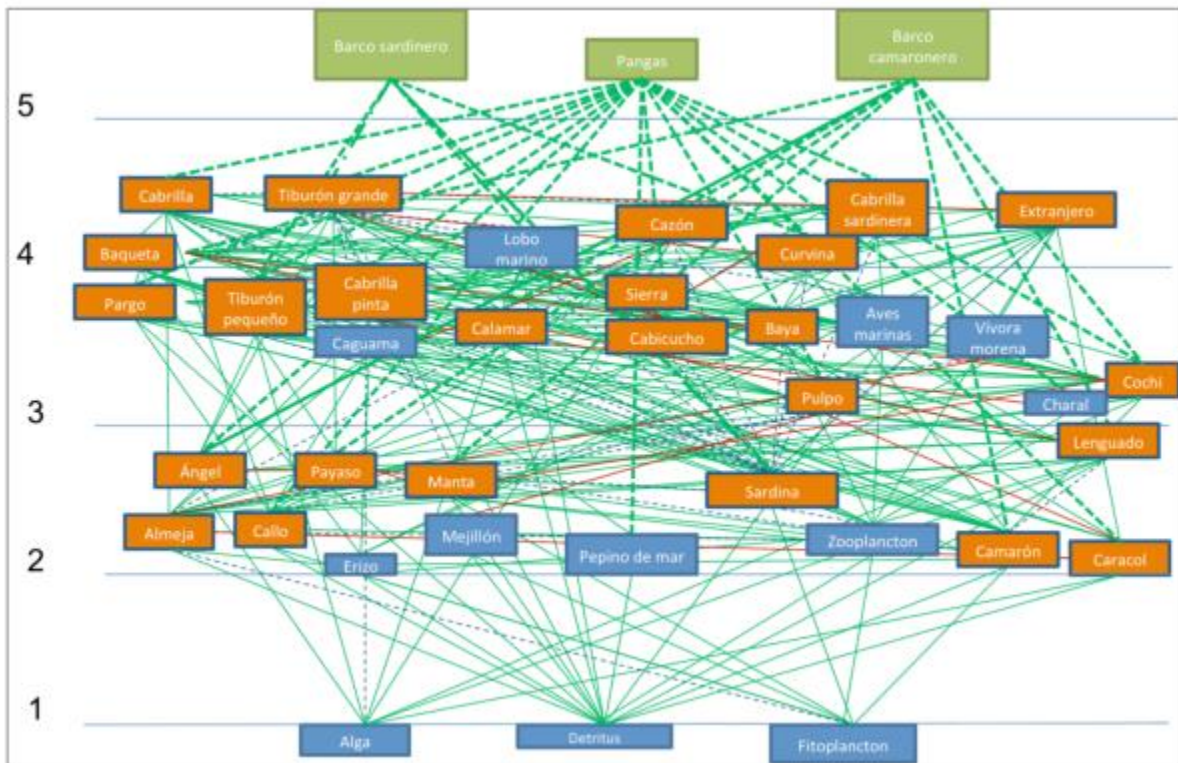


Figure 2. Trophic Interactions and resource users. Green = resources users. Orange = target species. Blue = non-target species (Espinosa-Romero et al. 2014)

There are seven cooperatives, five individual permit holders who operate as fish buyers, around 100 women who clean landed fish, and around eight industrial vessels (purse-seine and trawlers) that operate in the region. Fishers from Puerto Libertad also share fishing grounds with eight of the 17 communities located in the Northern Gulf of California (Duberstein 2009). There is very little tourism in the region, and none in Puerto Libertad.

Aside from fishing, the main economic activity in the town is the power station. The power station was constructed, along with a large pier in 1985. In the past, tankers unloaded at the pier although more recently fuel has arrived by duct from inland. The power station was recently converted to LPG (from heavy fuel) and there is a proposal to reopen the pier to bring in tankers again. A large solar power plant, the largest in Mexico, is currently being built (to be operational in 2019).

At the time of this work, there was a fisheries officer (CONAPESCA) in town (there has been times of no-officers), with the sole responsibility of signing official logbooks (to include the catch in CONAPESCA’s national database) and filing the paperwork required to transport the catch to other towns and states. Before COBI began work with the community in 2010, no other civil society organizations operated in Puerto Libertad.

Describe the ‘governing system’ (GS) in terms of DCDS. Note that GS can be governments, non-governments, and private actors. Also,

Mode of governance: Hierarchical and self-governance.

Mexican fisheries management is centralized—CONAPESCA sets and enforces the rules. INAPESCA provides technical advice to CONAPESCA for setting management regulations (e.g. quotas, closed seasons etc.).

Permits regulate resource access. They can be issued to cooperatives and individuals based on resource availability (DOF 2007a) and are issued for species or groups of species (e.g. clams, sharks, fin-fish). Given the isolation of the community, enforcement of rules could be considered as null. Thus, the fisheries authority relies on the locals' willingness to follow the rules.

Before the project started in 2010, the fishing community (fishers, cooperatives or individual permit holders) did not participate in the development of rules and regulations. Fishers did not necessarily fish the species authorized in the available permits. Fishers who work for cooperatives and individual permit holders often were not aware of the specifications of the permits or standards that they were working under. Currently, fishers have started to participate in rule and regulation making, especially for the clam fishery and no-take zones for fishery recovery.

The two national fishing regulations that apply to Puerto Libertad fisheries are: the NOM-029-PESC-2006 for sharks and rays and the NOM-016-PESC-1994 for mullets. The NOM-029-PESC-2006 authorizes the use of gillnets and longlines for SSF (see DOF 2007b). The NOM-016-PESC-1994 specifies mesh size (2 $\frac{3}{4}$ " for *Mugil curema* and 3 $\frac{1}{2}$ " for *Mugil cephalus*) and size limits (28 cm for *Mugil curema* and 30cm for *Mugil cephalus*) (see DOF 1995). Two seasonal closures apply to Puerto Libertad fisheries: one for sharks and rays from May 1st to July 31st each year (published on June 11th 2012) (see DOF 2012), and one for mullets from December 1st to January 31st (see DOF 1994).

When standards (NOM-029-PESC-2006 and NOM-016-PESC-1994) were reviewed with the fishing community, fishers did not feel rules were restrictive because they authorize traditional fishing gears. In terms of seasonal closures, fishermen expressed there is no incentive to break the one for mullets, because this species is not commercially important—it is used as bait. The seasonal closure for sharks and rays, however, strongly impacted the community in 2012, because sharks and rays constitute an important local fishery. However, they understand now the benefits of the closure as they are observing increased populations of shark species.

Informal rules have been defined and enforced through the Committee. Some of these rules include: no additional fishers or divers can fish in Puerto Libertad's fishing grounds, unless the committee approves it. All committee members have to participate in all the meetings and communicate the decisions made to their represented groups. All the groups have two representatives in the committee, only one of them have a voice and vote in decision-making processes, the other is only an observer. To make decisions, 80% of the members have to agree on the subject. When government officers visit Puerto Libertad, there is only one voice, representing the interest of all committee members.

For each system, indicate the level of Diversity, Complexity, Dynamics, and Scale (high, medium, low)

The natural system is diverse, complex, and dynamic with well-defined boundaries. The social and governing systems have low diversity (few sectors are present in Puerto Libertad, all of which are represented in decision-making), medium complexity (the interactions have increased in the last five years), medium dynamics (interactions have improved), and well-

defined boundaries (all key stakeholders are already identified and involved in decision-making).

Part 4: Governing system quality

The ability of the GS to govern depends on its characteristics (Part 3), and on three other qualities in relation to SG. Rate each quality on a scale of 1 to 5 after the description (1 = bad, 3 = moderate, 5 = good)

(1) Goodness of fit

The Puerto Libertad Committee structure can be considered a moderately good (3) fit for the community and ecosystem. Most of the different fishing sectors (cooperatives, permit holders and free fishers) are represented, and the inclusion of the free fishers (unorganized) has given them a voice and led to the creation of a cooperative to represent them. Two principal sectors remain unrepresented by the committee - the women who clean the catch and the unorganized fishers who did not join the new cooperative. With the principal goal of the committee being the common good of the community the inclusion of these sectors should be discussed.

Considering the natural system, and the fact that the different fishing sectors represented in the committee fish different resources, a multi-fishing sector committee is likely the most effective structure to address the issues at the ecosystem level and to bring fishers together to achieve the committee's goal.

(2) Responsive of modes

The committee has proven to be a governing system that is responsive to changes (5). Since its establishment in 2011, the committee has proved to be a successful platform through which the community has attempted to resolve the issues and conflicts that they had identified. Some of the attempted solutions were not successful (e.g. pilot projects for aquaculture), but many were (creation of no-take zone, installation of fisheries office). The committee has built on the positives, whilst not letting negative experiences overly affect progress.

(3) Performance of GS in the three orders

The main value under which the committee function is the common good. The three objectives they decided to work on are: increased economic benefits, increased social benefits, ecosystem health, and good governance. They designed and have implemented a set of strategies to achieve the objectives. These included: diversification of income, illegal fishing and ecosystem impact reduction, cooperation within committee members and with the government. After seven years working together, they have been able to achieve these objectives, and are in the process of setting new ones.

Part 5: Governing interactions

In the past, the most important and frequent interactions of the fishing community with external actors, were with buyers and government officers at the local and regional level. Most of them considered that these interactions were not reciprocal. Fishers felt they gave more than they received. The fishing sector, before the committee was established, felt that their relationship among them, was of medium importance, not frequent, but reciprocal.

At present (after the committee has been conformed), the committee members consider very important their relationship with buyers and government officers at the local and regional level, as well as with COBI, government officers at national level. The most frequent interactions are with buyers, local government officers, and COBI. They consider these interactions to be more reciprocal than before. In addition, they consider their relationship within the committee members of medium importance, medium frequency, and reciprocal. That means that the consolidation of the committee has helped consolidating the relationship with external actors (diversity and reciprocity are higher) and with committee members (frequency is higher) as well.

Plans for the future to improve external interactions are to increase communication, and in the case of buyers, the negotiations for setting fair prices. For improving internal interactions, they have suggested to keep inviting those that left the committee, as well as those that have not been included, in order to keep the representation of the whole fishing sector.

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