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CASE STUDY

A Humanity-centric Journey Towards Digitally Empowered Fishers

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A Humanity-centric Journey Towards Digitally Empowered Fishers

Turning the tide with disruptive participatory governance approaches Management

Abalobi and PescaData are two initiatives aimed at supporting sustainable fishing communities by co-creating a digital ecosystem for smallholder fishers and key stakeholders and achieving marine conservation outcomes in South Africa, Mexico, and beyond. The unique, innovative approach of a **data and platform cooperative** for fisheries aims to collect data, establish a knowledge base, digitally support fishing communities, create market opportunities, and better inform public decision making. The tools are built through extensive participatory, iterative design to create a usable solution, resulting in empowered fishing communities, with agency and ownership over data and data governance. This case study provides insights into data stewardship, participation and collaboration, knowledge sharing, and platform and data cooperatives.

Background and main challenges

Marginalization of smallholder fishers is not an inevitable outcome, but derives from policies and imbalances of power.[1] Much of collected marine data is in silos, leaving authorities with limited information to act upon. Fishing communities in low- and middle-income countries (LMICs) are historically excluded, face many environmental challenges, and struggle with access to resources and equal rights. Vulnerable fishers are hardly represented in the data. Fishing communities in LMICs, despite their contribution to food security and gross domestic product (GDP), are generally not recognized. "We also need to close the gap between big companies and small-scale traditional fishers," according to Serge Raemaekers of Abalobi. This is key to "unlock a radical paradigm shift," and "turning the tide for these vulnerable fishers requires new strategies, innovation, and a disruptive approach towards ensuring social justice, resilience, and transformation."

Mobilizing data to serve effective decision making is a challenge and requires all actors' involvement, with strong communication and cooperation between fishers, civil service organizations (CSOs), governments, academia, and others. Current models of data sharing are not scalable. Data can only be shared through and between multiple disparate systems with agreement on data governance. "Digital technologies [...] have not been designed to interoperate, meaning that the value we collect, curate, and create is not able to be shared, discovered, adopted, and adapted with ease," as Stuart Fulton from Comunidad y Biodiversidad (COBI) and the PescaData app points out.[2] This also "means to stop seeing [fishers] as research subjects or sources of information." Fishers are vital for strong collective action and participatory design of research and data governance. The value of data should flow to its rightful originators.

1. "Small-scale" fishers, but also Indigenous, artisanal, subsistence, and small-scale commercial and non-commercial fisheries that consist of small vessels using fixed fishing gears that are usually limited to the inshore areas close to their home ports.
2. COBI was launched by a "group of young people fascinated by marine life and concerned about the poverty levels in developing countries. The need to promote marine conservation and sustainable fisheries management was identified, always considering the necessity of working hand in hand with those who inhabit Mexico´s coastal communities." COBI developed the PescaData app.

Other challenges related to the case study environment

- Fishing communities are caught in structural and distributed inequalities and poverty. Negative engagement with authorities and corporations has disenfranchised fishers. Many fishers never gained legal rights to fish.
- Political and economic priorities are not always aligned with ecological ones; market failures have destructive effects, like overfishing, pollution, and habitat loss.
- Data sovereignty (or lack thereof) and stored knowledge assets have become highly siloed, unreliable, stagnant, and unable to move to where it is needed most. Without appropriate incentives or mechanisms for the data holder to keep their data accurate and up to date, its integrity will remain questionable.
- Many fishers are also locked in exploitative agreements with industry. Smallholder fishers are often linked to the wrong market incentives and lack any negotiating power.
- Capacity and funding are one of the biggest challenges faced by initiatives working in sustainable fishing. Grant funding as the main source of income is insufficient, as well as the robustness in operational infrastructure.
- Setting up a platform or data cooperative requires a lot of organizational and hard social work to make a participatory data governance approach happen.

How are data governance problems solved?

Many fishers already own or collect a lot of knowledge and data and implement sustainability initiatives, such as marine reserves, self-imposed restrictions, or programs. Fishing communities in LMICs need reliable, consistent, and accessible data that builds agency and resilience. There are a few initiatives that try to solve the above mentioned challenges and open up opportunities; PescaData, Abalobi, OurFish, and Shellcatch allow exact catch data to be recorded at sea, uploaded, and analyzed.

Actionable Principle: To become truly participatory and involve all stakeholders, it is necessary to move from user-centric, past human-centric, to a humanity-centric governance approach.[3] This means considerate and compassionate design of consent, and ecosystem education on available data governance approaches, from the very first stages of an initiative. Data governance can not be solved with a technical solution—it is a question of design.

Abalobi ("someone who fishes"), designed with and by fishers, is a fisher-centric, participatory, action-research project with a strong community component. Abalobi facilitates sustainable resource management, formalizing bottom-up strategies and unlocking socio-economic benefits. Their work is centered on activating stewardship and robust data collection, thereby enabling fishers to be co-

3. User-centricity focuses on individual users, usually in relation to user-friendly designs, products, and useful, relevant, profitable outcomes. Human-centricity adds people as its central focus, which lends itself more to "social problem solving" and takes a system point of view. Humanity-centered approaches focus on benefiting humanity, society, and communities. They go beyond human-centricity and include the entire ecosystem of people, all living things, and the physical environment.

producers of knowledge and owners of data. A web-based database and five interconnected apps cover the entire value chain and core governance processes. Abalobi also offers a range of services, including training and capacity building. Fishers agree to the terms of use allowing the team to track key metrics. The data is never shared with outside parties without prior consent and on their own terms. However, many opt to share their data anyways to communicate trends and potential areas of concern.

Innovación Azul and **PescaData,** operated by COBI, connects fishers and mobilizes knowledge, innovation, and solutions, designed by and for fishing communities. It facilitates registration and detailed storage of data between fishers and their fishing organizations. It is a place to connect with others; offer products, services, and knowledge; and solve common problems. Fishers are able to contribute to the knowledge of species and fisheries. Different actors can register the information they require to continue monitoring catches and carry out analyses. "One essential way in which we can overcome these challenges is by better sharing information across organizations, but this requires us to rethink how we use digital technology in our work, especially if we are to resolve the limitations to interoperability across the variety of tools we use on a daily basis, Fulton (COBI)."

Actionable Principle: There is an opportunity and a requirement to incentivize fishers to share their data to build a system that more immediately gives them access to that data as a means to make them a partner, rather than a beneficiary. Data ownership provides opportunities to respond to pressing social and environmental concerns faster than policy might.

Data ownership and control. These initiatives make it clear that the data is owned by the fishers, and that Abalobi and PescaData implement, co-design and code their data. Fishers are provided with control over their data and their traditional knowledge. The initiatives encourage fishers to use their data by organizing training and demonstrating its potential.[4] The apps emphasize gender equity, for example, via adapting tools to monetize value-added activities traditionally conducted by women. "We must ensure that [data] can be easily maintained and updated by those to whom it either legitimately belongs, or who can be relied upon to maintain it," says Raemaekers of Abalobi.

Actionable Principle: In trying to move to a more cooperative approach, carefully defining agency and sovereignty can help distinguish between what is "mine" and "ours." In other words, by creating a shared understanding, value for fishers can be created in a way that can more freely contribute to similar initiatives and local collectives. Conversations on data ownership should therefore include how data is generated and used, how value is created and shared, and what other opportunities they provide for the owner (i.e., sovereignty, control, and agency).

Data stewardship. The organizations assume a duty of care and responsibility to operate in the best interests of fishers. Their role as stewards is also reflected in their commitment to increase data literacy and create participatory governance structures. Representative fishers play an active role in making key decisions on data governance, for example, through monthly "data meetings." As data custodians, the teams provide data services and help visualize important details and patterns that may otherwise go unnoticed. Importantly, the data stewards obtain bargaining power necessary for fishers to renegotiate their position with authorities.

4. As such, data sovereignty was considered here to include: discussions on data ownership, centralized databases, and the lack of empowerment.

Platform and data cooperative. Abalobi and COBI function much like a platform cooperative or data cooperative. While their aspirations are high, becoming a genuine data cooperative requires demanding elements—a lot of time and effort are needed to understand and organize common resources and legal pluralism in the realm of fisheries. Platform co-ops are jointly owned and operated autonomous organizations. Through digital platforms, the co-ops are voluntarily united, owned, and democratically governed by those who use them. COBI transitioned into the platform co-op model in 2021. In Mexico, this is based on common interests and solidarity, self help, and mutual help. In this model, each user shares revenue streams and operating costs between members working towards sustainable ocean practices. It is estimated that 85% of the almost 300,000 people engaged in smallholder fishing are organized in more than 3,200 cooperatives.

As part of their strategy, COBI organized workshops on design principles for the governance of small-scale fisheries **data cooperatives** with the goal to create common ground on what data co-ops are, how they work, and the value of data for fisheries, and to establish whether they want to partake in one.[5] Participants recognized the value of the data they produce and the benefits of a data co-op. The workshop used a participatory approach to design the principles. As defined by the fishers, a data cooperative collects and manages the data of those who integrate it, protects information via processes and agreements on the use of the data, and creates value generating sales or data donation. The design principles are:

1. Ownership: Fishers are the data producers; they decide who has access to the data, under what conditions.

2. Access to alternative financing: Fishers are able to generate extra income from the sale of data, which can be used to sustain the data co-op, as well as marine conservation projects and sustainable fisheries.

3. Data transparency: Data collectors need to maintain clear agreements on the use of fishers' data.

4. Assessment of knowledge: Data collectors need to highlight contributions made by fisheries, placing them in decision-making spaces and benefiting their fisheries and communities.

5. Co-design the platform: Fishers require collective organization and support.

6. Security: Data collectors need to safely store and protect data collected by the data cooperative.[6]

Actionable Principle: At the core of a much-needed push for interoperability is also understanding the local context. Those conversations must come from a place of those in power being willing to both learn from fishers and unlearn their own assumptions to adapt processes and platforms. This also means a shift is needed into a mindset of interactions that are respectful and non-extractive.

5. Pinedo D., López-Ercilla I. (2022). Principios de diseño para la gobernanza de una cooperativa de datos del sector pesquero en pequeña escala. Reporte de taller. Comunidad y Biodiversidad A.C., Guaymas, Sonora, México, 13 Pp.
6. Data protection is very important for fishers, therefore, it is necessary to take the time to resolve any doubts that may arise regarding this issue.

Indigenous data sovereignty (IDS) helps establish fair and equal access to data that reflect traditional rights and customs, based on simple, transparent processes. Many traditional fishers—with an articulate version of their part of the ecosystem—lose their knowledge base or are overridden. With IDS approaches, traditional ecological knowledge and solutions are valued, along with Western research, and shared and integrated into decision making. Creating a common knowledge base via social learning opens the door for genuine collaboration and integration of fisheries aspects that are not often included in decision-making processes.

Marketplaces enable the processing and trade of fish and resources, increasing trust and confidence. Abalobi includes an ecological and social "story," fully traceable along the cold chain. It also maximizes interoperability with financial services and tools that facilitate access, track payments, and provide transparent business development for fishers. The marketplace can include fishmongers. Transparency is "critical if we are to enable fishers to realize a fair value for their catch and build tangible market incentives for responsible fishing practices," Raemaekers argues.

Humanity-centric design of applications. The fishers benefit from the open source intellectual property and drive the movement by contributing to the organization's governance structure. The initiatives promote more profound democratic and socio-economic reform, collective action, and institutional sustainability, where fishers are engaged beyond passive data collectors, to increase power parity between them and other stakeholders. These successes build confidence among fishers, authorities, and market actors. This may be important to engender recognition that alternative pathways are indeed able to deliver on their promises. The digital tools are built through extensive participatory, iterative design to create a usable solution for relatively low-skilled, low-literacy fishers. The applications are continuously being developed with a core group of fishers. Despite this inclusive approach, challenges remain with regard to scale and digital access.

Actionable Principle: Fishers, fishing communities, and co-ops are not homogenous. Increasing buy-in is not about applying successes from elsewhere, but connecting with them at the very first stages to understand their context, how to craft incentives, and build trust. All relevant stakeholders need to be considered and must work together in design and development, always with their purpose and needs in mind.

Increased visibility. Key metrics were developed in collaboration with different stakeholders, including the fishers, cooperatives, authorities, and supporting non-governmental organizations (NGOs). Many fishers have used their recorded data as evidence in rights appeal processes with the fisheries authority. This value proposition has become a core strength for sustained user engagement, as fishers have realized that digitizing their activities can bring about increased visibility and legitimacy among the sector authorities. Abalobi believes their approach could bring about South Africa's first community-driven fisheries improvement project (C-FIP), benchmarked against ecological and social indicators.

Informed decision and policy making. Abalobi and PescaData have demonstrated that inclusive tools can have a major impact in shifting societal and economic inequality. The opportunity to pool knowledge, people, and funding to address issues affecting marine ecosystems via "tech-enabled" strategies that emphasize the adoption of standards, schemas, and systems can increase the potential for collective impact. If the fishers consent to data sharing, other fishers or NGO partners can see the

aggregated data from all the fishers in one area. Groups can meet to discuss topics such as key trends and how to improve operations based on the data. Abalobi provides the fisheries authority only with data in the Monitor app. It owns this data stream and uses the data for fisheries management.

Facts and figures

Over 3 billion people depend on the sea biodiversity for their livelihoods.

- Almost 97% of those are in LMICs, and more than 90% participate in smallholder fisheries.
- Smallholder fishers play an important role in food security, poverty eradication, equitable development, and sustainable resource utilization.
- The sector contributes two-thirds of the global market catch for consumption, with an estimated 100 million additional people employed through associated activities.
- Currently, women account for half of the smallholder fisheries workforce.
- Dissatisfaction among fishers led the South African government to adopt a more inclusive policy, legally recognizing smallholder fishing for the first time. The policy takes a community-oriented, participatory, and adaptive approach to fish management to offset issues related to inequality and exclusion common across the sector. Marginalized coastal communities continue to struggle for equal access and rights to marine resources as the policy implementation is slow. Governments have the resources and can apply critical policy change. According to the Abalobi this requires a multi-stakeholder approach to work effectively
- The Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries state the need to develop and implement a human rights-based approach to fisheries governance and development with prominence to equity, sustainability, transparency, and accountability.
- The development of legal instruments that support "co-ownership and co-governance" for both individuals and organizations across multiple regulatory environments is needed.
- Currently, there are no platform cooperatives in Mexico, but the legal framework does allow their creation. COBI is working with the national government to better understand how platform co-ops could operate.

"The current and next generation of fishers are perfectly positioned to use and share their existing knowledge to co-create and implement solutions for resilient communities and healthy oceans."

Stuart Fulton, director, COBI

The business viability

Abalobi and COBI are social enterprises funded mostly through grants. The nonprofits have made some first strides in developing a revenue-generating business model based on subscriptions to their marketplace and a transaction fee. For Abalobi, this includes a tiered pricing structure for different consumers, restaurants, and retailers. Abalobi connects co-ops with banking services and insurance plans to facilitate transactions with retailers and upgrade operations. The goal is to support operations and management of cooperatives that use the platform and the nonprofit. PescaData receives sponsorships and (minor) contributions from researchers and fishing organizations to cover the operating costs of a platform co-op, i.e., an SaaS model with a minimal fee and data sales. The sale of data and the use of PescaData as an investment platform could provide additional income. Co-ops do not need to earn profit. The funding model envisioned is self-sustainable (as opposed to funding dependent on research of donors). The app was designed to scale exponentially (as opposed to the usual labor intensive onboarding or invite only).

Actionable Principle: Funding in this space is limiting growth. Most grants create temporary value, and there aren't many, if any, grants for creating interoperability between teams and platforms. Data remains siloed and the work duplicative as a result, causing more difficulties for future initiatives. The grant funding space is designed to be competitive, while the aim must be to create a collaborative alliance for grantees.

What was the impact and what lessons can be learned

- Fishers and other users who took part in the design of the platform have reported increased knowledge of the cold chain, an improved ability to engage with the market from a more informed position, and increased solidarity and cohesion among the network.

- **Political adoption.** As a result of facilitated learnings, fishers in South Africa engaged with the Minister of Fisheries to call for a stop on overexploitation, discuss climate change, suggest new adaptations, and use data to apply for loans to purchase better safety equipment. In 2015, the Minister endorsed Abalobi as the official catch management system for implementation of the new Small-scale Fisheries Policy.

- Participation is hard and requires significant commitment of time and resources. Creating a sense of local ownership via **co-design of the tech and program** is key. Scaling in **socio-cultural and socio-political regions** is difficult due to the highly contextualized nature of participation and co-creation. Processes need to cater to specific needs and experiences and foster ownership. Race and power dynamics are always at play in participatory approaches. It is important to build trust and confidence in stakeholder groups before discussing sensitive technical features.

- It is crucial to be aware of stigmas when applying **user-centricity**—stakeholders may be hesitant to share information, including their literacy level. Sustainability is supported through **trust and genuine engagement.**

- COBI co-organized **multiple workshops and engagements with fishers.** These provided for valuable insights into the dynamic of and engagements on these topics, building common grounds around what data co-ops are. Lessons included organizing recreational activities to promote dialogue and data literacy capacity building, among others.

- **Develop accessible visualizations.** Building a minimum viable product in the form of a logbook encouraged fishers to connect with other technologies. It is necessary to design an easy-to-understand solution that people will use every day, adding value to their activities.