Blue Justice for Small-Scale Fisheries: What, why and how

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Small-scale fisheries provide livelihoods and food security to millions of women and men around the word. They make important contribution to the local and national economy, as well as represent diverse value, cultural identity and heritage of many coastal communities. As commitments are being made to achieving Sustainable Development Goals (SDGs), small-scale fisheries have even more prominent role to play, given their connection to land and sea and their intersection with all goals. Unfortunately, in the framing of the oceans as the new economic and development frontier, many development initiatives, promoted through Blue Growth and Blue Economy agenda, tend to ignore small-scale fisheries, excluding them from the discussion and putting them in disadvantaged situations.

More needs to be done to encourage sustainable development initiatives that fully support the current and potential contributions of small-scale fisheries in achieving all SDGs. Pushing towards a more equitable and just space for small-scale fisheries requires, first and foremost, an understanding of the current situations, looking at the kind of injustices and inequity that may be happening and affecting women and men involved in small-scale fisheries, their families and their communities.

Photo: *Researcher interviewing local small-scale fishers, Kuakata Sea Beach. 202019 ©Natasa Tasnia Shipra*

WHAT IS BLUE JUSTICE?

A critical examination of how small-scale fisheries and their communities may be affected by Blue Economy and Blue Growth initiatives that promote sustainable ocean development but neglect small-scale fisheries and their contribution to ocean sustainability. We extend the concept to inland fisheries, which are similarly affected by land-based development that put them at risk and disadvantage them.

See also:
https://en.wikipedia.org/wiki/Blue_justice

> *... Blue Justice for small-scale fisheries in the blue economy agenda means inclusion of small-scale fishers and community members as stakeholders with an eye towards power imbalances and equity. The basic tenets of social justice address who has a stake in the issue, and focus on what needs to be done to restore justice for past wrongs in the marginalization of small-scale fisheries....(Jentoft, 2019. Life Above Water)*

Justice in context

Types of justice:

- **Distributive**
- **Social**
- **Economic**
- **Market**
- **Infrastructure/wellbeing**
- **Regulatory**
- **Procedural**
- **Environmental**
- **COVID-19 related**

- Distributive justice - restriction of access to space and resources due, for instance, to other ocean uses like tourism, aquaculture, mining, shipping, MPAs, for instance.
- Social justice - imbalanced power and relationship due, for instance, to systems that favours certain sectors and discriminate others in the society.
- Economic justice - inequitable opportunities for growth due, for instance, to unfair distribution of subsidies, credit restriction, product certification schemes, and limited access to land, productive assets, and livelihood options.
- Market justice - limited access to trade and markets, due to market certification schemes, or product standards developed without due consideration to small-scale fisheries context.
- Infrastructure/wellbeing justice - exclusion from access to health, education, judicial services, safe drinking water, and sanitation, poor roads, transportation, and lack of access to information technology and communication links.
- Regulatory justice - regulations that lead to unfair competition, including those related to quota allocation, gear use control, legal status, and resource ownership.
- Procedural justice - restricted access to decision-making due, for instance, to the process that designs without due consideration to the small-scale fisheries context.
- Environmental justice - disproportionate effects of industrial pollutant, hazard or waste disposal on low-income, and marginalized communities, compromising the health and wellbeing of their members.
- COVID-19 related justice - disproportionate effects of COVID-19 pandemic on small-scale fisheries, insufficient attention to examine the impacts on small-scale fishing communities, inadequate funding or support to mitigate impacts.

Definition of small-scale fisheries

Small-scale fisheries are known for their diverse nature, characteristics, and values. They also vary from one place to the next and thus difficult to capture with a single definition. Many countries define small-scale fisheries for regulatory purposes, mostly based on some measures, but other aspects are also noteworthy and should be better recognized, like the family orientation, community embeddedness, women contribution, along with the fact that some small-scale fisheries are seasonal and are part of an informal economy. Check FAO (20105) for a good overview about what defines and characterizes small-scale fisheries.

> *... Blue Justice has at its core a social justice principle that recognizes the need for small-scale fisheries to have equity, access, participation and rights within the blue economy. The Blue Justice approach for small-scale fisheries, therefore, is to "critically examine the political, economic and ecological processes of blue economy development initiatives.... (Moenieba Isaacs, PLAAS, 2019)*

Dealing with justice

Dealing with injustices is not easy, and certainly not something that can be done at an individual level. Fishers, civil society organization, governments, environmental organizations, and academia all have a role to play in promoting Blue Justice for SSF.

Here are some stating points:

1. Support the implementation of the SSF Guidelines
2. Illustrate small-scale fisheries as a key for sustainable ocean development, especially post Covid-19
3. Include small-scale fisheries in the discussion about all SDGs
4. Encourage governance reform to recognize small-scale fisheries rights and help realize their potentials
5. Promote coordinated application of policies and legislation that support small-scale fisheries
6. Enhance cross-sectoral collaboration and strengthen small-scale fisheries networks
7. Build broad awareness about the values and importance of small-scale fisheries

This e-book is part of the first steps in unpacking what happens at sea, on land, and in inland areas that disadvantage and marginalize SSF and make them vulnerable. The stories about social injustice and inequity in SSF from around the world offer insights and lessons that can be shared, as well as invite us to think and act individually and collectively about what we can do to bring Blue Justice for SSF.

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Impacts of water hyacinth in flood plain wetland on aquatic production and livelihoods of fishing people

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The Dooma wetland, locally known as Dooma baor, is a well-known floodplain wetland of West Bengal, in the lower Gangetic basin. This is one of the largest wetlands in Asia, with a water area of 257 ha and a depth of 8-17 ft. This seasonally open wetland is located near the border town of Bangaon of West Bengal, India, along the Bangladesh international border. The Dooma Fishermens' Cooperative Society Ltd. mainly governs this wetland. The society is constituted of 1,081 members, including 30 fisherwomen, and is governed by the cooperative law of the Government of India. The wetland fisheries of Dooma baor provide the lion's share of livelihood and income generation for the fisherfolk families of the nine surrounding villages (Anonymous, 2022). Recognizing the fishing opportunities, the culture-based fishery has been adopted in this wetland since 2021, with the support of Indian Council of Agricultural Research – Central Inland Fisheries Research Institute (ICAR-CIFRI). The pen culture or enclosed culture-based fish rearing of Indian Major Carps (IMCs) seed has been practised to enhance the fish production by simultaneously minimizing the seed cost and predation mortality of fish seeds. Through this initiative, the cooperative was able to generate INR ₹ 7.0 million during the period of 2022-23. However, the rapid growth of the macrophyte water hyacinth (Eichhornia crassipes) is causing impediments to wetland governance. While fishing is difficult in areas of the wetland where macrophyte grows, not all areas are equally affected, which can lead to tensions between fishers who fish in different wetland zones. Moreover, the water hyacinth covers around 20-25% of the wetland, which needs to be regularly cleared for fish production. At the moment, community members clean the water hyacinth on an annual basis, which represents a substantial burden to the fishers of Dooma. It is argued that an additional INR ₹ 0.2-0.3 million allocation is required every year to reclaim this wetland as the water hyacinth has to be removed manually due to a lack of mechanical measures.

Photo: *© Sujit Choudhury, 2022.*

Location:
Dooma wetland, West Benga,India

Ecosystem type:
Freshwater

Main gear:
Cast net, Lift net and Traps

Target species:
Snakehead murrel (*Channa striata*),Catla (*Labeo catla*), Rohu (*Labeo rohita*), Mrigal (*Cirrhinus mrigala*), Mola (*Amblypharyngodon mola*), glass fish (*Chanda* sp.)

Vessel type:
Small wooden boats

No. of small-scale fishers:
1081

> *... The huge amount of money involved in cleaning of water hyacinths is an added burden for the fishers of the wetland, in addition to other anthropogenic pressures, including climate change, pollution, and depletion of water resources on fish production.*

Justice in context

Types of justice:

- **Distributive**
- **Social**
- **Economic**
- Market
- Infrastructure/wellbeing
- **Regulatory**
- Procedural
- **Environmental**
- COVID-19 related

Wetlands are areas of immense importance for biodiversity and places in which multiple stakeholders have vested interests. Wetlands are an important resource of water, fish, and timber, and are a fertile ground for growing crops and vegetables, and keeping animal husbandry. They also provide non-timber resources and services like groundwater recharge, biodiversity conservation, flood regulation, carbon sequestration, nutrient recycling, and wastewater treatment (Prasad et al. 2002; Jogo & Hassan 2010). However, this ecosystem is threatened by unsustainable utilization practices, along with a superabundance of obstructive macrophytes like water hyacinth. This species is also considered to be invasive to many freshwater ecosystems of Asia, Europe, Australia, and North America. According to the climate models, its distribution may expand to higher latitudes due to the rise of temperature in the future (Hellmann et al. 2008; Rahel & Olden 2008). In favourable environmental conditions, it may double up its biomass by reproducing from stolons (slender horizontal branches through which the plant propagates) in a span of 5 to 15 days.

The high nutrient load, including the high temperature and eutrophic status of the wetlands, facilitates the rapid growth of water hyacinths (Harun et al. 2021). In return, the massive growth affects the water quality and reduces the available space for fish to grow. Its bushy shelter provides habitat to many fish, including predator fishes like Channa sp., which often consume fish seeds, resulting in lower fish production. The dense growth of water hyacinths reduces the oxygen levels in the water bodies for fish and other aquatic animals and provides a habitat for malaria and dengue vectors like mosquitoes. Besides, water hyacinth's dense growth causes barriers to fishing, reduces light penetration, and decreases the concentration of phytoplankton. On a positive note, its high growth absorbs the nutrients (nitrogen and phosphorous), heavy metals, and other contaminants like arsenic, cyanide, etc.

The socio-economic effects of water hyacinth are related to the proportion of the area covered by the macrophyte, the utility of the impacted waterbody, control mechanisms, and its responses (Villamagna & Murphy 2010). The manual cleaning of these macrophytes causes an additional monetary burden of INR ₹ 0.2-0.3 million to the poor fishers, and extra labour is often hired for cleaning of aquatic weeds. Additionally, the cleaned and piled biomass takes a long time to decompose, emitting greenhouse gases such as methane during the decomposition.

Definition of small-scale fisheries

As per the definition by FAO, the small-scale fisheries are defined as a category of capture fishery that generally present (some of) the following characteristics: (i) low capital investment, (ii) high labour activities often family or community-based, (iii) no vessel or small size (iv) relatively low production, which is household consumed or locally and directly sold. The Dooma wetland fishery is a community-based fishery, characterized by the use of small wooden boats and low capital investment. The fish captured is either used for personal consumption or destined for direct sale.

Dealing with justice

Considering water hyacinth's efficient utilization in terms of its value-added products and bioactive molecules, this species holds great opportunities. Water hyacinth has been considered a potential source of bioenergy or biomass energy (Carreño Sayago & Rodríguez 2018), such as biogas production (Chen et al. 2007) and biofertilizers (Manyuchi et al. 2019). Traditionally, the plant is used to cure gastrointestinal disorders and the beans are useful for proper spleen functioning (Sharma et al. 2020). It is also a great source of cellulosic material and can be utilized as natural fiber (Sari et al. 2023) and this environmentally friendly fiber can be used as raw materials for handicraft products and garments (Afzal et al. 2021). Owing to these opportunities, the fishers can be trained through various skill-development programs that focus on preparing different value-added products like handicraft material and fiber for making clothes and sarees. This can eventually empower the marginalized fishers, as the 'waste to wealth' approach would provide additional income and improve their livelihood.

Moreover, water hyacinth is a renowned phyto-remediating agent that can reduce the nutrient and contaminant load in the wetland water if the water runoff into the wetland can be channelized and filtered before entering into the system. With reference to India's governmental schemes and cultural scenarios, the periodical cleaning and removal of this macrophyte can be facilitated by executing this macrophyte cleaning work through the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS).

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Photo: © Sujit Choudhury, 2022.

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Trading health for wealth: Distributional inequities and uncompensated health risks in Sea cucumber dive fishery in Sri Lanka

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Sea cucumber fishery is a dive fishery with historical and artisanal origins. In the early stages, gleaning was practiced in shallow marine areas but overtime the fishery has expanded. Nowadays, fisherwomen collect sea cucumber from coastal shallow seas while in the deeper seas, fishing is being carried out by male divers who dive with or without breathing support. Nearly half of the diving community are self-trained divers, most of whom are artisanal fishers. Diving is not regulated for sea cucumber fishery. There is a general requirement for divers to register and carry a diving license, in addition to using registered boats. However, monitoring and surveillance are not strictly adhered to.

Fishing is managed by fishery associations at landing sites (i.e., community organizations) or by commercial exporters who hire divers. Even the self-employed divers end up selling their catch, either fresh or dried, to commercial exporters. Government does not regulate sea cucumber fishing even though divers and boats have to be licensed. As a result, there has been a sharp increase in fishing activity that is driven by value chain incentives and smuggling of sea cucumber over the Sri Lanka-India sea border.

Photo: *Sea cucumber diver in North western sea bed of Sri Lanka, 2022 © A. Maheepala*

Location:
Northern Peninsula Sea, Gulf of Mannar sea belt, North Eastern sea belt

Ecosystem type:
Marine

Main gear:
Gleaning supported by SCUBA equipment and boats

Target species:
Holothuria Sp.
Thelenota Sp.
Bohadschia Sp.

Vessel type:
Fiber-Reinforced Plastic (FRP) boat

No. of small-scale fishers:
5,000-7,000

> *... The second issue is that the private and social costs of diving-related health hazards, which are not addressed or compensated by any of the actors in the value chain or the public authorities...*

Justice in context

Types of justice:

- **Distributive**
- **Social**
- **Economic**
- **Market**
- **Infrastructure/wellbeing**
- Regulatory
- Procedural
- Environmental
- **COVID-19 related**
- **Other: Illegal practices (theft & smuggling)**

The issue of justice in the sea cucumber dive fishery comes into play in two particular ways. One is the unequal distribution of benefits across the value chain as sharing of benefits and risks is not equitably structured in the current value chain. Divers and boat-owners obtain a relatively small return to their inputs and effort while a large portion of the market premium for exportable catch goes to either collectors or exporter companies. The second issue is that the private and social costs of diving-related health hazards, which are not addressed or compensated by any of the actors in the value chain or the public authorities. Given the nature of effort and associated risks in diving to depths in excess of 70 feet, such economic inequities appear particularly unjust.

Divers experience decompression sickness and other underwater pressure-related ailments that can be life-threatening. While export market premium is high for most sea cucumber species collected in Sri Lankan waters, the value chain does not compensate fishers who exert a potentially life-threatening effort.For instance, based on a study carried out in 2020 (Prasada, 2020), a sea cucumber diver dives on average 75 feet, fetching LKR 501 (USD 2.5 in 2020 prices) per animal, on average. At the same time, the price of local sea cucumber in the export markets was LKR 10,000 (USD 50 in 2020 prices) per animal, on average. The contrast of low margins earned by the diver, who is risking his life, compared to the profits accrued by other actors in the value chain could not be more unbalanced.

Definition of small-scale fisheries

The fisheries act of Sri Lanka does not define the small-scale fisher. However, Sri Lanka's policy framework (i.e., National fisheries and Aquatic policy of 2018) highlights the need for protecting and improving the conditions facing the traditional, artisanal, and marginalized fisher groups. Depending on the species caught, the conditions in the landing site and associated revenues, and the season, a small-scale fisher could vary from anyone gleaning from the shallow sea waters to a person fishing using powered boats and modern harvesting methods. A common characteristic of the small-scale fisheries is its subsistent nature.

> *... The rights of small-scale actors in the value chains are being recognized in the state apparatus through the draft fisheries policy of 2018. However, the justice element is not necessarily linked to the rights as the legislative regulations are not yet put in place...*

Dealing with justice

The economic exploitation of the value chain is concurrent with the expansion of Asia-Pacific consumer demand. Therefore, the increased pressure in fishing effort and inequalities are observable more prominently in the recent past, particularly in the last 5 years, and are expected to exacerbate in the future with the rise of consumers' purchasing power in China and the rest of Asia-Pacific. This issue is receiving more attention now from the academia and the research community and is likely to garner consensus and support in the next few years. Meanwhile, public institutions are yet to come up with a stock management strategy and a set of guidelines for responsible value chain conduct.

The rights of small-scale actors in the value chains are being recognized in the state apparatus through the draft fisheries policy of 2018. However, the justice element is not necessarily linked to the rights as the legislative regulations are not yet put in place.

Other types of delay in addressing the injustices are observable in the context of COVID-19 pandemic of 2020/2021 and during the Sri Lanka's economic crisis of 2021/2022. The small-scale fishing operators of sea cucumber fishery were hit hard, alongside the other small-scale fisheries, due to the collapse of supply chains and fuel scarcity. There was no credible solution or special attention paid to small-scale fisheries during these episodes due to the lack of legislative protections of small-scale fishing operators, vis-à-vis tourism operators, for instance, who received legislative provisions for livelihood support and compensation.

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Sea cucumber catch from North western sea bed of Sri Lanka, 2022 © A. Maheepala

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Highly invasive and ecologically detrimental fish species affecting the livelihoods of small-scale wetland fishers in West Bengal, India

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India is home to 877 native freshwater fish species, out of which 450 are small indigenous fish. Conservation of this rich biodiversity is crucial for the environment and maintaining healthy ecosystem. In the recent years, the rivers, floodplain wetlands, *beels*, creeks, and canals, which are home to various indigenous species, have been subjected to various anthropogenic stressors that affect the aquatic biodiversity of resident flora and fauna. One such stressors is the introduction of invasive fish species in these aquatic ecosystems. Khalsi is a seasonally open oxbow shaped lake located in the Haringhata Block of Nadia district in the state of West Bengal, India, managed by the Khalsi fishers' cooperative society. Stock enhancement of the *beel* is managed through culture-based fisheries intervention. The fish cultured in this wetland are mainly Indian Major Carps (*Labeo catla, Labeo rohita*), Silver Carps (*Hypophthalmichthys molitrix*), Grass Carp (*Ctenopharyngodon idella*) etc. There are also numerous small indigenous fish species like Mola (*Amblypharyngodon mola*), Punti (Puntius sp), Tangra (Mystus sp.), and Koi (*Anabas testudineus*). Recently, a high abundance of two invasive species has been noticed in Khalsi wetland: *Pterygoplichthys paradalis* and *Pterygoplichthys disjunctivus*. These non-native species cause ecological imbalance and, eventually, economic harm. Occurrences of these two species in inland open waters have been reported from East Kolkata Wetland (EKW) and several states of India as well as in different South Asian countries. Introduction of these two species in this wetland may have been accidental; according to the wetland dependent community of the Khalsi *beel*, the species might be introduced along with carp seeds as there is no regular quality check in the hatchery produced seeds. Moreover, as Khalsi is a seasonally open wetland, these invasive species may have come from the parent river of the wetland. Frequent reporting of these fish from rivers and open or seasonally open water bodies across the nation is an indication that these species are compatible with the habitat conditions. Immediate attention towards their elimination is needed, otherwise the population will stabilize in the inland open waters of the nation and directly affect the small-scale, inland open-water fishery.

Photo: *Khalsi Beel source of livelihoods of the fishers, 2022.© Priya Chaterjee*

Location:
West Bengal State,India

Ecosystem type:
Freshwater

Main gear:
Cast net, gillnet, harpoon, hook and line, Seine net, surrounding net and traps

Target species:
Catla (*Labeo catla*), Rohu (*Labeo rohita*), Mrigal (*Cirrhinus mrigala*), Tangra (Mystus sp.), Snakehead murrel (*Channa striata*) and Mola (*Amblypharyngodon mola*), Punti (Puntius sp.)

Vessel type:
Small non-motorized boats

No. of small-scale fishers:
250 (Approx)

Justice in context

Types of justice:

- **Distributive**
- **Social**
- **Economic**
- Market
- Infrastructure/wellbeing
- **Regulatory**
- Procedural
- **Environmental**
- COVID-19 related

> *... The first incidence of presence of this species in the wetland was reported about four years back, but they were very few in numbers. In three-six months there was a huge increase in the population, including gravid females. These fish grow at a very high rate.*

Ecosystem hazards

Commonly detrivores, these non-native fish compete for the same niche as the bottom dwelling fish that leads to interspecies competition, resulting in degradation of native fish populations. Introduction and dominance of these species is ultimately expected to affect the food web and therefore dislodge ecological balance. They also tend to dig burrow in the mud and form tunnels in the bank wall of water bodies for spawning and nesting, which leads to soil erosion and increases turbidity of water, causing the banks to collapse. They also transfer pathogen to the native fish. All of these factors will eventually affect the small-scale wetland fisheries.

Hazard to resources

Fish of this genera are known for their rapid growth, high level of fecundity i.e., the ability to produce abundant healthy growth or offspring, and female-biased sex ratios, which is expected to cause explosive population growth upon an introduction. Catching them during harvest compels fishers to spend more time catching the desired fish like IMCs etc., which leads to waste of valuable human resources. They are also causing damage to fishing gears, which adds to the financial burden of the fishers, and may even cause minor injuries to fishers through their handling.

Health hazard

Due to a lack of proper disposal methods, the fish caught during harvest is discarded in open fields near the wetland. As the regular predators avoid them, the fish carcasses remains there until they are naturally decomposed. Due to their thick body composition, it takes much longer to decompose, which creates unpleasant odour. As these fields are located close to the neighbouring localities, it is causing problems for the local residents. There is also a risk of a vector borne infectious diseases from such open disposal of the fish.

Threat to livelihood and nutritional security

The majority of the small-scale fishers are economically vulnerable and, consequently, vulnerable to food insecurity and malnutrition. Collection of small indigenous fish is a means of nutritional and livelihood security for the women of the wetland-dependent community. Increase in population of these invasive species will reduce number of small fish and subsequently affect the livelihood and nutritional security of the fishers.

Definition of small-scale fisheries

In India, the beel/wetland fisheries are considered to be small-scale fisheries, as they are substance-based fisheries with small fishing craft and gears, involving less or no capital, using family labour to harness fish and other aquatic resources for local consumption and to earn livelihoods. Small-scale wetland fisheries in India contribute immensely to food and nutritional security and provide livelihoods for the rural populace.

Dealing with justice

The best way to deal with the current situation seems to be through the removal of these fish by catching them through repeated netting. In addition, identification of locations of the burrows, generally located on the bank of the wetland where the females lay their eggs, and subsequent disposal of the eggs by scooping them manually is an effective way of controlling their population growth. The common predators of the indigenous fish like fishing cats and piscivorous birds do not prefer this fish due to their heavily armored skin and presence of sharp spines on the fins. Hence, management by direct removal seems to be the only way out. Meanwhile, the sensitization of the fishers and the general public about the harmful effects of release of such invasive species on the ecosystem is of utmost importance. Disposal of ornamental fishery units consisting of crocodile fish is one of the potential sources of such species in open waters, hence caution needs to be practiced against such acts. In general, raising awareness among the general public about the threats imposed by invasive plant or animal species is required to prevent similar occurrence in the future. These fish are not used for consumption purpose or as fertilizers due to its high ash content and heavy metal content. However, they might be utilized as fish feed, crab bait etc. due to their high protein and lipid content that needs to be validated through research. In some parts of the Mediterranean, the thick skin of these fish is being utilized for shoe-making. Complete removal of these fish from the open-water ecosystems and ensuring prevention of similar incidents should be among the priorities for sustaining the small-scale wetland fisheries.

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Photo: The crocodile fish while putting nets in wetland, 2022. © Priya Chaterjee

How to cite

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Resource degradation and conflicts affecting small-scale wetland fishers of West Bengal, India

By Dr. Aparna Roy and Dr. B.K Das
ICAR-Central Inland Fisheries Research Institute

India is endowed with various kinds of wetlands, including freshwater floodplain lakes, dams, coastal and marine wetlands. These wetlands, especially the floodplain wetlands locally known as *Beels* or *Baors,* are more than an important regulator of many environmental and climatic factors and a habitat for a wide array of biodiversity — the wetlands also play a crucial role as a source of livelihoods to the people living on or around their periphery. Fisheries are an integral part of livelihoods for the communities living adjacent to the wetland areas. Small-scale wetland fisheries directly provide livelihoods and nutritional security to approximately 2 million people of India, particularly in Assam, West Bengal and Bihar.

Wetlands in India serve as a common pool resource, used by multiple stakeholders, including fishers. For example, wetlands are used for irrigation of agricultural fields, production of water-based crops, jute retting, and dumping ground for industrial waste. As a consequence of overlapping interests and uses, different conflicts arise among the stakeholders. Wetland areas in West Bengal, India, are under the jurisdiction of the Land and Land Reform department, which is predominantly interested in revenue building. In such circumstances, small-scale wetland fishers get less attention due to their poor socio-economic status. The voices of these fishers often remain ignored by the government. As a result, the resources are getting overexploited, which is threatening the livelihoods of small-scale fishers. Therefore, there is a need to develop a great number of improvements to ensure the utilization of these wetlands to their full potential in a sustainable manner. To do so, we argue that the conflicts between stakeholders need to be resolved.

Photo: *Wetlands: source of livelihoods to millennia.© Priya Chaterjee*

Location:
Khalsi beel, West Bengal,India

Ecosystem type:
Freshwater

Main gear:
Drag net, lift net, cast net, gillnet, harpoon, hook and line and traps

Target species:
Catla (*Labeo catla*), Rohu (*Labeo rohita*), Mrigal (*Cirrhinus mrigala*), Snakehead murrel (*Channa striata*) and Mola (*Amblypharyngodon mola*), Puti (Puntius sp.)

Vessel type:
Small non-motorized boats

No. of small-scale fishers:
250 (Approx)

> *... local non-fisher elites take a lease of wetland areas and convert them for different uses, such as, for example, vegetable culture, fish/shrimp culture, constructions etc. As a result, the total wetland area is gradually getting reduced.*

Justice in context

Types of justice:

- **Distributive**
- **Social**
- **Economic**
- Market
- Infrastructure/wellbeing
- **Regulatory**
- Procedural
- **Environmental**
- COVID-19 related

Prioritizing irrigation: Since wetlands are a huge repository of rainwater, they are the preferred choice for irrigation in agricultural fields, especially during the dry seasons. Unregulated irrigation practices create a shortage of water in the wetlands from February to May, which hampers both the capture and culture fisheries. Consequently, it affects the livelihoods of the fishers dependent on the wetland. The governing bodies of these wetlands are mostly non-fishers, and they often give preference to agricultural farmers.

Encroachment of wetland area: During the dry seasons (February to May), the wetlands are used for cultivation. Agricultural farmers build embankments across the wetland in order to access the dryland areas. Additionally, with the cooperation from the local government, they establish sluice gates to divert the water and gain access to the land. In some cases, local non-fisher elites take a lease of wetland areas and convert them for different uses, such as, for example, vegetable culture, fish/shrimp culture, and even for construction. As a result, the total wetland area is gradually getting reduced. Some of these wetlands include the wetlands of lower Gangetic plain viz. *Bhomra beel,* Khalsi *beel*, *Beledanga beel* and others. Furthermore, different infrastructure developments are causing changes in the water flow in/out of the wetlands, especially as they are closing off smaller channels, which used to be connected to larger rivers. Eventually, the change of water flow affects not only the hydrology of the wetland but also its biodiversity.

Consequences of jute retting on fisheries: Jute retting in water bodies is a common practice in rural Bengal. Jute retting results in the production of many harmful gases, which increases the organic load of the water that may lead to eutrophication. Consequently, substantial deterioration of water quality makes wetlands unsuitable for fishing and other aquaculture practices.

Definition of small-scale fisheries

There is no official definition of small-scale fisheries in India. As defined by the Food and Agricultural Organization of the United Nations (FAO), small-scale fisheries involve a relatively small amount of capital and energy, use small fishing vessels, involve family labours, make short fishing trips, mainly for local consumption, and mostly destined for the local markets. In India, inland open-water fisheries are considered small-scale fisheries since they involve less amount of energy and capital.

> *... reform is required in the existing governing system of wetlands, starting with participatory planning and execution. Equal representation from all strata of beneficiaries will ensure that the interests of every stakeholder involved in wetlands are safeguarded, thus protecting the livelihoods of the small-scale fishers as well.*

Dealing with justice

Social injustice occurs when people in a society are not treated equally. The small-scale fishers are already a disadvantageous group. In West Bengal, India, small-scale fishers that live around the wetlands are dependent on beel fisheries as their primary occupation. The degradation of the wetland ecosystem directly affects the life and livelihoods of the wetland fishers. Steps should be taken to manage the resources of wetlands in a way that can sustain current and future uses through the active participation of all the relevant stakeholders.

First, stakeholder consultation should be done prior to any infrastructure development activities. Second, the government has to be more proactive in tackling the social injustices caused by the abuse of political power by the local elites. Third, connecting the Indian Government Schemes like MGNREGA/RVKY to the wetland ecosystem can improve the water quality. The dredging of wetlands or removing the water hyacinths can be helpful for both fisheries and agriculture production. Four, jute retting can be done through advanced practices like chemical retting or microbial retting instead of traditional retting processes that take place in wetlands. This will not only reduce pollution of water bodies but will also be beneficial for jute farmers, as it will improve the quality of the fibre and reduce the retting time.

Finally, a reform is required in the existing governing system of wetlands, starting with participatory planning and execution. Equal representation from all strata of beneficiaries will ensure that the interests of every stakeholder involved in wetlands are safeguarded, thus protecting the livelihoods of the small-scale fishers as well.

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Photo: Participatory Rural Appraisal to prioritize the needs of the small-scale beel fishers. © Sujit Chowdhury

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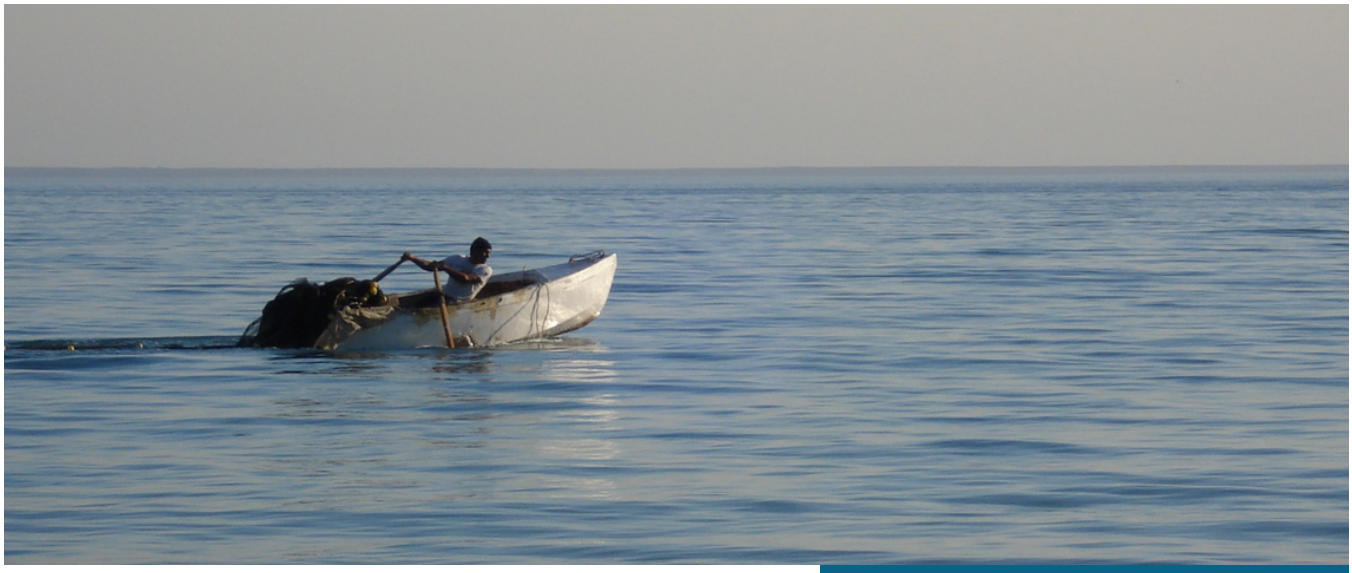
Artisanal fishers of Peninsula Valdés, Argentina, confronting asymmetries of power and rights in the management of a Protected Area



By Marta Piñeiro

Asociación de Pescadores Artesanales de Puerto Madryn (APAPM)

Although Argentina has a huge maritime platform, its citizens do not usually identify themselves with the sea but rather feel part of an almost exclusively agricultural and livestock country. Thus, artisanal marine fisheries are scarcely developed compared to other Latin American countries. Artisanal fishing in Península Valdés is an exception, with an origin that dates back to more than 3,000 years, practiced using rudimentary techniques and tools by the original Tehuelche settlers. At present, three fishing modalities exist which employ at least 120-130 fishers: beach seining, coastal gathering of mollusks and shellfish diving, all of which require a fishing permit issued by the provincial Fisheries Secretariat. Beach seining originated with the Italian and Spaniard immigrants who established in Puerto Madryn in the early1990s, bringing their fishing expertise with them. They made their boats and nets, and provided fresh fish to the residents of the port area. Currently it is carried out by teams of 2-4 fishers who use a beach net between 70-120 m long and a small fiberglass or wooden rowing boat. The manual gathering of octopus and mussels (among others) is a tough, commercial and subsistence activity that originated in 1920-1930 in San Matías Gulf, Río Negro Province, and expanded to San José Gulf, Península Valdés in the mid1950s. Shellfish hooka diving originated as an environmentally friendly alternative to dredging which was banned after San José Gulf was declared a Provincial Marine Park in 1974.

Photo: *San José Gulf. ©APAPM archive*

Location:
Peninsula Valdés, Chubut Province, Argentina

Ecosystem type:
Marine

Main gear:
Seine net, hookah diving (air compressor and hose), coastal gathering (with hooks for octopus, and hand gathering for other shellfish species)

Target species:
slipmouth (sapsap), yellowtail scad (salay salay), hasa hasa (short mackerel)

Vessel type:
Boats < 9.9 m &row boat < 3 m.

No. of small-scale fishers:
120-130

... One of the most successful ventures was a restaurant on the beach, run by women from artisanal fishing families. Its success was so great that it led local gastronomic entrepreneurs to pressure the municipal authority to tender the place and displace the fishers who could not compete against other bidders. A most positive long-lasting impact was the dissemination of the activity, its products, its recipes and the integration of fishers with the community as neighbors capable of transforming realities despite contrary predictions. As a result of that first experience, several fishers and their families started family ventures on their own, which were very successful and continue to this day...

Types of justice:

- **Distributive**
- **Social**
- **Economic**
- **Market**
- **Infrastructure/wellbeing**
- Regulatory
- **Procedural**
- Environmental
- COVID-19 related

Peninsula Valdés, whose lands are privately owned and have been traditionally used for sheep ranching, was declared a Protected Natural Area in 2001, including San José Gulf and part of Nuevo Gulf. Organized fishers participated actively in the elaboration of its Management Plan, which led to the listing of Peninsula Valdés as a UNESCO Natural World Heritage Site in 1999. This designation gave an important boost to the tourism industry, bringing thousands of national and foreign tourists, attracted by the spectacular beauty of a practically uninhabited territory and its wild fauna, especially the high concentrations of southern right whales and other marine mammals and birds that breed in the gulfs and coasts. Tourism is currently the third or fourth highest income-generating activity in the province.

The participation of the fishers in the elaboration of the Management Plan increased their entrepreneurial capacity and made them aware of the responsibilities and benefits of operating within a Protected Area. They became conscious that their products deserved to be distinguished for coming from a wild area with unique natural characteristics. Despite numerous attempts to improve marketing, they have not been able to obtain a certification of origin for their products, nor have appropriate marketing mechanisms been promoted by the government.

The local community has learned to appreciate the role of artisanal fishers as providers of good-quality seafood, worthy of a gourmet table. But the increased visibility of artisanal fishers has its other side. There are actors within the tourism sector who do not see artisanal fishers as allies but rather seek to expel them from the Protected Area. The confrontation with some of the local landowners for access to the beaches has been escalating and increasingly intimidating actions have been used against the fishers. Fishers are united in their struggle to defend their right to a decent and safe work but the lack of effective public policies leaves room for such excesses. Although support is emerging from various sectors of the community, the State has not exercised the mediating and facilitating role that it should in order to build forms of mutual collaboration and defend fishers' legal right to operate within the Protected Area.

Definition of small-scale fisheries

According to **Chubut Provincial Law N. XVII N. 86/2006**, specific to artisanal fisheries, "*Artisanal marine fishing constitutes a small-scale extractive activity, exerted by direct action in a habitual, individual or associated way, in the functions of captain or sailor, as well as coastal netter, shellfish diver or coastal gatherer, through the use of fishing gear and boats or without them, in the practice of capturing or collecting marine biological resources*."

The Regulatory Decree N. 1899/2011, in its Article 2, expands the definition: "*Artisanal fishing: involves a small-scale activity developed by artisanal fishers, with particular gear and equipment, and manual fishing procedures, developed in an area or sub-area of the provincial coastline, for harvesting a particular resource or a set of particular resources.*"

> *... By state decision, artisanal fishers are not represented in the decision-making bodies established for the protected area, even though they participated actively in the development of its Management Plan. By contrast landowners and local commercial chambers are members of its board of directors. Fishers are thus passive subjects of the regulations generated by the different state agencies involved which have historically prioritized the interests of the local landowners...*

Justice in context

The most pressing challenges are the lack of public policies designed to strengthen artisanal fishing as a productive activity, and that conceptualize the sector as an ally of environmental conservation and the activity as a tourist attraction for the region.

Additionally, the State does not act as a mediator in the face of power asymmetries between sectors. Landowners are powerful within Península Valdés, having access to decision-making spaces and great influence over public officers.

The high rotation of government officers does not allow a full appreciation within the State of the realities of artisanal fisheries; nor does it allow the articulation of short, medium and long-term projects as new staff in office tend to start all over from scratch when considering new strategies for the artisanal sector.

Lastly, there is a lack of political decision to promote a strong maritime culture for the general public.

Dealing with justice

The local artisanal fishery sector interacts on a regular basis with academic and scientific institutions, which have always collaborated with the Organization of Artisanal Fishers of Puerto Madryn.

The CCT CONICET-CENPAT (a Research Institution) presented a note recently (in March 2021) to the Ministry of Tourism to support the claim of the artisanal fishers regarding the cutting of access to the beaches in Península Valdés.

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“Hang in and survive!”: The ongoing struggle of ipponzuri tuna fishers in Iki Island, Nagasaki, Japan

By Wei Xu & Yinji Li
School of School of Marine Studies, Tokai University

Katsumoto Cho, a port town in the northernmost part of Iki Island, has long been well-known for ipponzuri (pole-and-line) fishing, including squid fishing and later tuna fishing. Within 30 minutes of the port, where the Tsushima Current pours in, is the well-known fishing ground ‘Shichirigasone’ (1).

Highly regarded as ‘Iki tuna’, bluefin tuna caught on Iki Island is cherished for its excellent quality, resulting from the ‘Ipponzuri’ fishing method which preserves quality of the fish as each tuna is carefully processed, one by one, during the catch. One to two fishers board a small 5-ton (t) class boat and fish for bluefin tuna using only a pole and line (2). Unlike in purse seine fishing, the amount of the catch can be adjusted to prevent overfishing. With the agreement of its members, the Katsumoto Fisheries Cooperative Association (FCA) banned the use of purse seine nets altogether in the 1950s and decided to conduct local fishing only with pole and line (3). Both tuna and squid are targeted using this method.

The fisheries on Iki Island are mainly coastal and small-scale. There used to be only squid fishing for the coastal fishery until 2000, but around 2000, it also encompassed bluefin tuna fishing (Ishii 2009). Ever since, there have been efforts to have it branded as ‘Katsumoto Ipponzuri Tuna’ (4). However, in recent years, the decline in Pacific bluefin tuna stocks has seriously impacted fisheries in Iki. According to the 2022 catch data of bluefin tuna by the Katsumoto FCA, the total bluefin tuna catch has been reduced from 358 t in 2005 to about 23 t in 2014. With the situation continuing to deteriorate, it is difficult to run the family fishing business based only on the amount of bluefin tuna, and as a result, several fishers have left the business.

Photos: *© Wei Xu & Katsumoto Fisheries Cooperative, 2023*

Location:
IKI Island, Ngasaki Prefecture Japan

Ecosystem type:
Marine

Main gear:
Hook and Line

Target species:
Tuna, Squid

Vessel type:
Power driven

No. of small-scale fishers:
278

> *... Most of the quotas for the most expensive large tuna fish belong to large and medium-scale purse seine fisheries. The method of allocation of catch quotas is often based on past catch performance.*

Justice in context

Types of justice:

- Distributive
- Social
- Economic
- Market
- Infrastructure/wellbeing
- **Regulatory**
- **Procedural**
- **Environmental**
- COVID-19 related

Since 2012, there has been a sharp decline in the overall catch, including that of large bluefin tuna. As a result, the total sales of the Katsumoto FCA plummeted from 1.04 billion yen in fiscal 2005 to 80 million yen in fiscal 2014 (5). The Iki fishers believe that the decline of tuna stock is due to the purse seine fishing in other waters in the Sea of Japan. In particular, there are claims that many bluefin juvenile tuna are caught during the spawning season, leading to a decreased stock (2). Another reason is that bluefin tuna and squids are now caught in large numbers in purse seines.

The coastal fishers have also complained of unfair allocation of catch quotas. According to the Japan Fisheries Agency 2023, the current Total Allowable Catch (TAC) for bluefin tuna in Japan for the 2023 management year is 4,194.8 t for small fish (under 30 kg) and 6,776.8 t for large fish (over 30 kg). In Japan, the bluefin tuna catch quotas allocated to fisheries are permitted by the Minister (offshore fishing), such as purse seine fisheries, and the Governor, such as set nets and ipponzuri (coastal fishing). For the 2023 management year, the allocation quota for large fish to the large and medium-scale purse seine fisheries was 3,962.4 t out of 4,753.2 t. On the other hand, the amount for coastal fisheries was 1,923.3 t (7). Most quotas for the most expensive large tuna fish belong to large and medium-scale purse seine fisheries. The method of allocation of catch quotas is often based on past catch performance. Bluefin tuna is a migratory fish and may not be caught at all due to seasonal spatial migration and sea conditions. For this reason, Iki Island ipponzuri fishers have requested the government to give more consideration to coastal fishers in the allocation of quotas.

In addition, injustice issues such as competition with recreational fisheries, which are often being regarded in Japan as ‘pleasure boat fishing’, foreign fishing fleets, and berthing cargo ships issues are likely to persist.

Definition of small-scale fisheries

Generally referred to as coastal fisheries, they are characterized by commutable distances from fishing ports (within a day). According to the official definition from Annual Statistics on Fishery and Aquaculture Production, coastal fisheries include non-fishing-vessel fisheries, fisheries with non-powered fishing vessels or with powered fishing vessels less than 10 tons, set-net fisheries and beach seine fisheries.

Dealing with justice

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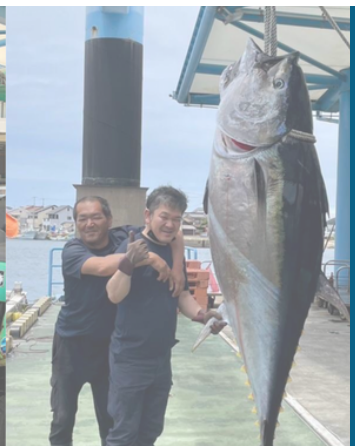
1. In 2013, 347 ipponzuri tuna fishers from five fisheries cooperatives in Iki Island came together and established a voluntary group, the ‘Iki City Tuna Resource Conservation Association,’ which aims to seek catch limits for inshore tuna during the spawning season to prevent the depletion of tuna resources.
2. Iki Island tuna fishers engage in activities such as exchanging opinions and holding meetings with tuna fishers from all over Japan at regular basis. They widely appeal to the current status of Iki's tuna fishery and the importance of resource management to broaden the circle of resource conservation activities.
3. In 2015, the ‘Iki City Tuna Resource Conservation Association’ and all tuna ipponzuri fishers of Tsushima Island who use the waters around ‘Shichirigasone’ announced a voluntary two-month ban on fishing for adult tuna over 30 kg from June 1st to July 31st. Approximately 400 fishers on Iki Island and about 600 fishers on Tsushima Island agreed to secure tuna resources and decided to ban fishing during the spawning season. The voluntary ban on tuna fishing is Japan's first attempt (8).
4. To raise awareness, tuna fishers in Iki Island have also actively used social media, to disseminate information and their thoughts and activities. However, with the decrease in fishers and aging population, it is difficult to keep the social media active nowadays.

Despite the various efforts of fishers, this issue on Iki Island remains to be solved. "We will hang in and survive!" The strong voices of fishers are heard as the battle of the pole-and-line tuna fishing in Iki continues.



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Striving together: The struggle of artisanal raft fishing in Peru for recognition

By Sophia Kochalski, Lotta C. Kluger, Gerardo H. Damonte & Nicola Espinosa Anaya*

Fishing from wooden rafts made of lightweight balsa woods is an ancient practice that secures the livelihoods of many artisanal fisherfolk in southern Ecuador and northern Peru (Figueroa 2022). A prime example is the small Peruvian town of La Tortuga in the province of Paita, where fishing is the main source of income for an estimated 90% of the population (Mendoza Bruno 2022). Fishing tasks are divided according to gender and age (Espinosa Anaya 2015): older fishers mainly engage in raft fishing, while the majority of younger fishers target pelagic fisheries resources in open water and only join the raft fishery in the peak season of the Peruvian weakfish. Women handle washing, cutting and selling the catch, either locally or at nearby markets.

The continued existence of this system and the associated social dynamics and mutual safeguards are at risk. During interviews in September 2023, raft fishers confirmed observed trends (Espinosa Anaya 2015; Figueroa 2022) that some species had disappeared from their fishing grounds and that individuals of their main target species had become smaller or no longer occurred in large numbers. People in La Tortuga have limited job opportunities beyond fishing due to the arid environment of the coastal landscape and a lack of other industries. Using a common adaptation strategies in the Peruvian fishing landscape (Kluger et al. 2020), younger fishers are becoming increasingly mobile and turning to other fisheries, such as the squid fishery in Paita.

Photo: *Drawings of balsilleros. Picture taken in Sechura, Peru on May 13, 2014 by Lotta C. Kluger*

Location:
La Tortuga, Piura Region, Peru

Ecosystem type:
Marine

Main gear:
Cast net, gillnet, hook and line

Target species:
Common Peruvian weakfish (span. cachema, *Cynoscion analis*), Coco croaker (span. suco, *Paralonchurus peruanus*), Flathead mullet (span. lisa, *Mugil cephalus*)

Vessel type:
Wooden raft

No. of small-scale fishers:
Approx. 1,200 - 2,000

> *...Artisanal and small-scale fishers shoulder blame from both industrial fishers and the public for the dire state of resources. However, they argue in return that industrial fisheries operate less selective and extract large portions of fish stocks. In La Tortuga, raft fishers attribute the decline in local resources to industrial fishing activities, an excessive number of boats, sea lions, and inadequate control measures...*

Justice in context

Types of justice:

- **Distributive**
- **Social**
- **Economic**
- **Market**
- **Infrastructure/wellbeing**
- **Regulatory**
- **Procedural**
- Environmental
- COVID-19 related

La Tortuga is positioned on the border of the provinces of Paita and Sechura, which has resulted in years of territorial dispute and a feeling of abandonment ("no-man's land"). During floods caused by the dynamics of the El Niño Southern Oscillation, the town is temporarily cut off from the outside world. Over the years, insufficient infrastructure, economic obstacles, and a perceivable wealth disparity among families who could benefit from more lucrative larger-scale fishing activities contributed to a widespread sense of dissatisfaction, adversely affecting both physical and mental well-being (Mendoza Bruno 2022).

Artisanal fisheries in Peru operate with little formalization and are typically overlooked in national surveys (Figueroa 2022). Despite their crucial contribution to local food security, artisanal fishers find themselves in a vulnerable position: they have little formal involvement in fisheries management decisions, and the national emphasis on fishmeal production and valuable seafood exports disproportionally favors industrial fisheries. Even small-scale fishing has the advantage over artisanal fishing in that it might informally enter into the value chain of export commodities (Damonte et al. 2023). These economic processes create and reinforce political imbalances.

The Peruvian governance system for small-scale coastal fisheries is hierarchically organized but, in fact, is mostly an open-access regime (Nakandakari et al. 2017), sparking conflicts around fishing areas and target species. Most strikingly, artisanal fisheries used to share the same legal category as semi-industrial steel purse seiners, allowing fishers with much greater financial capital and technical capacity access to the same fishing zones and state subsidies as artisanal fishers. Law Nº31749 now establishes that while the first five nautical miles from the coast are exclusively reserved for artisanal and small-scale fishing, purse seine nets (very common in small-scale and artisanal anchoveta fisheries) can only be used beyond three nautical miles from the coast.

Sources:

- The authors visited La Tortuga and conducted interviews with artisanal fishers on the following occasions: 2014 as part of a thesis work (Espinosa Anaya 2015), 2018 as part of a larger study on the impacts of the 2017 Coastal El Niño (Kluger et al. 2019, 2020), and 2023 with funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No. 896438.
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Definition of small-scale fisheries

The Peruvian government generally defines artisanal or small-scale fishing as activities carried out by artisanal fisherfolk and shipowners, either with or without boats. Key criteria include a hold capacity of up to 32.6 cubic meters, a length of up to 15 meters, and a predominant reliance on manual labour (Decreto Supremo Nº 012-2001-PE). Recent legislation (Law Nº31749) categorizes wood raft fisheries as traditional artisanal fishing, specifically carried out in artisanal boats, utilizing only non-destructive and selective non-mechanized fishing methods. Local fishers argue for its recognition as ancestral artisanal fishing (Taller de Socialización de la Ley N° 31749), a designation currently limited to other traditional boats such as reed boats, reed rafts, canoes, and artisanal sailboats.

> *...The observed efforts by the fishers of La Tortuga require community leaders and a sense of unity, possibly fuelled by a feeling of neglect amidst multiple challenges faced. Importantly, the large majority of the fishers used to come from La Tortuga itself (80%, Grillo 2016), which likely provides ground for solidarity and collective action (Nakandakari et al. 2017). However, recent years have seen repeated waves of immigration, which, together with the out-migration of young local fishers, represents a social and cultural change which might reduce local assertiveness...*

Dealing with justice

What has stood out in La Tortuga in recent years is the ability of fishers to mobilize and stand up for their own and the town's interests. Their efforts include the following:

- Long-time resistance to a census, citing the legal dispute between the bordering counties and concerns about potential political disadvantages (Espinosa Anaya 2015; Mendoza Bruno 2022);
- Protests in 2018 aimed at the oil and gas company Olympic Peru (2020-02-17-Eltiempo) and renegotiation of the easement contract. A group of independent fishers formed the group 'Frente de Defensa de La Tortuga' and reached an agreement that all houses in La Tortuga would receive free gas;
- Lobbying for getting the wooden raft fishery recognized as a traditional ancestral fishery (Taller de Socialización de la Ley N° 31749; and
- Share concerns, together with other fishers, regarding an experimental trawl fishery for yellow-leg shrimp within the five nautical miles zone, arguing that it would harm important habitats and is not consistent with the existing case law (2023-09-25-Memorial-Region-Piura).

In summary, artisanal fishing plays an important role in food security and livelihoods in Peru, and the sector continues to grow (De la Puente et al. 2020). For the future, it is crucial to gain a better understanding of evolving environmental conditions and their socioeconomic effects on dependent fisheries, as well as investigating the individual and cumulative environmental impacts of different fisheries and other sectors. Furthermore, we echo recommendations for other artisanal small-scale fisheries (e.g., De la Puente et al. 2020) to involve the fishers of La Tortuga directly in management and decision-making, support self-governance, social capital and leadership, and expand the access to markets, emergency aid, basic infrastructure, and alternative sources of income.

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Photo of La Tortuga. © Sophia Kochalski, 2018

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Loss of small fish diversity as 'trash fish' affects the livelihood and nutritional security opportunities of small-scale wetland fishers of Bihar

By Prajna Ritambhara Swain, Archana Sinha, Ganesh Chandra, Archan Kanti Das, Basanta Kumar Das*

Photo: *Hauls of SIF caught by gill net © Archana Sinha*

Manika Floodplain Wetland, or Manika Maun, is a seasonally open floodplain wetland located in Mushari block in the Muzaffarpur district of Bihar. It has a narrow connection with its parent river, the Burhi Gandak, only during the monsoon period. Manika Maun spreads over a 130-ha area with an average depth of 2 meters. About 300 fishers from 225 fishing families of the adjoining villages depend on this wetland for their livelihood and income generation. This maun is governed by the Department of Fisheries, Govt. of Bihar. As per the Bihar Jalkar Act 2008, the fishing access right in the wetland is given only to the primary fisherman cooperative society (PFSC) [1]. *i.e.,* the Mushari Prakhand Matsyajeevi (Mushari Block Primary Fisherman Cooperative Society Ltd.). The culture-based fisheries have been practised for the last three years in this maun. Following the technology, the cooperative has been stocking the fish seeds of carp during the late monsoon from Sept-Oct. The harvesting is done by a group of 5 -7 fishers, who typically operate drag nets to catch the fish. About 120 fishing days is carried out in one year, with an average catch of about 70- 75 kg/day/dragnet. Manika wetland has flourished with a rich diversity of SIFs such as minnows, Glassfish, clupeids, and bagrids. SIFs are small sized native auto-recruited species that grow up to a maximum size of 25-30 cm [2]. The fishers only collect the carp and simply discard the SIFs onsite without recording the catch details due to food preference and the unavailability of market preference.

Location:
Manika, Muzaffapur, Bihar, India

Ecosystem type:
Freshwater

Main gear:
Cast net, gillnet, traps, drag net

Target species:
Labeo catla,
Labeo rohita,
Cirrhinus mrigala,
Ctenopharyngodon idella,
Cyprinus carpio
and SIFs like
Amblypharyngodon mola,
Puntius sps, Channa sp,
Chanda sps, Osteobrama cotio,
Mystus tengara, and
Xenentodon cancilla

No. of small-scale fishers:
Approx. 300

> *...many fishers in different pockets of India, especially in the Central Eastern states like Bihar, are simply discarding these valuable resources as trash and only target the carps. They are neither aware of the nutritional significance nor the marketing channel for selling the prized fish in other places where the demand might be higher...*

Justice in context

Types of justice:

- **Distributive**
- Social
- Economic
- **Market**
- Infrastructure/wellbeing
- Regulatory
- Procedural
- **Environmental**
- **COVID-19 related**

Readily available SIFs like mola (*Amblypharyngodon mola*), Dhela (*Osteobrama cotio cotio)*, Kaski (*Corica soborna*), and darkina (*Esomus danricus*) are rich in micronutrients like Vitamin A, D, E, B1, B2, B3, iron and calcium [3, 4]. Unlike the carp or other bigger fish, the SIFs are generally consumed as a whole (bone, head, eye, etc.), making them a better source of micronutrients than the bigger fish. Consumption of SIFs is the key factor for attaining nutritional security among the rural populace [5, 6, 7] as they are natural supplements for combating three-dimensional hunger [8]. Besides, many SIFs are potential ornamental fishes such as *Pethia conchonius*, *Colisa fasciata*, *Chanda ranga*, *Amblypharyngodon mola*, *Aplocheilus panchax*, *Channa gachua*, *Nandus nandus,* etc. These species are well used by the ornamental fish industry [9, 10].

Despite this, many fishers in different pockets of India, especially in the Central Eastern states like Bihar, are simply discarding these valuable resources as trash and only target the carps. They are neither aware of the nutritional significance nor the marketing channel for selling the prized fish in other places where the demand might be higher. Besides, there have been instances of conflict between the member's PFSC and non-members concerning the right to fish these species in the Manika Maun. The local PFSC members have been licensed for fishing as per the State Fisheries Act, and the secretary of PFCS has gained the power to restrict access to others [11]. Moreover, pollution from point and non-point sources led to fish mortality in Manika Maun. For instance, in 2022-23 the monsoon runoffs from the adjoining agriculture fields and settlement areas cause large fish mortality (about 30% of stocked carp). The COVID-19 related restrictions, particularly the enforced lockdown period, had a tremendous effect on the local fishers. Due to restrictions, fishing days, as well as fish sales and marketing have been decreased. Das et al. [11] reported a 42 % loss of fishing days in Bihar state during the lockdown period. Even fishers responded that the fish harvest from March to May was 32% lower than the previous year due to lockdown restrictions.

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Definition of small-scale fisheries

Fishing in wetlands is a group activity, mostly considered as small-scale fisheries due to the following characteristics: (i) low investment, (ii) high labour intensity, (iii) manual gear operation, (iv) small motorized boat, either inboard or onboard, (v) low to moderate catch, and (vi) direct sale and local consumption.

> *...the preparation of value-added products from fish, such as dry fish and pickles, should be promoted, and rural women can be involved in the preparation of value-added products...*

Dealing with justice

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In dealing with the justice for SIFs in Central North or Central north-eastern states like Bihar, the first and foremost requirement is raising awareness among fishers about the importance of SIFs for nutritional security and health. In this regard, mass awareness programs need to be carried out on a regular basis. Although research institutes like ICAR-Central Inland Fisheries Research Institute are organizing such programs, more participation from the government and NGOs is still required. Another bottleneck in SIF management is poor marketing infrastructure, including marketing channels [10]. An organized cold chain-based marketing channel is required to enable a long-distance marketing channel from the low-demanding production area to the high-demanding area. Particularly, there is a high demand for the SIFs like Mola and Puntius on the markets in eastern and northeastern states like West Bengal, Odisha, Assam, Tripura and Manipur. Thus, the organized channel may help the fishers of Bihar fetch better prices.

Moreover, given that many SIFs are considered as ornamental fish [9], collecting live SIFs from the waterbodies and continuing their breeding and rearing may cause the metamorphosis of unemployed youth into successful entrepreneurs. Also, the polyculture SIFs, along with the bigger-sized food fish, could restrict labour migration to a greater extent as it will help support better livelihoods for rural people [12, 10]. Conservation and proper utilization of these valuable resources, as well as awareness about the cleanliness of the water bodies to reduce the pollution load, are some essential key points for the sustainability of these water bodies. Concerning to COVID related issues; Indian Government has implemented schemes like Pradhan Mantri Garib Kalyan Yojana (PMGKY), to assist the poor (people below the poverty line category) by providing 5 kg of food grains and 1 kg of pulses per person of each household free of cost through the public distribution system. PMGKY provided the necessary safety net to the poor population during the COVID lockdown [11].

Discarded SIFs as trash fish © Archana Sinha

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