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Sustainable Fisheries Management in Coastal Communities of India: Challenges, Governance Frameworks, and Pathways

Forward

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Coastal fisheries play a pivotal role in food security, export revenues and livelihoods in India. Marine fisheries are responsible for millions of fishers, processors and allied workers, with a coastline of 8118 km and an Exclusive Economic Zone of 2.02 million km². But this industry is increasingly under ecological, institutional and social pressures. The majority of the assessed marine fish stocks (nearly 30 per cent) are overfished; fish landings decreased by 2 per cent in 2024 to 3.45 million tonnes; post-harvest losses are between 20 and 30 per cent, and coastal communities are becoming more vulnerable to cyclones, sea level rise and warming seas. This article presents an overview of sustainable fisheries management in the coastal communities of India based on the findings of the Central Marine Fisheries Research Institute and the Food and Agriculture Organisation and recent policy literature. It covers state-level Marine Fishing Regulation Acts, Pradhan Mantri Matsya Sampada Yojana, seasonal fishing ban and community-based regulation system (padu system). The sustainability of production needs science-based regulation, gender responsive policy, better value chains, climate adaptation and community institutions to be recognised, the author concludes. Fisheries governance must be made ecologically based, socially inclusive, and accountable to the coastal communities to realise the Blue Economy vision in India.

Keywords: sustainable fisheries management, coastal communities, India, marine governance, blue economy, small-scale fisheries.

INTRODUCTION

India is one of the big fish-producing countries and one of the important maritime states of the world. It has a coastline, island territories, EEZ, estuaries, backwaters, mangroves, coral reefs and nearshore fishing grounds, which host a wide spectrum of fishery traditions and ecological systems. India is one of the top producers of fish and aquaculture products worldwide, with a total production of 197.75 lakh tonnes (approximately 19.78 lakh tonnes) in 2024-25, which includes marine and inland fish production.¹ Marine product exports are also of economic significance, and seafood is one of the major agricultural commodities for export for India. These figures demonstrate the importance of fisheries in national planning.

But it is the same industry that is under pressure. Marine landings in 2024 (3.45 million tonnes) decreased in comparison to 2023 (3.53 million tonnes), which is linked to cyclonic disturbances, climate variability, and the ongoing fishing pressure.² According to the CMFRI stock status assessments, almost 30 per cent of the stocks assessed were found to be under-exploited, over-exploited, or fully exploited.³ This is a global issue of concern as capture fisheries are experiencing a decline in stock health despite decades of policy attention.⁴ The estimated potential yield for the marine sector in India is 5.31 million tonnes, which is often talked of as an opportunity for growth, but cannot be realised by further investments in already stressed fisheries. In the absence of resource recovery, enhanced monitoring and enforcement, escalating production targets could exacerbate the pressures on coastal ecosystems.

The crisis is for small-scale and artisanal fishers; they are experiencing reduced catch, increased input costs, unsafe conditions, indebtedness and income insecurity. Nearly 80 per cent of Indian marine fishing labourers are linked with small-scale fishing, but policy benefits and investments are more clearly seen in mechanised and export-oriented fishing. Women, who carry out most of the processing, vending, drying, peeling and retail trading, are underrepresented in statistics and decision-making. So, sustainable management of fisheries

¹ *Annual Report 2024-25: Ministry of Fisheries, Animal Husbandry and Dairying* (Department of Fisheries, 2025)

² *Marine Fish Landings in India 2024* (CMFRI, 2024)

³ *Marine Fish Stock Status of India 2022* (CMFRI, 2023)

⁴ *THE STATE OF WORLD FISHERIES AND AQUACULTURE 2024: BLUE TRANSFORMATION IN ACTION* (FAO, 2024)

in India is not a biological issue. It is a matter of governance, justice, livelihoods and the legitimacy of institutions as well.

The challenge of coastal fisheries management in India has been discussed in an integrated way in this article, considering the ecological, regulatory, socioeconomic, community, and climate dimensions. It places Indian fisheries in the context of the Blue Economy narrative and contends that the Blue Economy narrative cannot be dissociated from the well-being of coastal communities or the health of marine ecosystems. The article follows eight substantive sections. It first outlines the ecological and economic profile of India's marine fisheries and thereafter examines the governance frameworks, key sustainability challenges, equity concerns, community management, climate risks and policy pathways. The end points out the conditions for sustainable, inclusive and climate-resilient fisheries governance in India.

ECOLOGICAL AND ECONOMIC PROFILE OF INDIA'S MARINE FISHERIES

The marine environment in India comprises the Arabian Sea, the Bay of Bengal and the Indian Ocean in the south. These areas vary in productivity, species composition, fishing practices, and climate event sensitivity. The southwest and northwest coasts are favoured by upwelling of nutrient-rich waters due to the monsoonal influence, and are rich in productive pelagic fisheries. The important species are oil sardine, mackerel, anchovies of the Indian Ocean, tuna, and other small pelagics. Threadfin bream, croakers, lizardfish, penaeid shrimps, non-penaeid shrimps, crabs, cephalopods, sharks and rays are the species associated with the demersal fishing grounds. These resources are distributed in 12 coastal states and 4 Union territories, all of which have their own fishing history and ways of fishing.

The marine landings data for 2024 underscores the ongoing significance and fragility of the industry. Gujarat continued to be the top fish-producing state with marine fish production of 7.54 lakh tonnes, followed by Tamil Nadu (6.79 lakh tonnes) and Kerala (6.10 lakh tonnes) (CMFRI, 2024). Maharashtra, Andhra Pradesh and Karnataka also played a significant role. Indian mackerel caught 2.63 lakh tonnes and oil sardine 2.41 lakh tonnes, the biggest and second-biggest groups of species landed. Anchovies, tunas and penaeid shrimps experienced an increase, and some demersal species such as threadfin bream and ribbonfishes experienced a decrease in landings. Of particular interest is the loss of demersal species, which are highly vulnerable to trawl fishing, juveniles being caught and habitat disturbance.

In terms of economic contribution, fisheries account for approximately 1.24 per cent of India's GDP and a significant share of the agriculture GDP. It provides livelihoods to 28-30 million people in the value chain: fishers, crew, vendors, processors, ice suppliers, boat builders, net makers, transporters, exporters, and informal workers. For marine products, exports were valued at Rs. In FY 2024-25, exports generated 62,408 crores, of which frozen shrimp ranks as the top source of export revenues. The key markets of Indian seafood are the United States, China, the European Union, Southeast Asia and Japan.

Policy targets are influenced by the economic significance of the sector. The objective of PMMSY is to boost production and exports, reduce post-harvest loss, develop infrastructure, and improve the income of fisher communities.⁵ But when production-based planning is not combined with fishing effort reduction and better stock management, it is a risk. The most important challenge is to grow value, income and resilience while reducing ecological pressures. Rather than how much production India is getting, the question is for coastal communities: who is benefiting from the growth of the fisheries and whether the resource base is sustainable for the future.

GOVERNANCE FRAMEWORK FOR COASTAL FISHERIES IN INDIA

Indian marine fisheries governance is influenced by the federal jurisdiction. Fisheries in territorial waters (usually 0-12 nautical miles) are under the authority of the state as per the Seventh Schedule of the Constitution. The Central Government has jurisdiction offshore beyond territorial waters and in the EEZ, especially with regard to foreign ships and offshore fisheries. This division presents a management challenge because fish stocks, fishing boats and ecological processes are not constrained by the legal boundaries. A fish stock exploited in the near shore can cross state waters and the EEZ, but the EEZ is under different legal authority.

Marine Fishing Regulation Acts have been enacted in all coastal states and Union Territories, with the majority being based on a model bill circulated by the Central Government in 1979. These laws govern the licensing, fishing areas, type of fishing gear, engine size, season closures, and fines. MFRAs, in theory, are supposed to be for the benefit of the traditional fishers and to control mechanised fishing effort. In practice, their content and enforcement

⁵ *National Policy on Marine Fisheries, 2020* (Department of Animal Husbandry, Dairying and Fisheries, 2020)

are widely different among the states. Traditional craft are often infringed in reserved nearshore areas by the use of mechanised craft. The enforcement of the mesh size regulations is poor. Often, penalties are insufficient to stop the large operators. Most importantly, there are no binding Total Allowable Catch limits or systematic relationships between stock assessment and regulatory action under these laws.

One of the most salient conservation measures in India is seasonal fishing bans. The uniform spawning and recruitment protection monsoon ban of 61 days was designed as a measure to protect spawning and recruitment. Although the ban is ecologically beneficial, its implementation has been inconsistent due to varying timing, coverage, compensation, and state-level compliance. The ban period leads to a direct income shock to poorer fishers and crew members if savings-cum-relief schemes and social protection measures are not in place and not effectively delivered on time. Hence, there is a need to build conservation measures with livelihood support; otherwise, they lose their legitimacy.

PMMSY is the largest recent government investment in fisheries. It has announced spending of Rs. It includes 20,050 crores for modernisation of harbours, landing centres, cold chains, fishing vessels, seaweed culture, ornamental fisheries, insurance and welfare measures (Government of India, 2020). The amount of investment is considerable. However, there are independent observers who have expressed concern that PMMSY tends to focus more on production and infrastructure and commercial development than on resource recovery, fisher rights and binding stock management. The scheme can only help towards sustainability if its infrastructure and financial inputs are linked to conservation measures, clear selection of beneficiaries and the inclusion of small-scale fisheries.

The National Policy on Marine Fisheries, 2017, acknowledges responsible and sustainable use, an ecosystem approach to fisheries, scientific assessment of fish stocks, welfare of fishers, especially traditional fishers and consistency with the FAO Code of Conduct for Responsible Fisheries.⁶ India is also committed under SDG 14 and is a party to regional organisations like the Indian Ocean Tuna Commission and the South Indian Ocean Fisheries Agreement. However, there is a significant gap between policy and practice. But the missing links aren't

⁶ Code of Conduct for Responsible Fisheries 1995

the language of the policies themselves; they're the lack of enforceable rules, coordinated institutions, and community trust.

PRINCIPAL SUSTAINABILITY THREATS

Ecological problems of Indian marine fisheries are most severe due to overfishing. According to the stock status assessment conducted by CMFRI, almost 30% of the stocks assessed are overfished and are not able to replenish themselves in a sustainable manner (CMFRI, 2023). Overall capture has hovered about 3.5-4 million tonnes for over a decade, implying that the industry is not growing healthily. Many fishing grounds require more effort to harvest the same number of fish. This is a traditional indicator of a falling CPUE and a reduced biomass of the stock.

There are definite indications of pressure on demersal resources of the northwest coast, particularly on the trawl fisheries of Gujarat and Maharashtra. Trawlers have overexploited threadfin bream, lizardfish, croaker and prawns. In fact, average fish size has been decreasing, which is a sign of overfishing of the recruits (fish before they reproduce). These are also evident in the northeast coast, where the catch rates in the trawl and prawn fisheries have declined over time. These are related to fleet growth, fuel subsidies, vessel financing and lack of adequate effort controls.

This is exacerbated by Illegal, unreported, and Unregulated fishing. IUU fishing in India involves using mechanised trawlers in the traditional fishing area, fishing during the banned period, crossing the boundary, underreporting of catch, fishing with banned fishing gears, under-mesh nets, fishing by pair trawlers, and fishing of protected species. The Coast Guard, Marine Police, state fisheries departments and other agencies are responsible for enforcement. The Comptroller and Auditor General of India has noted that three key areas of weakness in sustainable marine fisheries administration are enforcement gaps, weak data systems and institutional fragmentation.⁷

Conflict is also a very big issue with gears. Bottom trawling is common in the Indian commercial fisheries but disturbs the benthic environment, such as seagrass beds, coral communities and nursery grounds, extensively. Trawling also produces a great deal of

⁷ *Auditing Perspectives on Sustainable Marine Fisheries* (Comptroller and Auditor General of India, 2024)

bycatch, and in particular juvenile fish and species that are not the target species. Bycatch can be a significant component of the catch and decrease the ecological efficiency and future recruitment in several fisheries. Despite being banned in some cases, pair trawling is still being reported and has the potential of causing damages to the trawls and the fishing area of the small-scale fishers.

Post-harvest loss is an additional sustainability challenge. 20-30 per cent losses result in a significant portion of landed fish not creating nutritional or economic value. Quality and price are impacted by weak cold chain infrastructure, inadequate ice, poor landing facilities, lack of hygienic markets, and limited refrigerated transport. The problem is particularly acute for the small-scale fishers and women fish vendors who are often unable to invest in storing the fish and have to bear market price risks when the fish gets spoiled. There is an ecological, economic and social need to reduce post-harvest losses, therefore.

SOCIOECONOMIC DIMENSIONS AND EQUITY

The issue of clashes between artisanal and mechanised fishers is one of the oldest problems in Indian fisheries governance. Nearshore fisheries in the coastal states of Kerala, Tamil Nadu, Andhra Pradesh, Gujarat and other coastal areas were influenced by the introduction of motorised and mechanised fishing following the Indo-Norwegian Project and the expansion of trawlers. Traditional fishers were left competing with boats that were able to intensively harvest nearshore areas and used smaller fishing gear. This resulted in gear conflicts, loss of access, destruction of nets and political mobilisation.

These issues were voiced by the National Fishworkers Forum and the earlier fisher movements in Kerala, particularly to address the problems of destructive trawling, foreign deep-sea fishing and inadequate protection of traditional fishing zones.⁸ Violations of the nearshore waters for traditional craft, even though many state MFRAs have reserved them for traditional craft, are still committed due to weak enforcement. Sustainable management should not be a concession to 'welfare', but a legal and ecological necessity in the form of

⁸ John Kurien, 'RUINING THE COMMONS AND RESPONSES OF THE COMMONERS: COASTAL OVERFISHING AND FISHERMEN'S ACTIONS IN KERALA STATE, INDIA' (1991) UNRISD Discussion Papers No 23 <<https://dlc.dlib.indiana.edu/dlcrest/api/core/bitstreams/145c20b9-c828-499e-abd5-b74124314130/content>> accessed 01 August 2026

artisanal access. Small-scale fisheries tend to be less fuel-intensive, more job-creating per ton of catch, and are more integrated with local food systems.

Equity for gender is also at the core. Women are the backbone of the post-harvest fisheries economy. They engage in trading, processing, drying, peeling, and informal financing. In Kerala and Tamil Nadu, women are mainly engaged in fish retailing; in Odisha and West Bengal, in drying and prawn processing and in aquaculture-related activities. However, the statistics on fisheries are mostly of harvesting, so that women's labour is less visible. The ownership of assets is also very gendered. Often boats and nets are registered in men's names, thereby restricting women's access to welfare schemes, credit and institutional recognition.

Gender responsive fisheries policy is evidenced in some state-level initiatives. By making Gram Panchayat tanks available for lease to Women SHGs, Odisha has paved the way for thousands of women to embrace aquaculture as a means to enhance their food security and supplement their income. These cases illustrate that women can be active producers and managers if access to water bodies, training, credit and market support is provided by institutions. But these efforts are not all even. Women's participation in cooperative governance, planning of market infrastructure, credit design, insurance coverage and data systems should be incorporated in a national fisheries policy aimed at equity.

Social protection is still lacking for many fishers and fish workers. Important but subject to formal registration, cooperative membership or vessel ownership include accident insurance, savings-cum-relief schemes, Kisan Credit Cards, PM-MKSSY, housing support, and welfare boards. Migrant workers, women vendors, informal processors and seasonal labourers are vulnerable to being outside the welfare net. It is therefore imperative to implement portable and universal social protection for the entire fisheries supply chain in a credible sustainability policy.

COMMUNITY-BASED FISHERIES MANAGEMENT INNOVATIONS

Systems of collective regulation of the use of coastal resources have long been in place among communities in India. These systems cover fishing locations, time, fishing tools, labour relations, and conflict-resolution. One of the best examples is the padu system of Tamil Nadu,

as studied.⁹ In the case of padu, fishing sites are distributed among members of the fishing community according to local rules, including rotation and monitoring. This ensures no open access competition, less conflict and provides incentives to restrain.

Similar systems are found elsewhere in Kerala, Karnataka, Goa, and Andhra Pradesh in the form of shore seine groups, net-sharing, customary beach committees and local regulations on fishing grounds. The importance of these arrangements lies in the fact that they are social and local ecological knowledge. They may also be highly adaptive to shifts in local fish abundances. These institutions have been overlooked and/or dismissed as informal practices in the absence of legal force in modern law. It is a loss for governance of fisheries.

Another key form of institutions is Fisher Cooperatives. There are thousands of primary fisheries cooperative societies in India, distributed at both coastal and inland locations. Cooperatives can be used to facilitate access to inputs, credit, welfare, storage and improved market access for small-scale fishers. They are not consistent, though. Cooperative success depends on social capital, leadership quality, trust and external support, as evidenced by Kabir and Krishnakumar (2022). This is in line with the theory of common-pool resource governance, that communities can govern shared resources if they have clear boundaries, rules that are locally legitimate, graduated sanctions, and higher authority recognising local rights.¹⁰

Community-conserved areas and Marine Protected Areas also need to be considered more. India's formally protected marine area is small relative to the global goal for marine biodiversity. Although important, existing MPAs such as the Gulf of Mannar, Gulf of Kutch, Malvan and Lakshadweep areas are beset by conflicts with livelihoods. Where fishing communities are partners – and not just ‘encroachers’ – conservation is more likely to succeed. Seasonal closures, protection of breeding grounds, and mangrove restoration projects can be additional to MPAs if given legal backing and scientific support.

CLIMATE CHANGE AND COASTAL FISHERIES ADAPTATION

⁹ Kenton Lobe and Fikret Berkes, ‘The padu system of community-based fisheries management: change and local institutional innovation in South India’ (2004) 28(3) *Marine Policy*

<<https://www.sciencedirect.com/science/article/abs/pii/S0308597X03000873>> accessed 01 August 2026

¹⁰ Elinor Ostrom, *GOVERNING the COMMONS: The Evolution of Institutions for Collective Action* (Cambridge University Press, 1990)

Climate change has become a fisheries management concern. Increased sea surface temperatures, shifts in monsoons, more intense cyclones, coastal erosion, salinity intrusion, ocean acidification, and coral bleaching are influencing fishing days, fishing grounds, and species distributions, as well as household risk. Some of the reduction in marine catches in 2024 is attributed to major cyclonic systems such as Dana, Fengal, Remal, and Asna. Climate vulnerability is found in various forms in coastal Karnataka, Sundarbans, Odisha, Kerala, Lakshadweep, and the Andaman and Nicobar Islands.

Species changes can already be seen. Indian oil sardine has shifted to the northern parts of the country's west coast, and the traditional hubs in Kerala and Karnataka have had a series of booms and busts. Several species are influenced by nearshore warming for their breeding, recruitment and juvenile survival. The impact of ocean acidification on shellfish and bivalve aquaculture is through influences on calcification. Reef-associated fisheries, biodiversity and tourism livelihoods in the Gulf of Mannar, Lakshadweep and the Andaman and Nicobar Islands are impacted by coral bleaching.

The adaptation measures undertaken by the fishing communities include seasonal mobility, diversification of livelihood, utilisation of weather forecasts, implementation of INCOIS potential fishing zone advisory, investment in safer crafts, protection of mangrove areas and community-based disaster response. Ecosystem-based adaptation is of special significance. The critical importance of strengthening the climate resilience of India's coastal communities through restoration, livelihood diversification, early warning systems, and participatory efforts. The concept of mangrove conservation in the Gulf of Kutch is an example of synergising coastal protection and fish nursery functions.¹¹

PATHWAYS TOWARD SUSTAINABLE FISHERIES MANAGEMENT

First, governance changes are needed. India requires improved coordination between state and central agencies, standardised criteria among the various state MFRAs, credible implementation of traditional fishing zones, a standardised mesh size and standardised ban periods, and mandatory reporting of catch data. A national coordinating mechanism for marine fisheries should be established, which will cross the territorial waters-EEZ line, but

¹¹ 'Enhancing Climate Resilience of India's Coastal Communities' (UNDP) <<https://www.adaptation-undp.org/projects/enhancing-climate-resilience-indias-coastal-communities>> accessed 01 August 2026

not in a way that undermines the role of the states or the rights of the communities. The current draft national fisheries law can only serve to safeguard the welfare of small-scale fishers, to regulate industrial fishing efforts, and to make fisheries management decisions science-based.

Secondly, India needs to transition to an 'ecosystem approach' to fisheries. This involves routine stock assessment, habitat mapping, climate-sensitive modelling and management responses when stocks are in trouble. The scientific assessments of CMFRI need to directly inform licensing, the regulation of gear, closed seasons, and area closures. TACs and effort limits can be trialled initially in fisheries with higher data quality. Territorial Use Rights in Fisheries can be experimented in nearshore areas where community institutions are operating. These pilots are not supposed to be the subject of elite capture and should safeguard workers, women and poorer fishing households and crewmen.

Thirdly, the post-harvest investment should be considered as a conservation strategy. Increase value per fish landed with better ice supply, insulated boxes, hygienic landing centres, refrigerated transport, cold storage, online auction and quality testing. This decreases the need to raise catch levels to ensure income security. The interventions should be targeted to women vendors as the main beneficiaries. The markets require clean water, storage space, sanitation facilities, child care space and access to microcredit. Value-chain modernisation without such support could leave out the informal fish distributors who maintain the distribution chain along the coast.

Fourth, technologies need to be used in a manner that is advantageous to the small-scale fishers. INCOIS advisories need to be enhanced via mobile platforms in native languages. Simple, multilingual, and linked to fisher incentives, electronic catch reporting can improve data quality. VMS should be mandatory and enforced for larger mechanised vessels. Digital traceability can help combat IUU fishing and enhance the credibility of exports but cannot be burdened on small vendors without support.

Lastly, there is a need to integrate climate resilience into fisheries planning. Climate projections must be incorporated in stock assessment; Fisheries MPAs need to cover climate 'refugia' and nursery habitats; Fisheries harbours need to be built to withstand extreme weather; Insurance schemes should account for cyclone-related income loss. Supporting

livelihoods to diversify into seaweed farming, shellfish farming, ecotourism and climate-resilient aquaculture should be considered, especially in the Sundarbans, low-lying islands and cyclonic seafronts. The policies need to stay true to scientific recommendations and not production pressures.¹² This warning is directly relevant to the future strategy of fisheries in India.

CONCLUSION

India's fisheries along the coast are at a critical juncture. The sector provides jobs, foreign exchange, food and culture, but faces challenges of overfishing, gear conflict, climate risk, post-harvest losses, gender disparities and weak regulation. This contradiction is evident: India's vision of the Blue Economy can be realised only by ensuring the ecological foundation is intact and coastal communities are considered as rights holders in governance.

In this article, it has been contended that managing fisheries sustainably is more of a governance issue in India. Technical tools like stock assessment, monitoring systems, cold chains, protected areas, etc. are necessary, but without legitimate institutions and equitable enforcement, they will fail. Management of marine fisheries needs to move beyond a purely production-focused approach to one that takes into account ecological ceilings, community engagement, gender equality, value chain restructuring and climate adaptation.

The evidence in this review suggests a practical agenda. There is a need to harmonise and enforce the State MFRAs. Management decisions need to be related to the results of the CMFRI assessments. Artisanal fishers' traditional areas should be respected in practice. Women's presence needs to be acknowledged in data, credit, welfare, markets and governance. Post-harvest loss reduction needs to be a part of the sustainability agenda. Legally recognise community-based institutions that fit with principles of inclusion and accountability – padu systems, cooperatives, community conservation initiatives. Adaptation to climate change needs to shift from a project to permanent fisheries planning.

Whether the State will be able to develop a partnership with the coastal communities or be able to do management on top of them will determine the future of the fisheries in India.

¹² Kundan Pandey, 'Marine fisheries policy moving against the current of scientific recommendations' (Mongabay, 22 January 2024) <<https://india.mongabay.com/2024/01/marine-fisheries-policy-moving-against-the-current-of-scientific-recommendations/>> accessed 01 August 2026

Communities have already demonstrated their ability to collectively regulate, ecological knowledge, market adaptability and climate response. They need recognition, accurate information, equitable implementation, facilities, social security and participation in decision-making. By incorporating these values into the Blue Economy policy, coastal fisheries can be made more sustainable, equitable and climate-resilient. So long as it still focuses on output expansion and not ecological recovery and social justice, the sector's 'gains' will be increasingly tenuous.