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Contested Waters

Challenges to Resource Access for Inland Fisherfolk in India

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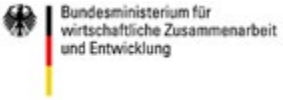

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Contents

Foreword

We are living through a period of deep and overlapping crises. Across the world, climate change is intensifying floods, droughts, heatwaves, cyclones, and ecological degradation, placing enormous pressure on livelihoods that are already precarious. Yet these vulnerabilities are not experienced equally. Communities whose lives remain closely tied to nature—small-scale fisherfolk, pastoralists, forest dwellers, small and marginal farmers, and other traditional producers—often bear the harshest consequences of environmental disruption despite contributing the least to ecological destruction. Their livelihoods are increasingly threatened by declining commons, extractive development models, pollution, enclosure of natural resources, and climate uncertainty.

At the same time, these communities hold vital knowledge, practices, and social systems that can help societies rethink humanity's relationship with nature. For generations, pastoralists have sustained fragile grazing ecologies, forest dwellers have protected biodiversity-rich landscapes, and small farmers have nurtured local agro-ecological systems. Similarly, inland fishing communities have depended on rivers, wetlands, lakes, floodplains, and reservoirs not merely as economic resources, but as living ecosystems intertwined with culture, identity, spirituality, and collective survival. Their knowledge emerges from long histories of coexistence with nature rather than domination over it.

In an era shaped by climate breakdown, such communities should not be viewed simply as vulnerable populations requiring welfare support. They must also be recognised as ecological stewards whose practices can contribute to more sustainable and equitable futures. Protecting their rights to land, forests, water bodies, grazing routes, and commons is therefore not only a question of social justice, but also central to ecological sustainability and climate resilience.

It is within this broader context that *Contested Waters: Challenges to Resource Access for Inland Fisherfolk in India* becomes especially significant. Inland capture fisheries remain insufficiently understood within mainstream policy discourse despite supporting millions of livelihoods and contributing substantially to food security, nutrition, and local economies. Much of the national conversation around fisheries has increasingly centred on production growth, aquaculture expansion, and market integration, often obscuring the lived realities of small-scale inland fishing communities whose

survival continues to depend on access to commons, ecological sustainability, and informal systems of labour and exchange.

This study makes an important contribution by bringing inland fisherfolk themselves back to the centre of the discussion. Drawing upon fieldwork across multiple states and diverse aquatic ecosystems, the publication documents not only the economic vulnerabilities faced by these communities, but also the deeper cultural, ecological, and political dimensions of inland fisheries. It demonstrates how climate change, shrinking commons, privatisation of water bodies, market dependency, debt, caste marginalisation, gender inequality, weak institutional recognition, and declining ecological health are deeply interconnected.

Importantly, the report also highlights how governance frameworks, conservation regimes, infrastructure projects, and regulatory practices can produce new forms of exclusion when social justice is absent from policy design. In many contexts, customary fishing practices are undermined, collective rights weakened, and access to traditional resources increasingly restricted. The experiences documented here reflect a broader pattern in which development and environmental protection are often pursued without adequate democratic participation from the communities most directly affected.

At the same time, the publication foregrounds the resilience and agency of fisherfolk communities. Across regions, communities continue to organise, negotiate, and assert their rights while articulating alternative visions of ecological stewardship rooted in lived knowledge, sustainability, and collective responsibility. These struggles compel us to rethink governance of natural resources—not through top-down systems of control, but through approaches that recognise community rights, local expertise, and the democratic character of commons.

By combining household surveys, interviews, focus group discussions, and regional case studies, this study contributes valuable empirical evidence to an area where systematic documentation remains limited. At a time when policy frameworks frequently aggregate capture fisheries and aquaculture into a single narrative of "fisheries growth," this report helps recover the distinct realities of inland capture fishing communities and the specific vulnerabilities they face.

At ActionAid, we believe that pathways towards climate resilience, ecological sustainability, and social justice must be shaped alongside those who depend most directly on natural resources. Fisherfolk are not merely stakeholders; they are rights-holders, workers, and knowledge-bearers whose participation is essential to building equitable futures that protect both livelihoods and ecosystems.

As ecological pressures intensify, the choices we make today will determine whether rivers, wetlands, and other water commons become spaces of exclusion and dispossession or shared futures grounded in justice, dignity, and sustainability. We hope this publication strengthens ongoing dialogue among policymakers, researchers, civil society organisations, and social movements, and contributes meaningfully toward more inclusive, rights-based, and community-centred approaches to fisheries governance and environmental policy in India.

Sandeep Chachra
President
ActionAid Karnataka Projects

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This report stands as a collective effort, grounded in collaboration between fisherfolk communities, researchers, field teams, and institutional partners. It reflects not only shared labour but also shared commitments to justice, dignity, and the rights of marginalised communities in the context of climate change and structural inequality.

Chapter 1

Introduction

India's inland capture fisheries have been a distinct system of collective life for millions over many millennia. The systemic modern history of the communities involved in it and all their underlying dynamics in totality constitute skills, processes, identities, and cosmologies formed along rivers, wetlands, floodplains, tanks, lakes, ponds, and reservoirs (ICSF, 2022; Fisheries Statistics, 2020; NFDB, 2023; FAO, 2024). India possesses vast and diverse inland fisheries resources, including 0.28 million kilometres of rivers and canals, 1.2 million hectares of floodplain lakes, 2.45 million hectares of ponds and tanks, and 3.15 million hectares of reservoirs (NFDB, 2023). These resources form the backbone of the country's fisheries sector, making India the second-largest aquaculture producer in the world.

The inland fisheries sector plays a critical role in India's rural economy, contributing to food security, employment, and biodiversity conservation. Through the 20th century till date, this sector in India has remained anchored in small-scale equipment and seasonal rhythms, even as policy and investment have increasingly propelled aquaculture, which consists of seed, feed, ponds, and cages, into the statistical foreground of inland fisheries (Chong et al., 2005; FAO, 2024). Though inland fisheries have grown in absolute terms, the rate of growth in terms of their potential has not been fully realised yet (Department of Fisheries, 2025). The sector remains among the least supported and least understood components of India's natural resource governance systems. Traditionally, the nature of inland fishing in India has been small-scale or subsistence (FAO, 2024). These communities have always caught fish using traditional, locally made craft and gear, and habituated near waterbodies, and used the catch for their consumption and sold the surplus catch to local or nearby villages and towns. That is why capture fisheries from inland water bodies are considered a source of safe fish, or "green fish", given their sustainable way of production (Pandit et al., 2021; FAO, 2024).

The sector has witnessed remarkable growth over the last two decades, with production rising from 7.5 lakh tonnes in 1950-51 to an impressive 184.02 lakh tonnes in 2023-24 (PIB, 2025). This transformation has positioned inland fisheries as a significant contributor to India's total fish production, now accounting for more than 75 percent of the total output (MOFPI, 2025). Moreover, in recent years, the sector has demonstrated exceptional dynamism, with inland fish production

more than doubling from 61 lakh tonnes in 2013-14 to 139 lakh tonnes in 2023-24, achieving an impressive Compound Annual Growth Rate (CAGR) of 8.58 percent (Department of Fisheries, 2025). However, it is crucial to note that much of the growth inland fisheries since the 1990s has been in culture fisheries, not in capture. This divergence is often papered over in aggregate production narratives, even as stories of compounding challenges of families and communities involved in capture fishing over generations and centuries are accumulating in research, news, and other literature. These challenges are directly related to declining catches and shrinking access to natural waters (Iyengar & Chakraborty, 2024).

The indispensability of the fisheries sector can be gauged from the fact that it supports approximately 28 million people at the primary level, with inland fisheries providing livelihoods for about 23 million fishers across the country (Department of Fisheries, 2025; FAO, 2024). These include fishers, fish farmers, fish workers, and vendors across the value chain (Department of Fisheries, 2020). Besides, the average participation of women is 36 per cent in inland fisheries (FAO, 2024).

However, as mentioned, despite their contributions to the national economy and ensuring food security for millions, many small-scale fishers face pervasive economic vulnerability and a multitude of systemic barriers. Inland fishing communities have historically relied on rivers, ponds, and reservoirs for sustenance, livelihood, and cultural identity. They face a confluence of challenges that threaten their livelihoods and the sustainability of inland fisheries. There has been a lack of focus on the struggles of millions of inland fisherfolk whose livelihoods have been challenged by various extractive development projects (SANDRP, 2025).

The agenda of increasing the contribution of small-scale fisheries is smeared with many concerns and constraints. Over the past three decades, the development of the fisheries sector, especially at large scale, has led to overexploitation of resources and risks to habitats and ecosystems around the world. Customary practices for the allocation and sharing of resource benefits in small-scale fisheries, in place for generations, are being challenged and disrupted, resulting in non-participatory and centralised fisheries management systems. As a result, small-scale fisherfolk communities suffer from unequal power relations and the hegemony of the state and the corporations. Conflicts with large-scale and technologically aggressive fishing operations have grown more common. Sectors like tourism, aquaculture, agriculture, energy, mining, industry, and infrastructure developments wield stronger political or economic influence, further marginalising the small-scale inland fisherfolk (FAO, 2015).

The challenges are multidimensional, ranging from limited waterbody access to negative externalities stemming from agriculture and industries, from suboptimal institutions to climate change. Lack of essential infrastructure, with the small-scale inland fisherfolk, like cold storage and processing facilities lead to post-harvest losses and economic exploitation through intermediaries. Loss of access to water bodies due to industrial development and weak governance further restricts fishing areas and contributes to overexploitation (Joshy, 2017). Environmental degradation and pollution from industrial effluents, agricultural runoff, and improper waste disposal severely contaminate water bodies, causing fish kills and habitat loss. Finally, climate change impacts, such as unpredictable rainfall, rising water temperatures, and extreme weather events, introduce new risks, disrupting fishing activities and damaging infrastructure, thereby exacerbating the vulnerability of these communities. Beyond their struggles, inland small-scale fishing communities play a crucial role in safeguarding ecological commons, including rivers, lakes, wetlands, and reservoirs. Their traditional knowledge, sustainable fishing practices, and direct dependence on these ecosystems make them key custodians of freshwater biodiversity, water resources, and ecological balance (Noble et al., 2016; FAO, 2024).

While coastal fishing communities in India have received greater academic and policy attention, there is a need to shift the focus toward inland fish workers and their challenges (Das & Roy, 2022). Substantial data gaps persist. While production and seed statistics are systematically recorded, caste-disaggregated, gender-disaggregated, and ethnographic household data remain scarce. Very few long-term studies map fisher household economics, migration, or intra-community hierarchies. Gendered labour patterns in inland capture fisheries are minimally documented (PIB, 2025a).

This study intends to bridge the gap in the understanding of academia and policy space. The present work explores both the ecological stewardship and the challenges faced by inland fishing communities. While small-scale inland fishers face significant socio-economic and environmental pressures, they are not merely resource users—they are custodians of freshwater ecosystems. However, increasing privatisation of water resources, environmental degradation, and exploitative leasing systems have severely disrupted their access and autonomy across Indian states. Recognising their role and empowering them with conducive policies, fair access to resources, and ecological incentives is crucial for the future of both inland fisheries and overall freshwater biodiversity and ecosystems.

The present report delves into the economic and social profile of inland fisherfolk and understands the challenges in the lives of small and marginal inland fisherfolk

communities in India. The sample of the study includes locations in 6 Indian states across the country. This study covers the fisherfolk communities that depend on inland water bodies in the following locations across six Indian states - Barna Dam and canals of the Narmada river (Madhya Pradesh), ponds and canals of East Medinipur (West Bengal), Dal lake, Manasbal lake and Wular lake along with their canals (Kashmir), Deepor Beel in Kamrup, (Assam); Konda Karla Ava lake and Meghadri Gadda river in Vishakhapatnam district (Telangana) and Kosi river (Bihar). The diversity of the regions in the sample helps us understand the similarity as well as the heterogeneity of concerns faced by fisherfolk in India. In our purposive sampling, each location is represented by the dominance of one type of waterbody. Apart from determining the species found in waters, the type of waterbody, whether river system, canal, marsh, or estuary, also determines the interactions between local economy and ecology, as well as their distinct governance systems. The focus of the study is on both the challenges of accessing inland water bodies and the policies (and practices) that support or hinder inland fishing and the communities dependent on it. The study, through its primary data collection, redirects academic and policy attention towards the often-overlooked challenges confronting inland fish workers in India. The report adds to existing understanding of the fisheries sector, providing a nuanced and detailed analysis of the specific hardships experienced by inland fish workers.

Major themes identified in the study include the discussions on market access, role and scope of cooperatives, weak policies and political will, rise of privatisation of waterbodies, reduced sovereignty of the fisherfolk communities, and the severe consequences of environmental degradation and pollution, risks posed by climate change, and the undervalued role of women in the occupation.

The research intends to provide a voice by generating evidence-driven insights. These insights inform the development of targeted policies and interventions designed to address the unique vulnerabilities of inland fish workers and improve their livelihoods. The major challenge is the wide recognition that the small-scale inland fishers are not merely resource extractors, but defenders of the ecosystem. This has to be imbued into the mainstream policy discourse. Recognizing their role and empowering them with sustainable policies, fair access to resources, and ecological incentives is crucial for the future of both inland fisheries and freshwater biodiversity conservation in India.

This publication is organised into five broad sections that collectively examine the changing realities of inland fishing communities in India. Following this introduction, Chapter 2 reviews the existing literature on inland capture fisheries, focusing on questions of livelihoods, ecological change, governance, market systems, labour,

and access to commons. Chapter 3 outlines the research methodology, including the mixed-methods approach adopted for the study, the survey design, sampling framework, and fieldwork conducted across six states and multiple aquatic ecosystems. Chapter 4 presents the core findings of the study, drawing upon household surveys, in-depth interviews, and focus group discussions to analyse the socio-economic conditions, cultural practices, livelihood patterns, gender relations, market vulnerabilities, environmental challenges, and governance-related issues shaping inland fishing communities today. The final chapter synthesises these findings to reflect on the broader structural challenges confronting inland fisherfolk and advances recommendations for more equitable, community-centred, and ecologically sustainable fisheries governance in India.

Chapter 2

Literature Review

The inland fishing sector is usually divided into two categories based on resource ownership and functional aspects of the occupation – inland capture fishing and aquaculture (FAO, 2024). Inland capture fishing involves capturing naturally occurring or maintained stock fish species in naturally occurring or artificially developed but often common waterbodies like rivers, lakes, ponds, wetlands, estuaries, and reservoirs. Inland capture fisheries and the communities practising them have existed for many millennia across numerous geographies on the planet and continue to possess unique and diverse socio-economic structures, cultural practices, and ways of life. On the other hand, aquaculture involves the development and maintenance of artificially developed waterbodies, most often ponds, on private lands, which are then seeded and maintained according to specific quantities and quality of specific fish to be sold. In contrast to inland fisheries, which are often small-scale and subsistence-oriented, aquaculture is largely an economic incentive-based industry that has developed over the last few decades.

The separation between capture and aquaculture represents the difference in property regimes and value systems. Capture fisheries have continued to evolve in a landscape marked by a mix of common pools of open resources and lease rights over an increasing percentage of former open resources. While rights to these open waterbodies were historically negotiated among communities for everyone's rights, lease rights to a select few, often through the legal support and patronage of the state and polity, have increasingly become sites of conflict (FAO, 2024; Iyengar & Chakraborty, 2024). At the same time, aquaculture implies enclosure - the private control or lease of a privately owned waterbody for commercial gains (Marshall, 2001).

The rights of small-scale inland fishers are increasingly being examined through a human rights and environmental justice lens. Globally, the rights-based fisheries framework, advanced by the FAO's *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries* (FAO, 2015), situates fishers as both rights-holders and custodians of aquatic ecosystems. Within India, however, the governance of inland fisheries remains shaped by colonial legacies of property, feudalism, caste hierarchies, and bureaucratic lease systems (Kelkar & Arthur, 2022; Ganesh, 2022). The development discourse in India has traditionally assumed that fisheries were

marginal before the country gained independence in 1947. Pillai and Katiha (2004) argue that, before state interventions in the 1950s, marine fishing was carried out primarily at a subsistence level, with indigenous crafts. While Indian fisheries during this period might have appeared small-scale, particularly from the perspective of government technocrats, they still maintained commercial linkages. European traders often targeted other commodities, but Indian fisheries were still part of global trade networks.

As established, the inland fisheries in India play a crucial role in the national economy, contributing to food security and the livelihoods of millions of people. However, increasingly, the inland fishing sector faces the challenge of resource access and use, which involves, apart from the ability to access and use the waterbodies for fishing, the ability to use certain areas of the lands connected to and adjacent to the waterbodies for a plethora of post-harvest activities. On the other side of the inland fishing value systems and market access and pricing, have had changing dynamics in recent years, with small and marginal fishers and fish sellers experiencing increasing difficulties in accessing storage, transport, and physical market spaces or any pricing support. The extant literature focuses on how they are increasingly bearing the brunt of the compounding effects of all the challenges. In this regard, the present study attempts to capture the key sets of challenges that traditional inland fisherfolk encounter due to reduced community control over resources (including waterbodies and associated and connected lands), market access, and government support.

Small-scale inland fishing communities also face numerous challenges that hinder their socio-economic stability and threaten the sustainability of freshwater ecosystems. These challenges range from environmental degradation, loss of access to water bodies, and ineffective governance to socio-economic vulnerabilities arising from limited market access and post-harvest losses (Sugunan, 2023). According to Kumar et al. (2019), stated that pollution from industrial effluents, agricultural runoff, and over-extraction of water resources has significantly degraded water bodies, resulting in the loss of aquatic biodiversity. The experience of the degraded quality and quantity of capture is well-reflected in the discussions with our respondents, as mentioned in the following sections. Venugopal et al. (2019) mention that the introduction of commercial aquaculture practices has displaced traditional fishing communities, with significant consequences for both the environment and the livelihoods of those dependent on these resources.

Poverty among the fishing community is quite widespread, with a large fraction of fisher households categorised as Below the Poverty Line (BPL) (Salagrama, 2006). As Jadhav (2024) points out, small-scale fisheries are context-specific, deeply

embedded in place and community, and shaped by particular social, economic, and historical relations.

Furthermore, lack of adequate infrastructure, such as cold storage and transport facilities, hampers the ability of small-scale fishers to access profitable markets, reducing their income and exacerbating their economic vulnerability (Sugunan, 2010). It was found that in the inland fisheries systems, the onset period for the breeding of Indian Major Carps *(rohu, catla,* and *mrigal),* which have the highest domestic demand in the country for most of the freshwater fish-eating population, was delayed by the late arrival of the monsoon season (Das et al., 2019). This is affecting the carp production cycles and consequent harvest and seasonal demand from consumers. In addition, a decline in fish spawn availability in the river Ganga has been documented (Das et al., 2019).

Governance issues are also another key challenge. While some efforts have been made to involve local communities in managing fisheries resources, a lack of effective policy frameworks and enforcement mechanisms remains a significant barrier to sustainability. Thus, the need for improved institutional frameworks to manage water bodies effectively, highlighting the role of community-based management models that empower local fishers and ensure equitable access to resources (FAO, 2024). The importance of cooperatives and collective action in addressing these challenges has been underscored by studies such as that of Solomon (2023), which found that cooperative models can improve market access, reduce exploitation by middlemen, and promote sustainable fishing practices.

There exists ample literature suggesting that the small-scale fishers are environmental defenders for the freshwater ecosystems. According to Sinthumule (2023), traditional knowledge and fishing practices play a significant role in conserving aquatic biodiversity. Communities such as those in the East Kolkata Wetlands have long used sustainable practices like wastewater-fed aquaculture systems, which recycle urban sewage while supporting fish production (Dutta, 1996). Additionally, fishers have been involved in habitat restoration efforts, such as the afforestation of riparian zones to prevent soil erosion and maintain river health. These practices help mitigate the impacts of climate change, as wetlands serve as carbon sinks, helping regulate local climate conditions (Roni, 2005).

Inland fishing operations are carried out by using traditional gear such as gillnets (which are the most commonly used in all kinds of waterbodies), seines, cast nets, drag nets, and other types of miscellaneous gear. These methods, often characterized by low investment and high adaptability, allow local communities to harness aquatic resources without large capital investment, making them crucial

for rural livelihoods. These methods are also an integral part of the cultural identity of these communities, presenting the traditional ecological knowledge (TEK) developed over generations. Besides, traditional nets and fishing practices used in India are equally diversified, varying across different inland water bodies such as rivers, wetlands, reservoirs, lakes, and floodplains (FAO, 2024).

Studies also highlight the role of small-scale fishers in advocating for the protection of water bodies from industrial encroachments. Fishers in the Chilika Lake area in Odisha, for instance, have resisted attempts to privatise water resources and have been instrumental in lobbying for the protection of this critical ecosystem (Nayak, 2012). Furthermore, community-based fish sanctuaries have proven to be effective models for freshwater fish conservation, with local fishers managing and protecting specific water bodies from overfishing and other destructive practices (Jumani et al., 2023). These initiatives are vital in preserving the ecological integrity of freshwater ecosystems and ensuring the long-term sustainability of inland fisheries.

Moreover, as mentioned, much of the growth in land fisheries since the 1990s has been in culture fisheries, not in capture. Capture fisheries continue to be distinct not only in the ecology of open waters but also in social institutions like customary use, collective work, ritual obligations to river spirits and village deities, and knowledge encoded in sites, species, currents, and seasons (FAO, 2015; Vohra, 2020). FAO's documentation of inland capture cites these fisheries as globally significant for nutrition and livelihoods while being chronically under-measured and undervalued in policy and statistics. The state's statistical matrices converge on aggregate inland output, which obscures the cultural and communal intricacies of capture fisheries while foregrounding the more capital-driven structures of aquaculture (FAO, 2024).

Socio-Economic Challenges and the Rights Framework

Small-scale inland fishers are positioned at the intersection of ecological dependence and socio-economic marginalization. Studies underscore that poverty among fishing communities is both a cause and a consequence of weak access rights and governance systems (Neiland, 2006; Allison and Horemans, 2006; Béné, 2009). Many of India's traditional fishing castes—such as Kaibartas, Mallahs, and Kewats—are classified under marginalized social groups, facing double jeopardy of vulnerability (Kelkar & Arthur, 2022).

A rights-based approach links these economic deprivations to broader frameworks of human dignity and social justice (Franz et al., 2015; Ratner et al., 2014). The FAO

(2015) guidelines explicitly frame fisheries rights as extensions of fundamental human rights—rights to livelihood, food, participation, and non-discrimination. Yet, as Chandra (2022) observes, inland fisheries in India often operate under lease systems that prioritize revenue generation over equity. Leaseholders—usually from upper castes or wealthy backgrounds—control access, often excluding small fishers.

In this context, tenure insecurity emerges as a defining feature of inland fisheries. Schlager and Ostrom's (1992) conceptualisation of property-rights regimes—defining access, withdrawal, management, exclusion, and alienation rights—offers a useful analytical framework. Borrowing from the framework, it is observed that most small-scale inland fishers in India possess access and withdrawal rights at best, while management and exclusion rights remain concentrated in state agencies or elites (Kelkar & Arthur, 2022).

Governance, Policy, and Perceptions of Sustainability

Governance of inland fisheries is complicated by fragmented institutional authority—often spread across departments of irrigation, revenue, and environment (Kelkar & Arthur, 2022). While some community co-management models show promise, policy coherence remains weak. There is an absence of long-term ecological incentives for fisherfolk who practice sustainable harvesting.

Perceptions of "sustainability" and "fair access" vary locally. Studies such as Gustavsson (2018) and Hossen (2024) illustrate that traditional fishers perceive sustainability as maintaining a symbiotic relationship with the ecosystem—practices guided by local norms and customary taboos. In contrast, government agencies tend to frame sustainability in terms of yield efficiency and scientific aquaculture.

Community-based management initiatives, such as fish sanctuaries in Assam and Bihar, demonstrate that ecological incentives work best when local cultural knowledge and collective ownership align (Pomeroy, 1995). Empowering fishers through cooperatives and ensuring participatory decision-making thus emerges as a recurring recommendation (Kelkar & Arthur, 2022).

In India, policy documents and extension narratives have prioritized productivity gains and export earnings that create the recurring groundwork for increasing support for aquaculture while leaving the legal structures of capture fisheries tenure for marginal and small-scale communities underdeveloped or poorly designed (Nayak et al., 2006). The National Fisheries Development Board's summaries of

growth accentuate production and value without disaggregating how much comes from capture as opposed to culture, a data gap that weakens granular planning. FAO and ICSF reviews conclude that inland capture catch statistics are weak and under-reported in many states, mirroring a broader global pattern of statistical invisibility (FAO, 2015; Kelkar & Arthur, 2022). When the statistical instrument blurs the line between capture and culture, the lived differences for customary users—gear, season, risk, access—are lost in the averages.

Challenges to Inland Fisherfolk Communities

Challenges for small and marginal inland fisherfolk over the last 20–25 years can be attributed mainly to the following interacting forces: socio-economic disparities in terms of caste, gender, and access to property; evolving state policies and leasing regimes; and environmental change and pollution. First, social structure and land relations mediate who fishes where, when, and on what terms. Research shows how caste and community identities organise access, obligations, and exclusion, shaping labour mobility and ownership across India's fisheries; while much scholarship centres on coasts, analogous dynamics of hierarchy and gatekeeping are visible inland wherever tanks and river margins are embedded in agrarian power (Rao & Sophia, 2023). In floodplain and tank systems, fishers frequently report that residual waters in privately owned lands are off-limits or toll-based, and in many reservoirs, cooperative or contractor control structures determine entry. The texture of this control is decidedly local but reflects a national pattern in which agrarian property and administrative leases subordinate customary fishing claims (Nadu, n.d.).

Second, policy and law have evolved unevenly across states, with inland capture governed as a 'state subject'. Where formal statutes exist, they are often production-oriented, framing inland waters as assets to be leased rather than as social commons under community tenure. Comparative work on reservoir leasing describes two models—revenue-based and welfare-based—applied variably by states, with differing lease rates, eligibility, and objectives; in both, traditional fishers can be marginalised by design or execution (Chandra, 2022). Meanwhile, fish worker organizations have criticised national-level policy drafts for prioritizing growth and export while inadequately addressing tenure rights, social equity, and gender (Mangar, 2023). Besides, fish worker organizations have also criticised national level initiative for definitional ambiguity and lack of focus on women fisherfolk. Overall, the critique is not that aquaculture should halt; rather, that capture tenure must be recognized, and development of culture must not dispossess capture users through enclosure, eviction, or exclusionary licensing.

Third, environmental and climatic stressors intensify risk. Inland capture depends on hydrology, connectivity, and water quality. Flood control, embankments, irrigation withdrawals, and sand mining alter flows and fragment habitats; agricultural runoff introduces fertilizers, pesticides, and insecticides; urban effluents degrade oxygen and carry toxins; invasive species and hatchery escapes transform communities; and heat waves, erratic monsoons, and droughts compress ecological windows. FAO's global reviews repeatedly flag under-appreciated inland capture contributions and the fragility of habitats under development pressure, warning that statistics often fail to register declines in catch per unit effort until livelihoods are already undermined. Local and state initiatives to restore native stocks—restocking indigenous species, regulating invasives—suggest a way forward, but these require community governance and water-quality enforcement to avoid "stocking without stewardship". The ecological signal seen in fisher testimonies—smaller fish sizes, fewer days of productive fishing, seasonal volatility—aligns with these documented stressors and should be treated as empirical evidence, not merely anecdote; yet systematic open-water catch and effort datasets across India remain sparse, strengthening the case for new field programs (Bevilacqua et al., 2016).

The conceptual foundation for addressing these gaps is fishing rights and tenure. FAO's 2015 Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries (SSF Guidelines), negotiated through a global, participatory process, set out principles that centre on human rights, tenure security, gender equity, and community stewardship. They bridge to FAO's tenure guidelines on land, fisheries, and forests, emphasizing that fisheries governance must recognize access, withdrawal, management, exclusion, and alienation rights as lived bundles in specific contexts (FAO, 2015). In the global North, inland fisheries tenure often combines private water rights, angling leases, quotas, and regulated access within conservation frameworks, with strong enforcement and user associations (Marshall, 2001; Pinkerton, 2018).

In the global South, customary and communal tenure predominate. Riverine pools and floodplains are governed collectively, where community norms fix turns, gears, and seasons. Yet, these arrangements are weakly recognised in statutory law, permitting displacement by leases and projects. India's own inland commons exhibit both formal reservoir leases with customary rules in tanks and river reaches, along with community-based systems such as the *padu* in Kerala (though coastal and brackish), which illustrate how rotational access and local governance can align sustainability and equity (Lobe and Berkes, 2004). For India's inland capture, the implication is clear: a rights-based approach should (1) legally recognize customary capture tenure where it exists; (2) devolve management rights to fisher collectives with co-management frameworks; (3) limit enclosure by contractor leasing that

excludes traditional users; and (4) integrate water-quality and environmental controls into tenure, because "rights to fish" without "rights to clean water" are hollow.

It should be noted that value systems and customs in small-scale fisheries (SSF) draw similarity to the peasant mode of production, given their family-based, artisanal nature. However, under the pressure of changing social relations, commercialization, and changing market structures, the traditional, subsistence-oriented lifestyle is undergoing a shift to market-oriented, high-tech, and often competitive commercial operations. This shift from a traditional peasant mode of production to a market-driven economy is altering long-standing value systems. Traditionally, these communities operated on a logic of social reproduction and subsistence, where customs like "sharing the catch" acted as informal social security. However, as global demand and commercialization seep into local docks, the collective identity is often replaced by individualized competition. The esoteric ancestral "ecological wisdom" of the water bodies is being sidelined by a reliance on modern technology (GPS, sonar) and industrial efficiency metrics. Besides, the traditional priority of subsistence consumption is clashing with the pressure to participate in the market through middlemen, where they often don't get a fair price for their yield. Thus, the struggle is multifaceted: in terms of catching up with evolving socio-economic realities, market needs, government policies, as well as preserving their community-focused customs, and maintaining their sovereignty over common resources.

Women's work animates every stage of inland capture value chains—sorting, cleaning, curing, drying, carrying, vending, and household budgeting—yet the literature shows persistent invisibility in data, credit, infrastructure, and decision-making (Nayak & Vijayan, 2006). Central Marine Fisheries Research Institute (CMFRI) and allied studies point out that post-harvest and marketing are major loci of women's contribution, dominating low-margin, labour-intensive segments (Sathiadhas et al., 2003; Sudhakara et al., 2003). Asia-wide syntheses indicate that women frequently constitute nearly half of the fisheries workforce, with systematic under-recognition in governance and tenure (Kusakabe, 2003; Chambon et al., 2024).

Field studies from inland regions (e.g., Assam) describe shifts from door-to-door vending to back-end processing roles as markets formalise and mobility constraints rise, with value addition (sorting, grading, icing) remaining crucial but low-paid (Das, 2020). ENACA's summary of gender participation, using CMFRI census inputs, quantifies high female shares in seed collection, marketing, and curing/processing, but national-level inland-specific metrics remain limited (Kashyap et al., 2019). The policy direction is straightforward but demanding: collect gender-disaggregated

data for inland capture; design women-focused post-harvest infrastructure (drying yards, cold boxes, hygienic sheds, retail spaces); tailor credit and SHG linkages to capture seasonality; and formalize women's roles in co-management and tenure decisions. Any rights reform that sidelines women would reproduce today's inequities under a new banner.

In the policy arena, the tension between growth and rights remains unresolved. Commentaries on India's 2020 draft national policy criticised its production bias, silence on caste and gender, and the risk of eviction through leasing and infrastructure (Vohra, 2021). Parallel initiatives—NFDB programming, state "blue economy" roadmaps, and restocking campaigns—show sincere effort but often lack the tenure-and-rights spine that would secure benefits for capture communities (Department of Fisheries, 2025). International guidance offers a path: implement the SSF Guidelines domestically, with state-by-state roadmaps for inland capture that identify tenure baselines, map water-bodies and rights holders, and sequence reforms; build co-management institutions where capture is viable; and design aquaculture expansion so it does not extinguish capture access. The literature recognises the need for law, policy, and local institutions coordination, else development will always be synonymous with displacement (Nayak & Vijayan, 2006).

The modern history of India's inland capture fisheries is therefore a story of persistence under pressure: communities who continue to cast nets in rivers and tanks while the statistical and policy spotlight swings to ponds and cages; women who carry the value chain without being counted; and a tenure landscape where customary access contends with leases and projects. The way forward lies in clear conceptual separation of capture and culture in data and policy; structural shifts in the current system with greater autonomy for access commons; recognition of capture tenure and co-management; environmental safeguards as core parts of rights; and gender-responsive design that brings women into the centre of authority, infrastructure, and credit. India's own institutions—the Department of Fisheries, NFDB, state fisheries departments—have the reach to lead this shift; FAO's SSF Guidelines provide the compass. The question is whether we will measure, acknowledge, value, celebrate, promote, recognize, and govern inland capture in time to keep its communities and cultures alive.

Chapter 3

Research Methodology

Objective and the Scope of the Study

The themes emerging from the initial literature review helped shape the major objectives of the study. The study sought to understand the changing livelihood patterns of small-scale fishing communities and to identify the environmental, climatic, and market-related factors influencing contemporary fishing practices. It also aimed to examine the interconnections between different forms of deprivation experienced by inland fishing communities, including economic insecurity, ecological vulnerability, and institutional exclusion. At a broader level, the study intended to contribute toward the development of holistic and evidence-based policy frameworks for small-scale fishing communities, while also recommending pathways for sustainable, equitable, and inclusive livelihood development.

Guided by these objectives, the study focused on several key research questions. It sought to understand the specific socio-economic and environmental challenges faced by small-scale inland fishing communities in India, and to examine how existing policies and governance practices either supported or hindered their livelihoods and access to resources. The study also explored local perceptions regarding policies, resource access, and ongoing ecological and environmental changes affecting inland fisheries and dependent communities.

Methodology of the Study

The methodological framework adopted for the study combines quantitative and qualitative approaches to develop a comprehensive understanding of the realities faced by inland fishing communities across India. By integrating household surveys, focus group discussions, interviews, case studies, and secondary research, the study seeks to capture both the structural dimensions of deprivation and the lived experiences, ecological relationships, and livelihood challenges shaping inland fisherfolk communities today.

Survey Design

The study adopts a mixed-methods approach to study the inland fisherfolk situation based on primary data collection. To get a first-hand understanding of both the

challenges of access to inland water bodies and the policy opportunities faced by the inland fishing communities, primary data collection methods were used. The sample study includes fisherfolk communities dependent on inland waterbodies, Fish Farmer Producer Organisations, representatives from the community, CSOs, CBOs, women collectives and traditional social organisations, and government officials, employers of the informal sectors, policy makers, local authorities. For the quantitative study, a total of 600 households across six states were surveyed using a structured questionnaire. To mitigate the logistical challenges of the data collection and data entry process, a Computer-Assisted Personal Interviewing (CAPI) method was used for the data collection process. The Kobo Toolbox, an open-source Android app for collecting survey data developed by the Harvard Humanitarian Initiative, was used.

The survey tool captured quantitative and categorical data on the characteristics of and factors impacting the fishing occupation and connected lives of the fisherfolk community. The survey (attached in the appendix) included closed-ended, categorical, and multiple-choice questions. The questionnaire also captured perceived and evolving challenges and experiences of the fishing families related to inland fishing over the last few years.

Focus Group Discussions

The quantitative survey was extensively supplemented by Four Focus Group Discussions (FGDs) in each of the 6 states (making it a total of 24 FGDs in total across India). The FGDs aimed to capture nuanced and diverse information about the community's experiences as a whole and how families relate to and express themselves as a community on aspects related to their fishing occupation, along with their collective demands and expectations. The Focus Group Discussion (FGD) provided rich qualitative information on the daily challenges, perceptions, and experiences of the inland communities of fishermen.

Moreover, key informant interviews of community leaders, fishing experts, government, and former government officials were conducted to provide relatively macro-level information on the policy landscape, evolving socio-economic structures, connected challenges, and potential or demanded solutions.

Using the snowball/ purposive sampling method to select the sample households, the data collection started in September 2025 and went on until October 2025. Using a case study approach, 12 case studies in total (2 from each state) were developed to provide in-depth inputs on fishing and related aspects gleaned from any two households, one each from a separate area, within each state that provide

a deeper dive into a wider set of connected living experiences that a common small scale or marginal fishing family has faced in recent times.

Secondary research was conducted in the initial phases to support detailed planning of the methods and modalities of the fieldwork, and further in-depth secondary research throughout the study to consistently add context and actionable information that complements the primary research information being collected. A comprehensive secondary study of extant literature, white-papers and policy documents has been undertaken in order to understand the gaps in the literature, the current situation, and future prospects of the fisherfolk in India.

Sampling and Site Selection

The sample included fisherfolk communities that depend on inland water bodies in the 6 locations across India (refer to Table 3.1): 1. Andhra Pradesh – Konda Karla Ava Lake and Meghadri Gadda river regions in Visakhapatnam (Vizag) district. 2. Assam – Deepor Beel region in Kamrup (metro) district and Urpad Beel region in Goalpara district 3. Bihar – Kosi River embankment region in Supaul district 4. Jammu and Kashmir – Dal Lake region in Srinagar district, Wular Lake region in Bandipora district, and Ganderbal Lake region in Ganderbal district 5. Madhya Pradesh – Barna river and Barna dam reservoir region near Badi town in Raisen district 6. West Bengal – Spread out regions in different directions near Contai town in East Medinipur district. As mentioned previously, the logic for the selection of the sites dominated by one type of aquatic ecosystem stems from ensuring diversity of the regions in the sample to understand the similarities and variations in the lived experiences of fisherfolk in the respective ecosystem. Besides, fishing practices,

Table 3.1: Summary of Geographical Area of the Study

State	District	Region
Andhra Pradesh	Vishakhapatnam	Konda Karla Ava Lake
		Meghadri Gadda river
Assam	Kamrup (Metro)	Deepor beel
	Goalpara	Urpad beel
Bihar	Supaul	Kosi River embankment region
Jammu and Kashmir	Srinagar	Dal Lake region
	Bandipora	Wular Lake region
	Ganderbal	Ganderbal lake region
Madhya Pradesh	Raisen	Barna river and Barna dam reservoir region
West Bengal	East Medinipur	Regions near Contai town

governance styles, traditional fishing practices, access rights, and the impact of climate change vary with waterbodies.

Field Data Collection Process

The field survey was carried out by surveyors from ActionAid Association's teams and allied social organisations present across India. The data collection process was monitored by the research team, with the support of ActionAid Association offices in Assam, Bihar, Jammu and Kashmir, Madhya Pradesh, Telangana, and West Bengal. The training of surveyors across 6 states was organised in a hybrid mode throughout the data collection process. Additionally, before launching the survey, pilot surveys were conducted in East Medinipur.

The data collected through the survey is presented in figures and tables, with simple descriptive statistics for observations in Section 4. Both the structured questionnaire and the data obtained from focused group discussions, observations, and interviews were analysed to identify common themes and patterns, as well as to observe the distinctive needs of the various groups. The qualitative analysis, apart from triangulating the findings of the survey data, also allows for an in-depth exploration and comprehensive understanding of the fisherfolk's issues. Together, both processes enabled the identification of significant findings, which were then presented through visual aids to facilitate effective communication and a clear and concise understanding.

Chapter 4

Survey Findings and Discussion

This chapter presents the findings from the multi-state study on inland fishing communities across six Indian states, drawing on both quantitative and qualitative methods to understand the socio-economic, cultural, ecological, and governance-related realities shaping fisherfolk livelihoods. The study covered 641 households in total, with a little over 100 households surveyed in each state.

The communities interacted with were at locations that include: Konda Karla Ava Lake and Meghadri Gadda River, Vishakhapatnam district, Andhra Pradesh; Deeper beel, Kamrup (metro) and Urpad beel, Goalpara district, Assam; Kosi river embankment region, Supaul district, Bihar; Wular lake region, Bandipora district and Ganderbal lake region, Ganderbal district, Kashmir; Barna river and Barna dam reservoir region, Raisen district, Madhya Pradesh and rural areas near Contai town, East Medinipur district, West Bengal. Structured household surveys and in-depth interviews (IDIs) were conducted with all sampled households, alongside four Focus Group Discussions (FGDs) in the respective sample population areas within each region across the six states.

The analysis presented in this chapter situates primary field data alongside the broader body of secondary literature reviewed earlier in the study. The chapter is organised into several interconnected sections. It begins by examining the cultural and social meanings of fishing across different regions, highlighting how fishing functions not only as a livelihood but also as a form of inherited identity, ecological knowledge, and community life. The following sections analyse the socio-demographic profile of surveyed households, including caste composition, education, housing, and access to basic services. This is followed by a discussion on the types of water resources and ecosystems on which communities depend, alongside the growing erosion of commons and changing access to fishing grounds.

Subsequent sections explore livelihood patterns, household incomes, debt, dependence on fishing, and the increasing diversification of labour. The chapter then examines gender relations within fishing economies, focusing on the often invisible yet central role played by women in processing, marketing, household survival, and informal economic activities. Further sections analyse market

structures, access to cooperatives, and the role of intermediaries and contractors in shaping economic vulnerability. Finally, the chapter examines the impacts of environmental degradation and climate change, alongside the role of governance and fisheries policies in restructuring access to resources, livelihoods, and ecological sustainability.

Together, these sections provide a comprehensive account of the multiple and interconnected challenges confronting inland fishing communities today.

Fishing as Life, Fishing as Livelihood

For the Kahar community living near the Barna river in Raisen district of Madhya Pradesh, fishing is not merely an occupation but a deeply rooted spiritual and cultural inheritance. Across more than 100 families in Barna colony and surrounding villages, it is understood as a sacred duty passed down through generations. Oral narratives trace their ancestry to river deities and water spirits, embedding everyday fishing practices within a wider cosmology of reverence for nature. The worship of Ghatoiya Dada, the community's primary water deity, reflects this ecological ethos. Seasonal rituals—performed before the monsoon or prior to collective fishing events—seek protection and abundance, while deities such as Durga ji, Mari Mata, and Ilahi devi are invoked during festivals and communal gatherings. Together, these practices form an intricate cultural fabric where livelihood, belief, and identity are inseparable.

Yet, this relationship with water is under strain. Declining fish availability, restricted access to water bodies, and the growing monetisation of fisheries have weakened both livelihoods and the cultural systems that sustain them. Younger generations, faced with diminishing returns, are increasingly turning to wage labour, masonry, and small trade, viewing fishing as both economically uncertain and socially devalued. As one elder noted during a focus group discussion, "our ancestors worshipped the river; today our children avoid it." This shift is not simply occupational—it marks a deeper rupture in the transmission of ecological knowledge and cultural meaning.

Similar tensions between cultural continuity and economic survival are visible across the inland fishing regions covered in this study, though shaped by distinct ecological and governance contexts.

In the Konda Karla Ava Lake and Meghadri Gadda River region of Visakhapatnam, Andhra Pradesh, fishing communities maintain longstanding ties to inland water systems through traditional techniques and shared practices—handmade nets, bamboo traps, and small wooden or fibre boats—with knowledge of fish behaviour, seasonal flows, and water ecology passed down across generations. Elders describe

fishing as a collective activity embedded in community life, where sharing of catch and mutual support were central. Ritual practices, including offerings to local deities before the start of fishing seasons and observances linked to river and lake cycles, continue to shape cultural life, though often in diminished form. However, this traditional system is undergoing significant transformation. The expansion of industrial activity around Visakhapatnam, along with pollution, water diversion, and fluctuating access to fishing grounds, has affected fish availability and ecological balance. Cooperative structures exist but are uneven in ensuring equitable access, and many small-scale fishers find themselves excluded or marginalised within formal systems. As incomes from fishing decline and uncertainty grows, households increasingly diversify into wage labour, construction work, or small-scale trade. Younger generations, in particular, view fishing as a precarious livelihood and aspire to alternative occupations, leading to a gradual erosion of traditional knowledge systems and a shift in community identity from collective subsistence to fragmented survival strategies.

In the wetland ecosystems of Deepor Beel in Kamrup Metropolitan and Urpad Beel in Goalpara, Assam, communities such as the Malo continue to anchor fishing within ritual practices and collective norms. Elders of the community inform that they learned fishing and net-making from their forefathers, and these practices have been passed down through generations. Handmade nets, bamboo traps (jakoi, polo), and small wooden boats remain in use even today. Both men and women participate in preparatory tasks, and fishing was historically done collectively. Ethnographic records indicate that Kaibarta and Rabha fishers adhere to ritual norms, such as releasing gravid brood fish during spawning seasons and observing weekly worship cycles to deities like Santoshi Maa, Kali Maa, and Surjya Devta. Around Deepor Beel, field studies in 2015–2019 describe festival-linked communal fishing and taboos that prohibit harvesting near vegetation patches believed to shelter juvenile fish. In southwestern Assam, documentation between 2020–2021 identifies at least fourteen communities with traditional fish-preservation practices—drying, smoking, and fermenting—that serve cultural and subsistence needs.

However, traditional knowledge systems and practices are gradually fading. Younger generations, seeing little reward and much hardship, aspire to leave fishing behind. Parents encourage education, but poverty and lack of opportunities make it hard to sustain schooling. As a result, the traditional identity of the Malo fishers is caught between cultural continuity and economic survival.

Along the Kosi River in Supaul, Bihar, fishing livelihoods are shaped by extreme ecological volatility, where flooding and embankments simultaneously sustain and constrain access to aquatic resources. Here too, fishing is tied to mythic lineages

and ritual observances. Traditionally known as the descendants of Nishadraj—who, according to mythology, helped Lord Ram cross the river—this Nishad community of Bihar remains dependent on traditional fishing and boating. Fishing is considered an ancestral profession passed down through the centuries. It is viewed as a "cultural responsibility" tied to the Kosi River. Families in the Supaul region worship "Ma Kamala" before fishing, promising offerings for a good catch. They also worship deities like Durga and Bajrangbali, specifically those symbolizing water and nature. However, fishing is increasingly supplemented by migration and wage labour.

In the high-altitude lake systems of Wular Lake in Bandipora and the wetlands of Ganderbal, fishing is understood not merely as an occupation but as a way of life deeply embedded in social identity, spirituality, and ecological relations. FGD findings and quantitative research indicate that these communities continue to self-identify as fishers through inherited cultural practices, religious meanings, and intimate engagement with the cyclical rhythms of the lake ecosystem. Fishing is integrated into a broader lake-based livelihood system that includes aquatic vegetation harvesting, reed collection, and small-scale navigation, all of which depend on long-standing ecological knowledge of seasonal water patterns.

Across locations such as Hajin, Muqdamyari, and Manasbal, respondents repeatedly described fishing as a family practice transmitted across generations. Older community members often framed fisheries as a divine gift and a moral responsibility tied to sustaining both human and natural life. Participants emphasised that fishing carries ethical and spiritual significance beyond income generation, positioning the lake itself as a living entity that nurtures the community. As one elder expressed, "Our lakes are us; they nourish us; we need to nourish them," reflecting a deeply rooted ethic of environmental stewardship (Gul et al., 2024). Ritual practices linked to water, local shrines, and seasonal observances continue to reinforce this collective identity. In villages near Hazratbal and Saidakadal, practices such as sacrificial offerings before the first seasonal harvest, community net-repair gatherings, and shared fish-based feasts strengthen communal cohesion and reproduce cultural continuity.

Traditional fishing practices—including the use of shikaras and handcrafted nets—remain prevalent, while ecological knowledge and ritual skills continue to be passed down within families, distinguishing these communities from other rural populations in Kashmir (Wagay & Yasmin, 2012; Habib, 2020). However, shrinking water bodies due to siltation, pollution, encroachment, and restrictive conservation measures have severely constrained access to fishing grounds. Declining fish catches and increasing livelihood insecurity are pushing younger generations away from fisheries, contributing to the erosion of traditional ecological knowledge and the gradual reconfiguration of fisher identity itself.

In the rural areas near Contai in East Medinipur, fishing communities have long been shaped by a close relationship with rivers, canals, and brackish water systems. Fishing here is not merely an occupation but part of an inherited cultural rhythm tied to tides, seasons, and local ecological knowledge. Traditional practices—such as the use of handwoven nets, bamboo traps, and small country boats—continue to persist, alongside knowledge of breeding cycles and water behaviour passed down through generations. Elders recall a time when fishing was largely collective and subsistence-oriented, embedded in reciprocity within the community. However, this system is undergoing significant transformation. The expansion of aquaculture, increasing commercialization, and climate-induced disruptions such as cyclones and saline ingress have altered both the ecology and social organisation of fishing. While some households have transitioned to pond-based aquaculture, many small fishers struggle with unequal access to resources and markets.

Returning to the Barna River and Barna Dam reservoir region of Raisen, fishing communities depend largely on reservoir-based fisheries that have evolved over time with state-led irrigation and dam projects. Unlike riverine systems rooted in myth and mobility, fishing here is shaped by regulated access and cooperative structures. Traditional fishing knowledge—such as seasonal fish movement and net-making—coexists with more formalised systems of leasing and stocking. Communities often recall earlier periods when access to riverine resources was more open and community-controlled. Today, fishing is mediated through cooperatives and contracts, which has altered both the social relations and the sense of ownership over water bodies. Cultural practices linked to fishing—such as local rituals invoking river deities before the fishing season—continue, though often in reduced form. Economic pressures, declining catch sizes, and unequal distribution of fishing rights have made livelihoods precarious. As a result, many families diversify into wage labour or agriculture, and younger members show limited interest in continuing fishing as a primary occupation.

Across these regions, fishing communities remain deeply connected to water bodies as both sources of livelihood and sites of cultural identity. However, environmental degradation, weak policy support, and market pressures continue to deepen poverty and marginalisation while eroding these relationships. At the same time, there is a growing awareness around collective action, rights-based advocacy, and environmental stewardship, particularly among younger generations who are redefining traditional occupational boundaries. This reflects a broader transformation in which ecological decline is intertwined with cultural loss, underscoring the need to sustain livelihoods through not only economic support but also the protection of community knowledge, access rights, and cultural practices.

The question of who constitutes a "fish worker" lies at the heart of understanding the transformations unfolding across inland fishing communities. We have drawn upon observations and recommendations made by the National Federation of Small-Scale Fishworkers in its memorandum to the Department of Fisheries regarding the Marine Fisheries Census 2025, particularly its critique of narrow occupational definitions and its emphasis on recognising diverse forms of labour, ownership, migration, and allied activities within the fishing sector, for the following argument[1] .

Fishing should not be understood as a narrowly defined occupation limited only to those directly engaged in catching fish. Across inland and coastal regions, fisheries are sustained through interconnected systems of cultural practice, ecological knowledge, seasonal labour, and diversified livelihoods. Conventional administrative definitions often fail to capture this complexity, particularly when they rely solely on vessel ownership or ambiguous categories such as "active fishers." Such approaches blur important distinctions between those who actively labour in fisheries and those who merely control fishing assets.

In practice, many fishing households combine fishing with agriculture, wage labour, migration, or other informal work due to declining fish stocks, ecological degradation, and insecure access to water bodies. As a result, rigid distinctions between "full-time" and "part-time" fishers do not adequately reflect lived realities. A broader understanding must also include allied activities such as net making, fish processing, drying, marketing, transport, and other forms of labour that sustain fishing economies. Women's contributions—both productive and domestic—remain especially under-recognised, despite being central to the survival of fishing households.

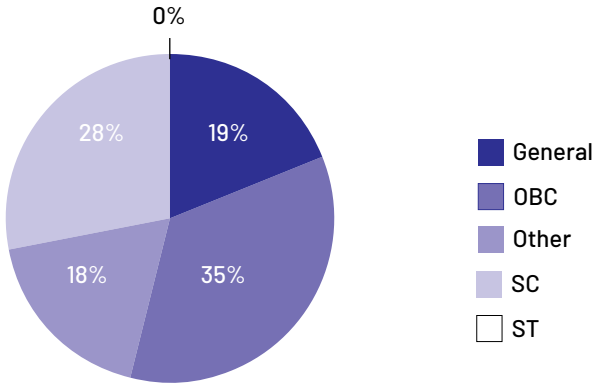
Recognising fish workers therefore requires attention not only to occupation, but also to social identity, livelihood dependence, and participation in the wider fishing ecosystem. Such an approach is essential for ensuring inclusive welfare policies, accurate enumeration, and equitable access to rights and resources.

Socio-Demographic Profile of Surveyed Households

As mentioned earlier, the structured questionnaire covered 641 households across eight districts in six Indian states. A large majority of the sample—about 80 per cent (515 households)—is drawn from rural areas. Consistent with existing literature,

1. https://smallscalefishworkers.org/wp-content/uploads/2020/05/Letter-to-Secretary-DoF.pdf

Figure 4.1: Proportion of Households



inland fisher workers largely come from marginalised communities, a trend clearly reflected in our sample. As shown in Figure 4.1, most surveyed households belong to the Other Backward Classes (OBC), followed by the Scheduled Castes (SC).

In terms of religion, about 84 per cent of the sample identified as Hindu, while the remaining respondents identified as Muslim. However, these broad social categories do not fully capture the complexity of community identities. For instance, the inland fisheries zones of Meghadri Gedda and Kondakarla Ava in Visakhapatnam district, Andhra Pradesh, illustrate distinct yet interconnected socio-ecological settings that sustain a range of artisanal and small-scale fishing communities. These communities are predominantly drawn from Backward Classes (BCs), including Vaddera, Yetha, Setti Balija, Chakali, Kapu, Velama, Muslim, Gavara, and Oda Balija castes. Historically, they have depended on manual labour, small-scale trade, and natural resource-based occupations. While they do not fall within the SC or ST categories, they occupy a complex intermediate position within the regional social hierarchy.

Although socially heterogeneous, these communities share common occupational and economic characteristics. Traditional fishing groups such as the Yetha and Setti Balija have engaged in fishing and fish marketing for generations, often without formal recognition or institutional support. Other groups—including Vaddera, Kapu, Velama, and Chakali—have entered fishing more recently, frequently as a response to displacement, loss of agricultural land, or seasonal unemployment in construction and agricultural labour. Notably, most surveyed households in Andhra Pradesh identified themselves under the "other" category rather than within conventional SC or OBC classifications.

Similarly, Muslim OBC and Gavara families in these regions participate in small-scale fishing, fish vending, and allied activities such as net repair and boat maintenance. The Oda Balija community, traditionally associated with itinerant trade and small-scale economic activities, has also diversified into fish marketing and transport. This occupational diversity has fostered a localised yet cooperative economy around these water bodies, where caste boundaries have gradually blurred in response to shared livelihood challenges.

Despite being broadly classified as Backward Classes, these communities remain socially and economically peripheral within the rural hierarchy. Their intermediate social position often excludes them from targeted welfare measures available to Scheduled Castes, while also denying them the advantages enjoyed by dominant agrarian castes. Consequently, they occupy an ambiguous space—neither the most deprived nor socially powerful—which limits their political visibility and weakens institutional representation. Their ongoing struggles for tenurial rights, inclusion in cooperative societies, and access to welfare benefits reflect this structural marginality. Despite their central role in sustaining local fish economies, their identity as inland fishers remains largely unrecognised by the state.

In terms of education, the survey data reveal significant gaps in literacy and schooling among inland fishing communities. Nearly 37 per cent of respondents reported having received no formal education, while around 20 per cent had completed only primary schooling. Although there has been a marginal improvement over the past decade—with more families, especially girls, being sent to school and college—high dropout rates and irregular household incomes continue to limit sustained educational attainment.

These patterns are reinforced by field-level findings. In the Malo community around Urpad Beel in Assam, educational deprivation remains acute. Focus group discussions (FGDs) indicate that most adults are either illiterate or have studied only up to the primary level. With daily incomes ranging between ₹200 and ₹300 and monthly earnings rarely exceeding ₹12,000, households prioritise immediate survival over long-term educational investment. Children often drop out early to support fishing or household work. Despite the presence of self-help groups (SHGs), their role is largely restricted to credit provision, with little emphasis on training or capacity building. FGDs further revealed weak state presence—most families reported not receiving housing or welfare benefits, and there is limited awareness of entitlements due to the absence of regular engagement by government officials.

These findings align with existing literature. Studies from Kashmir show that 78.9 per cent of fishers in Dal Lake and 61.3 per cent in Wular Lake are illiterate (Habib &

Jan, 2021; Ali, 2025), underscoring the structural nature of educational deprivation across inland fishing communities. Low literacy levels not only constrain economic mobility but also reduce awareness of government programmes, sustainable fishing practices, and market opportunities. In many cases, this is compounded by inadequate infrastructure—such as limited access to schooling, sanitation, healthcare, and drinking water—which further entrenches marginalisation.

The implications are far-reaching. Declining fish yields, as reported by interviewees—from earlier levels of 10–15 kg per day to as low as 1–1.5 kg today—have intensified livelihood insecurity. In this context, low educational attainment restricts the ability of households to diversify into alternative occupations or engage effectively with formal markets and institutions. As a result, younger generations increasingly migrate to urban areas or take up unskilled labour, signalling a gradual erosion of traditional fishing livelihoods.

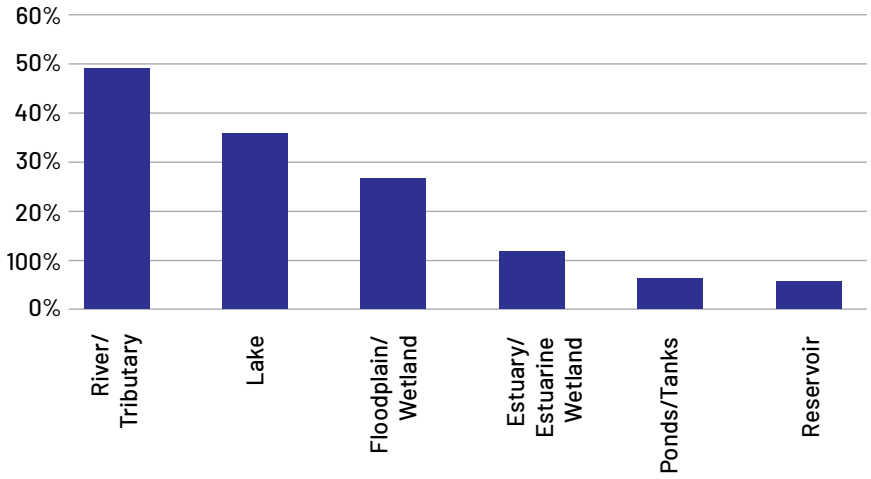
Overall, the convergence of survey data, field insights, and existing research points to a cycle where low education, economic precarity, and institutional exclusion reinforce one another. Addressing this requires not only improving access to schooling but also strengthening support systems—such as local infrastructure, awareness programmes, and livelihood diversification opportunities—to enable meaningful educational and economic mobility.

Housing conditions further reflect this vulnerability. Only 44 per cent of surveyed households live in pucca (permanent) houses, while 54 per cent reside in kutcha (non-permanent) or semi-permanent structures. Among those living in kutcha houses, nearly 50 per cent are from Bihar. Similarly, about 33 per cent of households in semi-pucca conditions are from Kashmir. In contrast, nearly 40 per cent of households living in pucca houses are from Andhra Pradesh, followed by Madhya Pradesh (18 per cent).

Types of Water Resources

Rivers and their tributaries are the primary source of fishing for small-scale fishing communities (FAO, 2024). These water bodies not only sustain livelihoods and provide supplementary income, but also serve as an important source of affordable protein for large sections of rural populations. As shown in Figure 4.2, about half of the respondents of our survey also depend on rivers and tributaries for fishing, while 37 per cent rely on lakes.

Figure 4.2: Percentage of Households



The use of different water bodies is strongly shaped by geography. For example, estuaries are relevant mainly in coastal states such as West Bengal and Andhra Pradesh, whereas floodplains and wetlands are more commonly used in Assam, Bihar, Kashmir, and Madhya Pradesh. In Bihar, most families depend on both rivers and floodplain/wetland systems. In Madhya Pradesh, as many as 91 per cent of surveyed households rely on rivers and tributaries. In Assam, wetlands and lakes provide the primary fishing grounds, while in Kashmir and Andhra Pradesh, lakes are the main source. Medinipur district in West Bengal, being a coastal region, depends heavily on estuarine ecosystems for inland fishing.

It is important to note that different types of water bodies are affected by climate change in distinct ways, which also informed the selection of diverse ecosystems in the study. Estuaries, which lie at the interface of rivers and the sea, are particularly vulnerable to sea-level rise and changes in salinity. In contrast, freshwater wetlands are more sensitive to variations in rainfall and temperature.

Governance frameworks for these ecosystems also differ. Wetlands are primarily regulated for conservation under the Wetlands (Conservation and Management) Rules, 2017. Estuaries fall under coastal and brackish water regulations, such as the Coastal Regulation Zone (CRZ) rules. Rivers and lakes, as freshwater systems, are largely governed by state-level inland fisheries policies. These regulatory frameworks are further supported by central government programmes such as the Pradhan Mantri Matsya Sampada Yojana (PMMSY).

Erosion of Commons and Barriers to Access

As fishers depend mainly on open rivers, canals, and wetlands for daily fishing, in recent years, private fishery leases and land conversions have reduced their traditional access. Many fishing areas are now encroached or converted into fishery ponds run by private owners. In Medinipur, though some government lease systems exist, they often favor influential groups, leaving small fishers marginalized. Whereas fishing rights in Raisen's reservoirs and rivers are administered through the Madhya Pradesh State Fisheries Federation Cooperative Limited, which operates under a leasing system. However, instead of empowering local fishers, the system has been captured by powerful contractors, landlords, and politically connected groups, leaving traditional fishers marginalized.

While the government grants lease rights to the cooperative society in Vishakhapatnam, there is no provision for financial assistance or institutional credit. The absence of recognition as formal fishers also excludes them from state-level social protection schemes and welfare entitlements.

Historically, access to Urpad Beel was open and communal, but in recent years, the Fisheries Department imposed seasonal restrictions to conserve fish breeding. A three-month fishing ban from April to June now prevents the community from earning income during that period. Because of their dependence on the Beel, some fishers continue fishing even during the restricted season, often facing harassment and fines from the Forest and Fisheries Departments. In response to these tensions, the fishers were advised to form a Fishing Cooperative Society by the District Commissioner. The society was established only recently, and it remains weak in functioning, lacking proper guidance and support. Traditional Malo fishers also face competition from other communities, especially Muslim fishers, who use larger nets and modern gear, allowing them to dominate the Beel. Complaints about net thefts, loss of fish, and lack of regulation are common, worsening their financial insecurity.

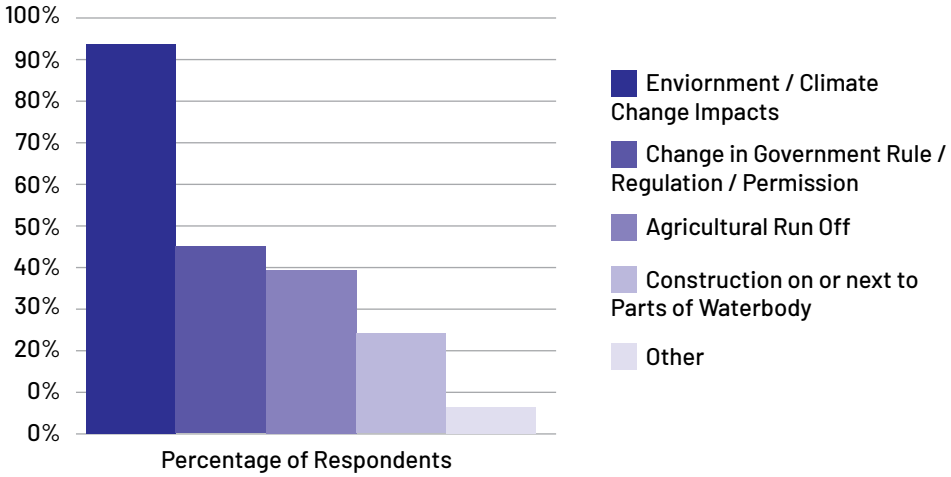
The fishing communities around Wular and Manasbal have faced numerous obstacles in accessing lake resources. There are many settlements around or at the centre of the lakes, which thus restrict the accessibility to the outlying villages. Wular populations that are below the poverty line have to contend with seasonal variations in water levels and increased siltation during autumn, which, conversely, block the navigational routes. Boat access is still possible, but due to ecological degradation, fish availability is significantly reduced. As reported by respondents, winter exacerbates mobility challenges, making it almost impossible

to fish in ice-covered waters (Habib & Jan, 2021). The regulations of fishing co-operatives introduce additional barriers. Such policies were described as archaic and unfair by fisherfolk, thus predisposing them to exploitation by intermediaries and contractors. There were a few cases of net confiscation or limitation, often using vague clauses and threats by external stakeholders, as reported by several households. Contractors (thekedars) often control the fish trade, and by offering low prices for the catch, they offload the production risk onto the communities. The addition of infrastructure cannot improve access, as the inequality in infrastructure development along the Manasbal Lake route, which aimed to boost tourism, did not sufficiently meet the access needs of fishermen (Ali et al., 2025).

These fisherfolk groups are characterized by entrenched poverty, low literacy, and a lack of diversification in their livelihoods. According to data, over one-fifth of Wular fishers have an average annual income of less than 5,000, and about 65.6 percent of Dal Lake fishers have an average monthly income of less than 15,000 (Habib & Jan, 2021; Ali, 2025). With such low wages, households tend to move towards peripheral jobs, including day labor and fruit vending. Social stigmatization persists; a 2019 survey in Baramulla revealed that 64.42 percent of fishers had a socially marginalized perception of not belonging to the village.

In terms of access to waterbodies, 70 per cent of the respondents reported that the changes have been regressive. As reported by virtually all the respondents, access to water bodies has become more difficult. The major reason for increasing difficulty in water access is attributed to the environment/climate change impact. Changes in government rule/regulation/permission and agricultural runoff have also significantly resulted in reduced access to water bodies amongst the fisherfolk. For instance, the NFP 2020 framework encourages the leasing of inland water bodies (rivers, wetlands, and reservoirs) to private entrepreneurs for cage culture and intensive aquaculture, which could turn traditional fishers into contract labourers. Similarly, the focus on doubling exports and promoting high-value species like tuna often prioritises large-scale industrial fleets over the subsistence and local-market needs of artisanal fishers. Furthermore, small-scale fishers and allied workers, unable to contribute equity to aquaculture ventures, face exclusion from common property resources—such as seasonally stocked ponds and reservoirs managed by fisheries departments—as these become privatized or degraded (Vohra, 2020). As per our data, the Kahars, in Madhya Pradesh, who have been historically dependent on the Barna River and adjoining reservoirs for fishing, have found their economic situation changing over the last two decades. They report that major transformations have occurred in their access to water bodies and the average number of fish caught because of multiple and diverse reasons.

Figure 4.3: Causes for reduced access to waterbodies in last 5-7 years



About 97 percent of the respondents report that the quantity/quality of fish in the waterbody has been affected by some adverse environmental/climate change event(s) in the last 5-7 years. (See Figure 4.3)

Deepor Beel has seen particularly dramatic policy shifts. Following its Ramsar status in 2002, in the period 2008 to 2019, the Wildlife (Protection) Act was enforced in a manner that led to increasing fishing restrictions in sanctuary-notified portions of the beel, which has contributed to declining access for the fishing communities. In 2021, 4.10 square kilometres of Deepor Beel were declared as a wetland for environmental conservation purposes, coming under environmental protection and biodiversity conservation laws.

Livelihood Patterns

The economic profile of the respondents offers important insights into fisherfolk occupation patterns. A significant majority—nearly 69 per cent of surveyed households—have two family members engaged in capture fishing (see Figure 4.4). This highlights the centrality of fishing as both a livelihood and a household survival strategy.

Fishing serves dual purposes for these communities: it meets subsistence needs while also generating income. In this sense, fisheries are not merely an occupation but a multidimensional economic base that supports both daily consumption and commercial activity. This dependence is particularly stark in Assam, where, among the 100 sampled households, 77 per cent reported having no income source other than fishing.

Figure 4.4: Number of Household members involved in fishing

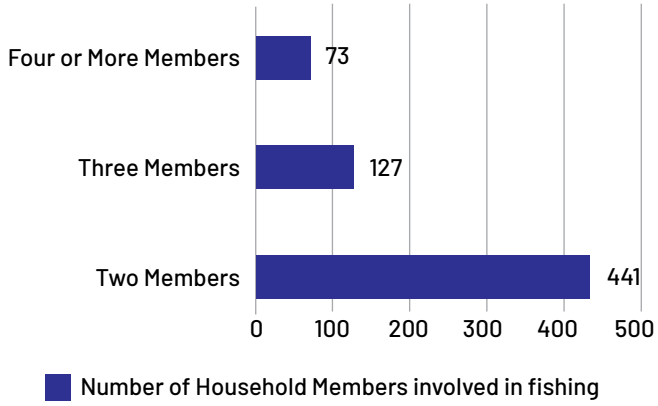
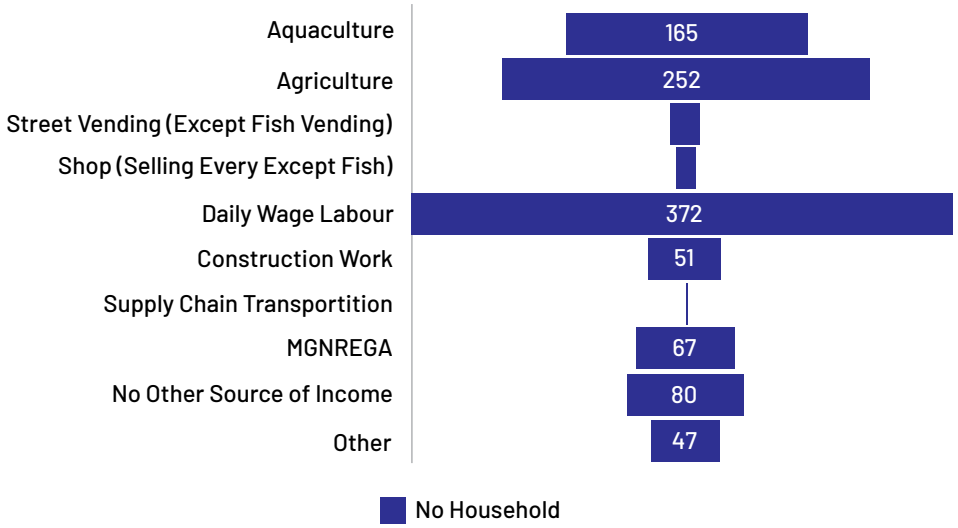


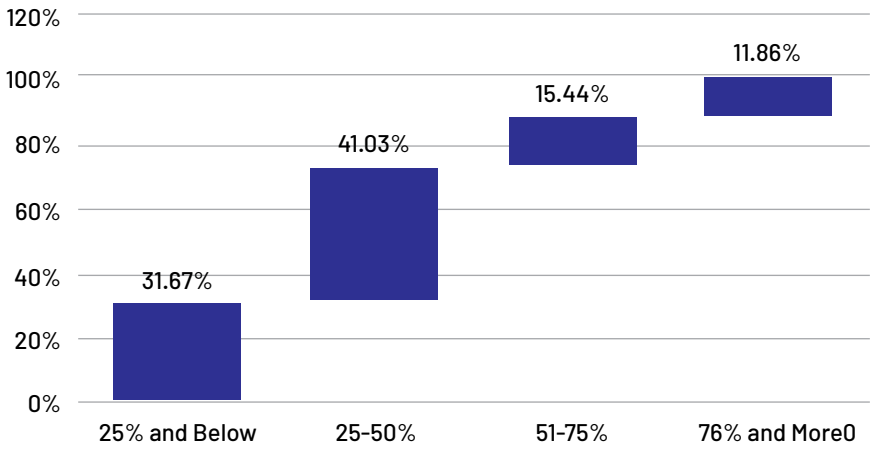
Figure 4.5: Source of Income Other Than Fishing



At the same time, diversification is common across the broader dataset. Many households engage in multiple economic activities to supplement their income. A substantial proportion works as daily wage labourers, while others participate in agriculture and aquaculture to reduce vulnerability and stabilise earnings (see Figure 4.5).

Despite challenges in accurately estimating household income, this variable remains crucial for distinguishing between full-time and part-time fisherfolk.

Figure 4.6: Inland Fishing's Contributed to Household Income in Last 1-2 Years



Conventionally, full-time fishers are defined as those who spend more than 90 per cent of their working time in fishing, while others are considered part-time. However, the National Fishworkers' Forum (NFSF) suggests that a more appropriate classification would be based on the proportion of household income derived from fishing versus other sources, as this better captures livelihood dependence.[2]

An important dimension of this analysis is the contribution of inland fishing to total household income. For about 40 per cent of families, inland fishing contributed between 26 and 50 per cent of total income in the past one to two years. In contrast, for approximately 32 per cent of households, fishing contributed one-fourth or less (see Figure 4.6). This suggests that nearly one-third of fisher households are effectively "pluri-workers," compelled to rely on multiple income streams due to political, economic, and environmental constraints. For instance, focus group discussions (FGDs) in Medinipur indicate that fishing accounts for roughly 25–50 per cent of household income, with the remainder coming from daily wage labour, masonry, or farming.

Income data further underscore the economic precarity of these communities. Around 50 per cent of households earn between INR 5,001 and 10,000 per month, while 30 per cent survive on INR 5,000 or less. (See Table 4.1) Overall, most fisher households earn less than an estimated INR 1.2 lakh annually. When examining how fishing contributes to income across different income groups (Figure 4.7), an inverse relationship emerges.

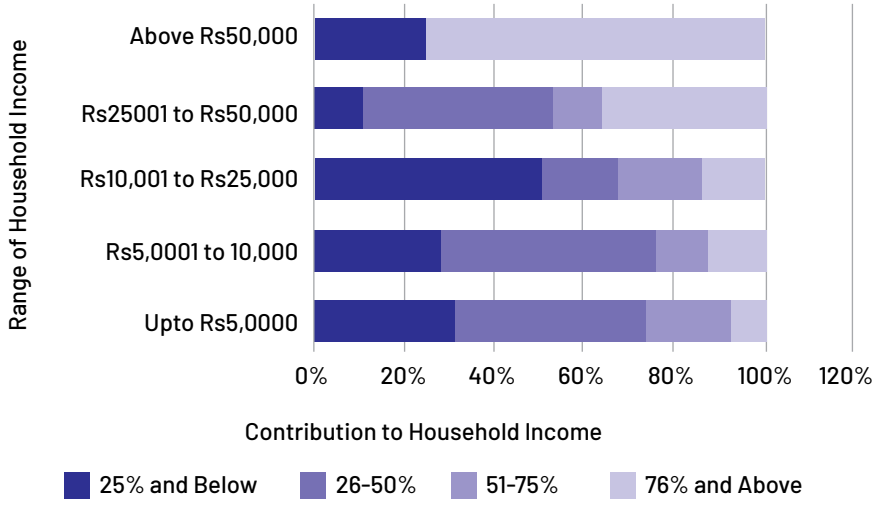
2. https://smallscalefishworkers.org/wp-content/uploads/2020/05/Letter-to-Secretary-DoF.pdf

Table 4.1: Monthly household income reported by households

Monthly Household Income	No. of Households	Percentage
Above Rs 50,000	4	0.62%
Rs 10,001 to Rs 25,000	95	14.82%
Rs 25,001 to Rs 50,000	28	4.37%
Rs 5,0001 to Rs 10,000	320	49.92%
Up to Rs 5,000	194	30.27%
Total	**641**	**100%**

Note: The respondents were asked to give an approximate average per month of the total monthly household income in the last 2-3 years.

Figure 4.7: Contribution of Inland fishing to monhthly household income



For the 42 per cent of the poorest families (earning an average of INR 5000 per month), inland fishing contributes 25-50 per cent of their total family income. The pattern of contribution remains similar across other income groups, with dependence on fishing declining as overall income increases. In higher-income households, fishing contributes less than one-fourth of total income. Notably, nearly 80 per cent of households fall within the lowest income brackets (up to INR 10,000 per month). Statistical analysis confirms a weak but significant negative correlation (at the 5 per cent level) between total household income and the share of income derived from inland fishing.

State-level variations further illustrate these patterns. In Andhra Pradesh, most respondents derive 26–50 per cent of their income from fishing. In Assam, 65 per cent report that fishing contributes more than 76 per cent of their income. In contrast, in Bihar, Madhya Pradesh, and West Bengal, most respondents report that fishing contributes 25 per cent or less. In Kashmir, the majority indicate that fishing accounts for 51–75 per cent of household income. FGDs in Kamrup, Assam, reveal that while fishing remains the primary livelihood, parents increasingly aspire for their children to pursue education-based professions. In Madhya Pradesh, however, struggles over resource control have forced many fisher households to shift toward daily wage labour, construction work, or agricultural tenancy.

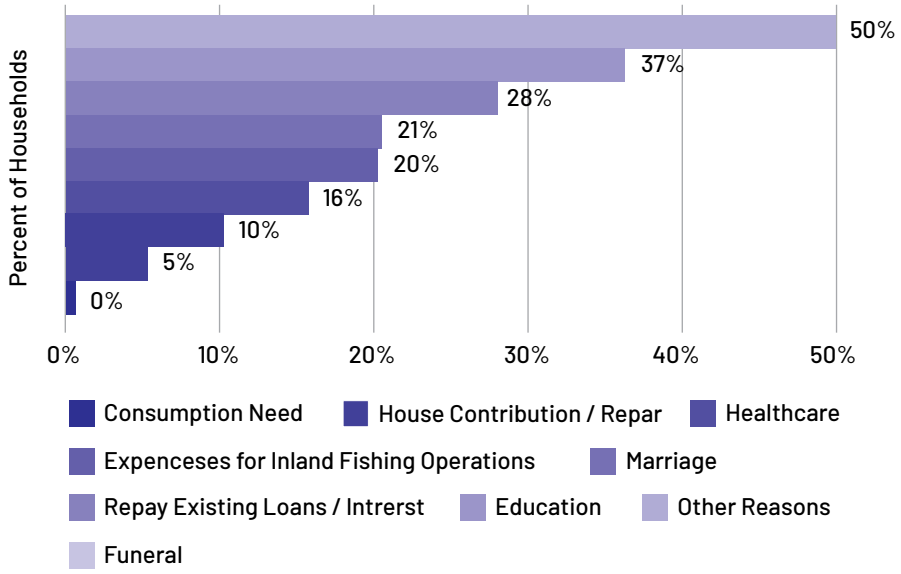
Poverty among these communities is multidimensional. Beyond low incomes, fisher households face deprivations in education, healthcare, and access to basic services, which undermine their ability to realise civil, political, economic, social, and cultural rights. Their remote locations further limit access to markets and public services (FAO, 2015), reinforcing cycles of marginalisation.

Given their economic and climatic vulnerability, access to social safety nets is critical. Nearly 95 per cent of households reported dependence on the Public Distribution System (PDS). (See Table 4.2) Financial stress is widespread: 70 per cent of surveyed households are in debt. Half of these households have taken loans to meet basic consumption needs, followed by loans for housing (36 per cent) and healthcare (28 per cent). Around 20 per cent have borrowed for fishing operations or marriage expenses (see Figure 4.8).

Table 4.2: Households with access to Social Security Scheme

Access to Social Safety	Percentage of Households
Fisher/Fish Worker Union	21%
Public Distribution System (PDS)	95%
Health Insurance	66.50%
Pension scheme	18%
Farmer's welfare scheme	2.60%
Labour Welfare scheme	10.70%
Housing support scheme	19%
Other Social Security Scheme	0.07%
No Social Security Scheme	4.80%

Figure 4.8: Reasons for Household Debt

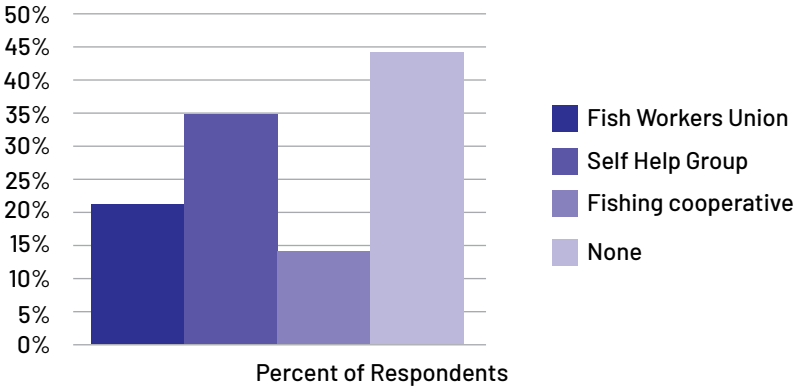


The situation in Deepor Beel, Kamrup (Assam), illustrates this vulnerability. The community has low educational attainment and limited occupational diversity. Most households rely on fluctuating fishing incomes and depend on informal credit (baki) during lean periods. Earlier government support—such as subsidies for boats and nets—has been discontinued, further intensifying economic insecurity.

The lack of political representation and poor engagement with collectives is another major challenge. In the Kahar community of Madhya Pradesh, administrative apathy and lack of legal literacy among fishers compound the problem. Few are aware of their entitlements under the Fisheries Policy (2008) or environmental regulations protecting small-scale fishers. The absence of collective organisation leaves them vulnerable to arbitrary enforcement and exclusion. Similarly, in Bihar, the majority of the respondents are unaware of their rights or government schemes. The field reports reveal that, despite a dedicated Fisheries Department, benefits rarely reach the grassroots, often intercepted by politically connected individuals.

Figure 4.9 shows the extent to which respondents are part of different organisations or collectives. The largest share—about 44 per cent—reported not being part of any organisation, indicating low levels of collective engagement among inland fisher households. Among those who are organised, Self-Help Groups (SHGs) have the highest participation at around 35 per cent, suggesting that these are the most accessible and prevalent form of collective for the community. Membership in

Figure 4.9: Percent of Respondents as a part of Organization/Collectives



fish workers' unions is comparatively lower, at approximately 21 per cent, while participation in fishing cooperatives is the least, at about 14 per cent.

Overall, the data highlights a significant gap in formal collective organisation, with a majority either unorganised or relying on informal or semi-formal structures like SHGs rather than sector-specific institutions such as unions or cooperatives.

Fishworker cards are crucial for small-scale inland fisherfolk as they provide legal recognition of their occupation and enable access to government welfare, financial aid, and insurance—especially during non-fishing, lean, or ban periods. This recognition not only offers dignity but also helps protect fishers from exploitation by middlemen and informal moneylenders. As identity documents, often with biometric data, these cards validate eligibility for subsidized equipment, training, and fishing rights in inland water bodies such as rivers, lakes, and ponds. They also facilitate access to subsidies under the Pradhan Mantri Matsya Sampada Yojana (PMMSY), including support for boats, nets, fingerlings, and feed.

Additionally, fishworker cards are required to access schemes like the Savings-cum-Relief programme, which provides financial support during fishing bans or lean seasons. Cardholders can also access institutional credit, such as Kisan Credit Cards (KCC) for working capital. In this sense, these cards are critical for enabling small-scale fishers to transition from informal, unrecognised workers to formal beneficiaries of state support, thereby strengthening their livelihood security.

However, access to fishworker cards remains limited and uneven. Since not all members within a household possess one, the survey examined whether any family member held a card. Only 150 respondents (23 per cent) reported access. (see

Figure 4.10 and) Socio-economic factors significantly shape this access. Of the 641 respondents, 239 are women, yet only about 15 per cent of them possess a card, compared to 28 per cent of male respondents. (See Table 4.3)

Moreover, 138 respondents stated that at least one member in their household holds a fishworker card. However, in nearly 80 per cent of these cases, the card is held only by male members. Just 24 households reported both men and women as cardholders. In effect, only 15 per cent of female respondents have access to fishworker cards, and only 28 families reported women cardholders within the household. (See Table 4.4) Caste disparities are also evident: although most

Figure 4.10: Respondents with Fish Workers Card

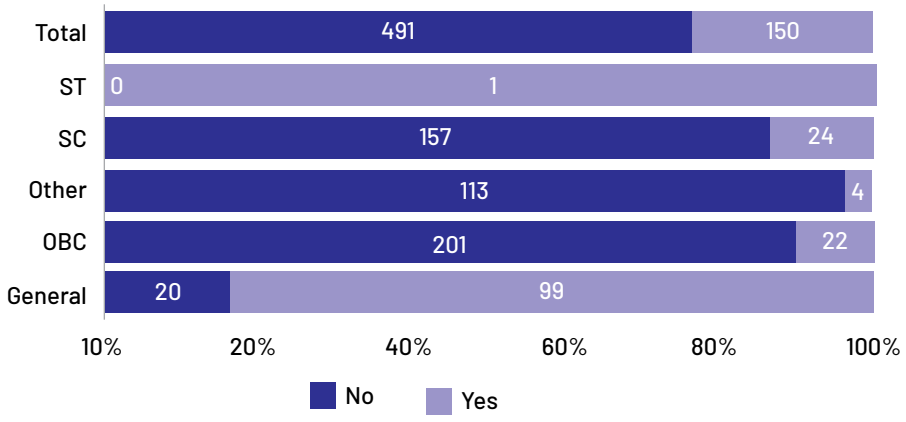


Table 4.3: Proportion of males and females possessing Fish Worker Card

	Do not possess FWC	Possess FWC
Female	84.52%	15.48%
Male	71.89%	28.11%
Total	76.60%	23.40%

Table 4.4: Possession of Fish Worker Card within Bouseholds

	No. of Households	Percent
Both male and female	24	17.39
Only Female	4	2.9
Only Male	110	79.71
Total	138	100

fishworkers belong to OBC and SC categories, only about 10 per cent and 13 per cent, respectively, reported access.

Gender

As per the estimate by FAO (2024), at least 9.47 million women are involved in the inland capture fisheries sector. As per the FAO report, the proportion of women employed in inland capture fisheries in our selected state is considerably high, ranging from 50 per cent of women in Andhra Pradesh, 48 per cent in Bihar, 36 per cent in Assam, 45 per cent in Madhya Pradesh, and 42 per cent in West Bengal.

The gender division of labour across the fishing communities is clear but complementary: men engage in capture fishing, while women manage the value chain and market interface. Thus, the gender relations in the fishing community exhibit a traditional but cooperative pattern. Men primarily handle net casting, repair, and water-based fishing activities, while women are responsible for cleaning, drying, sorting, and selling fish. Women also manage household finances, especially during off-seasons when fishing income declines. Women contribute significantly to household income yet remain under-recognised. Decision-making in fishing matters generally rests with men. For instance, in Medinipur, women often sell dried or smoked fish door-to-door or in nearby villages, earning very marginal profits. Similarly, in Madhya Pradesh, women play an important role in fish processing and sales. In Barna colony and Dehalwara, groups of women collectively dry, roast, or salt fish for sale in nearby villages. However, without functional self-help groups (SHGs) or access to microcredit, their enterprises remain informal and unrecognized. The absence of official "fisher cards" further excludes them from state welfare schemes and insurance programs. The field studies reveal that fishing is not only a source of income but also an inherited way of life and cultural identity for the fisherfolk community of Madhya Pradesh and West Bengal.

In Andhra Pradesh's fishing communities, men engage primarily in fishing, while women handle post-harvest activities such as cleaning, sorting, and selling fish. Men are registered members of the fishermen's cooperative society, whereas most women are organized into Self-Help Groups (SHGs). Livelihood activities are based on collective effort, with community elders and local panchayats enforcing customary norms and resolving internal disputes. The Kondakarla Ava Inland Fishermen's Cooperative Society functions as a robust and cohesive institution. Two major social groups within the society operate in mutual harmony and share a collective sense of purpose. Over the past decade, there has been a noticeable shift toward prioritizing education—many families now aspire to provide higher education to their children. Notably, several girls from these fishing families are pursuing undergraduate degrees,

indicating gradual social mobility and gender empowerment. However, the exclusion of widows and families of deceased members from cooperative membership remains a major concern. The government has not created a mechanism to extend rights or social security to these families. Consequently, there is no formal recognition or inclusive framework ensuring equitable participation of women or marginalized households within the cooperative system.

In Assam, fishing as an occupation reflects clear gendered divisions of labour. While men primarily engage in fishing, women play a vital role in fish selling and small-scale trade. In most local markets, only women sell fish, and many of them are elderly (aged 60–80 years). Women also participate in Self-Help Groups (SHGs) and take loans mainly for household repairs or children's education. Despite training in skills such as pickle-making, weaving, and tailoring, these opportunities are not fully utilized due to a lack of capital, equipment, and market linkages. Women's contributions are economically significant yet socially undervalued, and they remain largely excluded from formal decision-making within fishing societies. Women in the community also face several limitations. Although they play a crucial role in selling fish and maintaining the household economy, they remain excluded from equitable representation in formal decision-making forums. Women face constraints such as low literacy levels and limited access to training on new technologies, which hinder their ability to take up leadership roles and participate in decision-making processes (Baruah, 2019). Besides, development policies traditionally target men as fishers and managers, while women are often excluded from mainstream planning and decision-making processes in the fisheries sector. Women also face competition from exporters and traders with greater access to credit and resources, further limiting their influence in decision-making (Baruah, 2019). Many women shared that Self-Help Group (SHG) trainings in pickle-making, weaving, or tailoring have not helped them in practical terms due to a lack of financial capital and marketing support. Both men and women expressed deep dissatisfaction over the lack of government intervention and developmental opportunities, which could otherwise strengthen their livelihoods and preserve their cultural connection to Deepor Beel.

Despite a gender divide in fishing activities, it is evident that there is an upward trend in the number of women involved in market activities, and they are increasingly taking responsibility for managing their household finances in Kashmir. Some women's self-help groups (SHGs) in the Kondbal region are currently exploring the possibilities of a low-cost, small-scale fish processing business. However, women remain disproportionately burdened with physically strenuous workloads, household chores, and childcare duties, thus reducing their presence in community-level decision-making. The consideration of gender issues in the fisheries policy has the potential to increase production and promote social integration.

Thus, despite their critical contribution, women remain excluded from decision-making structures. Women's contribution often goes undervalued in official statistics, policies, and governance frameworks (PIB, 2025). Many women are members of Self-Help Groups (SHGs), which provide limited access to microcredit and small-scale loans, reducing dependence on private moneylenders. However, their access to institutional finance, skill development, and cold-chain infrastructure remains minimal. However, the collapse of cooperatives and inactive SHGs has left them without collective platforms. Interviews revealed a desire among women for greater recognition and training opportunities in areas such as fish preservation, packaging, and marketing. Thus, promotion of women-led SHGs and cooperative societies provides financial assistance for boats, gear, and infrastructure, boosting their role in the value chain. In interviews, women also expressed concerns over the increased workload due to male migration. As some men seek wage labor outside the village, women manage both household and community responsibilities, reflecting an invisible yet growing feminization of poverty within the sector.

Issues with the Market Economy

Access to markets remains crucial for sustaining livelihoods. For most small-scale fishers, survival depends not only on the ability to catch fish but also on their capacity to sell it at fair prices, access storage and transport infrastructure, secure fishing rights, and participate in collective institutions such as cooperatives. However, across regions, inland fishing communities remain positioned at the weakest end of highly unequal market systems dominated by contractors, intermediaries, traders, and politically connected actors. Weak infrastructure, lack of cold-chain facilities, exclusion from formal recognition systems, and poor institutional support further intensify their vulnerability. The findings discussed below demonstrate how market exclusion, limited bargaining power, and weakened cooperative structures combine with ecological decline and restrictive governance frameworks to deepen economic insecurity among small and marginal inland fisherfolk.

Market Access

In Madhya Pradesh, the fish market in Raisen district operates through a highly stratified value chain dominated by traders from dominant caste groups. The Kahar fishers, lacking bargaining power, remain at the lowest tier of this hierarchy. Their typical earnings range between ₹30–₹50 per kilogram, while market prices often exceed ₹400 per kilogram for the same fish species. The absence of formal cooperatives or cold storage infrastructure forces most to sell their catch door-to-door within local neighbourhoods. Moreover, access points to the Barna River are blocked by private landowners or fenced properties. Moreover, local fishers face physical intimidation, confiscation of nets, and destruction of boats.

The community members also pointed out that the contractors often hire non-local migrant labourers, displacing the indigenous Kahar fishers. This story is not just limited to the Raisen district, but is rather a norm of economic vulnerability faced by the small-scale fishing communities across the country.

Fishing in both Meghadri Gedda and Kondakarla Ava is largely subsistence-oriented and dependent on daily catch and immediate sale. The average annual household income among these groups ranges between ₹40,000 and ₹70,000, with significant seasonal fluctuations. Very few families possess boats or mechanized equipment; most rely on small country boats, bamboo rafts, or shore-based netting. Given their non-traditional fisher status, many of these communities lack formal licenses, lease rights, or access to cooperatives under the Department of Fisheries. Consequently, they remain excluded from government welfare schemes targeted at recognized Scheduled Caste fisherfolk. This institutional invisibility has intensified their vulnerability to eviction, restrictions, and income instability, particularly in water bodies like Meghadri Gedda, which are primarily designated for urban drinking water supply. In Kondakarla Ava, Andhra Pradesh's largest natural freshwater lake and a designated eco-tourism site, the restrictions are more pronounced. The government's emphasis on conservation and tourism development has limited fishing rights and altered the local ecology. Many fishers now supplement their incomes through wage labour, fish vending, and informal tourism-related work. Though fishers are granted annual lease agreements for fishing rights in the lake, families of deceased members are often denied the transfer of these rights, leading to intergenerational insecurity. Despite repeated demands, the government has not issued official identity cards to the active fishing households.

Lack of Infrastructure

Some fishers from the Kahar community hold FSSAI licenses or permits, but these remain mere tokenistic in the absence of logistical and financial support. No cold-chain systems exist to preserve fish, leading to wastage and distressed sales. Fishers also report harassment and discrimination in municipal markets, where they are often charged higher stall fees or denied space altogether.

In Vishakhapatnam, fishers have no formal rights over the reservoir. Due to the inactivity of their cooperative society, they have been unable to secure collective fishing rights. Although the government has leased some smaller tanks to fisher groups, conflicts with local farmers have prevented their effective use. Fishers have demanded identity cards recognizing their occupation, but the governmental response remains absent. Moreover, the community lacks lease rights or financial assistance from the state. They have not received any form of economic recognition or institutional support for their livelihood activities.

Fishers in Deepor Beel typically do not sell their catch directly in markets. Instead, they rely on middlemen *(prohori),* who collect fish and sell them in nearby markets at higher prices, thereby reducing the fishers' profit margins. Fish pricing follows an informal system, where sales occur by estimated quantity rather than weight. Prices fluctuate daily depending on demand, supply, and weather. Due to the lack of cooperative marketing structures and organized storage or transport facilities, the fishers have little control over pricing, leaving them economically dependent on intermediaries. Moreover, the local fishing society serves as an informal regulatory body that organizes fishing activities, enforces membership rules, and maintains order. However, participation is mostly male-dominated, with limited involvement of women in leadership or policy discussions. In the Urpad Beel area, fish marketing is dominated by middlemen *(beparis).* After long hours in water, fishers sell their catch to them at low prices, unable to directly reach markets or consumers. Due to a lack of storage, transport, or cooperative marketing, the fishers earn barely enough to survive. The profit margins are captured by intermediaries. There is also no proper record-keeping or price regulation, and the new cooperative society is still too weak to ensure fair trade. Thus, despite their labour, the Malo fishers remain excluded from market benefits. The Fishing Cooperative Society, formed under the Fisheries Department's guidance, is still underdeveloped and poorly organized. Members lack training, leadership skills, and understanding of collective bargaining. The area suffers from educational backwardness.

Access to Cooperatives

Cooperatives form a crucial organizational structure for the small-scale inland fisherfolk landscape, as these member-owned collectives enable fish workers to overcome market bottlenecks through collective action, shared resources, and enhanced bargaining power. Cooperatives often help in overcoming fishworkers' vulnerability into collective strength, and address the precarity-ridden economic conditions of the fishing communities. In many cases in India, the lack of voice has contributed to the poor representation of the fisherfolk membership. For instance, in Kashmir, currently, the Wular and Manasbal regions lack active cooperative or formal unions, and the women's SHGs in Kondbal exhibit low organizational unity. The Wular village, where the Hanji people reside in remote lands bordering the lake, is not connected to the district headquarters and lacks access to social welfare programs. Possible beneficial schemes, such as fishing licenses, market subsidies, and welfare programs, often provide advantages to dominant groups in the lake's periphery. The level of education in such societies is generally low, and women have limited awareness of their rights and restricted access to government services. Overall, collective bargaining and capacity building may be revolutionized by the formalization of functional cooperatives, locally based organizations (CBOs), and adult literacy programs.

The so-called development practices are rather antithetical to the existence of traditional communities. For the Kahar community of Madhya Pradesh, the construction of the Barna Dam has further disrupted fish breeding cycles and migration routes. During the monsoon, the sudden release of dam water sweeps away fish stocks and nets, while in summer, low water levels concentrate pollution and deplete fish diversity. In the Supaul region of Bihar, it was reported that no active cooperatives or unions exist. Besides, government-appointed secretaries often prioritize personal gain or big traders over the community's interests. While numerous fishing cooperative societies proliferated since the 1980s, with the 1964 cooperative law as a major legal basis in the Kondakarla Ava lake region, poor regulation and weak institutional capacity led to increasing challenges. On one side was growing pollution in the waterbodies, and on the other, low revenues for the sector overall, and thereby hardly any revenues for the government. Hence, in the 1980s and early 1990s, increasing use of bigger machinery in the country in fishing overall and a greater push for fish exports made the state government, often in close connection with relatively richer cooperative members, towards contractualization of the major parts of the fishing value chain of these bodies to outside contractors. This was done citing the need for greater revenues generated by the sector and thereby higher revenues for the state government. Hence, fishing operations were contracted out to individuals and businesses, many of whom were close to influential members of the FCSs or politicians of the state. Further, in the 1990s and early 2000s, state programmes pushed linking the tanks reservoir-based fisheries with SHGs and mandal-level federations of fishing cooperatives. These developments further excluded most of the small and marginal traditional fisher households from the customary direct access and use rights that were there till the late 1970s and, to some extent, in the 1980s. Many such families were compelled to become wage labourers to fish and harvest for the cooperative members and contractors.

The solution lies in moving away from state-controlled waters toward community-led management. When fisherfolk have legal rights to the water, they are more likely to invest in long-term sustainability. The strengthening of the cooperatives stands to ameliorate the predominantly marginalized, fragmented, and vulnerable fisherfolk community, which also lacks adequate infrastructure and institutional support. Inland fishers often rely on private moneylenders due to a lack of access to formal credit. Cooperatives help eliminate these intermediaries by providing institutional credit, loans for fishing gear, and insurance coverage. Moreover, cooperatives provide a platform for collective action, including bargaining, allowing fishers to negotiate better prices and improving income levels for the fisherfolk community by eliminating the middlemen. Besides, in the wake of ecological threats like pollution or habitat degradation, cooperatives help in promoting sustainable

practices, such as scientific stock management, leasing rights management, and collective, regulated harvesting. Many cooperative societies in India integrate traditional knowledge with modern practices in inland fishery management. They often implement scientific stocking and harvesting in reservoirs, adopt sustainable yield practices to maintain ecological balance while optimizing production, ensuring community governance for equitable benefit distribution among local populations. Besides, they often develop tourism for ancillary income sources.

Besides, often in rural villages and small fishing hamlets, primary fishery co-operative societies work closely with local fishermen, handling their urgent requirements and smoothing daily activities. Key roles encompass extending micro-loans at lower rate for fixing gear, buying vessels, or covering personal crises; distributing affordable fishing essentials such as nets, boats, motors, and gear; pooling and selling members' catches as a group to fetch higher rates; delivering advice on optimal methods and innovations for catching and processing fish; and bolstering member well-being with lean-season assistance and social safeguards.

Impact of Environmental Damage

Meghadri Gedda, which functions both as a creek and a drinking-water reservoir for Visakhapatnam, shows how industrial pollution intersect with inland capture fisheries. Environmental studies since the 2010s have documented heavy-metal contamination and water-quality stress in the Meghadri Gedda system, including the surplus channel and creek (Bhavani; "A Study on the Meghadri Gedda Surplus Channel Characteristics"). In May 2020, after the styrene gas leak from the LG Polymers plant at RR Venkatapuram, the National Green Tribunal ordered CSIR-NEERI to test water in Meghadri Gedda reservoir and surrounding wells. NEERI reported that the reservoir water showed moderate-to-high organic content and could not be used directly for drinking or domestic purposes; bioassay tests on zebrafish revealed only 60 per cent survival in undiluted reservoir water (Rao). While styrene levels were below detection limits in most samples, the findings underscored chronic organic pollution and biological oxygen demand. For local small fishers, this kind of contamination both threatens fish health and can trigger access restrictions when authorities frame the reservoir primarily as a drinking-water source rather than as a multi-use livelihood resource.

The above story is illustrative of the environmental dimension of the crises faced by fisherfolk communities. It has emerged as a strong theme in the analysis.

As mentioned in the previous section, the findings reported that participants consistently reported a visible and drastic decline in fish population and water quality

over the past few decades. The detailed discussions reveal three key unfavourable environmental outcomes responsible for deteriorating catch and water quality.

1. Chemical pollution: Local farmers occasionally dump pesticides and fertilizers into nearby drainage channels that empty into rivers and ponds, leading to massive fish deaths.
2. Agricultural runoff: Continuous flow of chemical residues from surrounding fields causes eutrophication, altering the pH and oxygen balance of water bodies. Moreover, Agricultural runoff containing pesticides and fertilizers pollutes the water, damaging fish reproduction.
3. River dredging and sand mining have changed water flow, pushing fish downstream and away from traditional fishing zones.

For example, in Kashmir, agricultural runoffs are a source of lake pollution, bringing large volumes of fertilizers, pesticides, and insecticides from the surrounding landscapes. These contaminants enter the lakes both directly and indirectly through interconnected networks of streams, thereby increasing nutrient loading and chemical toxicity. According to fishermen's reports, the last several years have witnessed a significant increase in the mortality of aquatic species. Participating in the extraction of sand at breeding locations is a practice that has been detrimental to the lake's ecosystem, as it interrupts natural spawning activities. The surrounding fishery populations of Wular and Manasbal Lakes are under severe ecological stress, attributed to climate change and the increasing impact of anthropogenic forces. The species degradation that stands out the most in this context includes the weakening of fish populations, directly posing a threat to the community's livelihood security. A high concentration of water pollution has exacerbated the death of fish, especially in summer, as the amount of dissolved oxygen decreases due to the eutrophication process and algal bloom. Additionally, the accumulation of plastic and solid waste in the benthic habitat has disrupted the regular breeding and foraging grounds of fish species. The issue of pollution in the lake has emerged as a significant concern. The accumulation of solid waste, agricultural runoffs, and household discharge has significantly impaired the quality of water in the lake. According to the residents, the once-clear waters have become malodorous, producing foul odours and lacking aquatic plants that support fish reproduction. High sediment loads have also disrupted fish habitats and spawning areas, leading to increased fish mortality, which has often been attributed to eutrophication and chemical pollution. Encroachment of the lake was another primary concern. Participants mentioned that parts of the lake have been gradually filled in for agricultural use, housing development, and road expansion. This not only reduced water spread but also disrupted the shallow zones where fish usually breed. They

reported that these developments have "shrunk the lake's lungs," leaving fishers with smaller catchment areas and limited access.

Negative externalities are not only imposed by the local agriculture practices involving pesticides and other toxic chemical runoffs, but also by the local industries. In the Meghadri Gedda Reservoir in Visakhapatnam District, the widespread use of chemical fertilizers, herbicides, and pesticides in surrounding farmlands has had deleterious impacts on aquatic life. A large number of fish perished during the gas leak incident at LG Polymers in the Meghadri Gedda Reservoir. Similarly, intense heatwaves about four years ago caused mass fish mortality, especially among surface-dwelling species, though deeper-water species were less affected in the reservoir. Additional threats include effluents from nearby apartments, industrial pollution, and quarry waste entering the reservoir.

Similarly, the ecological condition of Deepor Beel has deteriorated significantly over time. Deepor Beel receives untreated sewage, urban runoff, and waste from Guwahati primarily through the Mora Bharalu and Basistha-Bahini drainage systems, along with leachate and garbage from the Boragaon dumping ground and surrounding urban settlements. Overtime these pollutants have degraded water quality and reduced fish productivity. Fishers in Assam report that the taste and variety of fish have declined over the years due to contamination and overfishing. Seasonal storms and erratic rainfall patterns have made fishing more hazardous, and high summer temperatures further limit fishing hours.

Apart from these shocks, improper decision-making has led to disruption in the biodiversity of the aquatic ecology. In Kashmir, the adverse impacts of the Fisheries Department's introduction of fish were highlighted by the community, particularly the introduction of larger non-native species at Safapora. These new taxa outcompete smaller native species, hence reducing the local biodiversity. Fish harvests have thus been reduced significantly in both quantity and species. Although it used to yield prevalent catches that could feed households in the past, the current output is insufficient to sustain people on a subsistence level. Similarly, in Andhra Pradesh, recently, an invasive species, Tilapia, has proliferated in the Kondakarla Ava lake. While this species adapts well to changing environmental conditions, it threatens native and high-value species such as Korameenu (Snakehead Murrel), leading to economic and ecological concerns among the local fishers.

Environmental degradation has thus become not just an ecological issue but a social justice concern, amplifying poverty and displacement among the most marginalized communities. The degradation adds to the economic hardships of the communities. Respondents in Medinipur district inform that the volume and

diversity of fish species have declined significantly compared to 10–15 years ago. As the average yield reduces, the average cost of fishing increases. This is because the costs of maintaining nets and boats have increased over time. Moreover, the increasing costs haven't been matched by increasing incomes. Moreover, Medinipur fisherfolk report a decline in their income and limited upward mobility.

The government has not adequately recognized or responded to the environmental degradation affecting Kondakarla Ava. During heatwaves, mass fish deaths occur, but there are no official assessments or compensatory measures. Similarly, contamination from chemical fertilizers and domestic effluents continues unchecked. Local fishers consistently call for the promotion of nature-based and organic farming practices in the surrounding catchment areas to prevent runoff and safeguard the aquatic ecosystem.

In Kashmir, increased heat waves have lowered the water table, thereby reducing the fish catch and forcing fish to move to depths beyond the range of fishing vessels. These environmental threats have significantly compromised the ecological sustainability of Wular and Manasbal ecosystems, and hence, the livelihoods of the communities that rely on them are at stake. The combined impact of pollution, climate irregularities, and loss of biodiversity has increased the vulnerability of the ecosystem as well as the livelihood security of the fisherfolk. Participants expressed that climate change has made their work increasingly unpredictable. During the rainy season, heavy storms, strong winds, and fluctuating water levels make it extremely difficult and dangerous for them to go fishing. Many fishers mentioned accidents and injuries caused by sudden weather changes. They observed that the number and variety of fish have declined in recent years, directly affecting their earnings. Despite their long association with the waterbodies and dependence on it for survival, they have not received any meaningful opportunities or support from the government. Earlier, assistance for boats, nets, and fishing equipment was provided, but such initiatives have stopped completely, leaving them to struggle without institutional help. Moreover, the respondents identified the building and the following destruction of a bund near the lake as a significant source of ecological imbalance. The local observations indicate that fish prefer shallow areas for spawning, which have disappeared after removing the bunds, resulting in a significant decline in breeding. One of the participants stated that the fish have no place to lay eggs, which helps to emphasize the lack of connection between the traditional ecological knowledge and new interventions.

The ecological condition of Urpad Beel (Assam) has also deteriorated due to a combination of climate change and human interference. Once, seasonal floods brought fish from other wetlands, replenishing the stock. Today, that natural cycle

is broken due to: siltation and sedimentation, reducing depth; reduced rainfall and irregular flood patterns; embankments that block fish migration; and pollution from nearby human settlements and water treatment plants.

The fishers mentioned that the water treatment plant nearby is polluting the Beel. After three months or so, the fish begin to rot, and the water becomes dirty and foul-smelling, making it hard to fish. Climate variations, such as extreme summer heat and erratic storms, have also made fishing physically exhausting and unsafe. These factors combine to make the Malo community's livelihood increasingly uncertain and precarious.

Impact of Climate Change

Climate change is another second major aspect of ecosystem disruption. Climate change, characterized by unpredictable rainfall patterns, frequent floods, extended droughts, and rising temperatures (and resulting heatwaves), has altered and disrupted the water levels in lakes, thereby affecting the natural migration and reproduction of fish. Moreover, the impact of climate shocks is not absorbed uniformly across the social stratum. The marginalised communities, whose existence is intertwined with their local ecology, like water bodies, face double jeopardy through the intensification of existing vulnerabilities and the addition of new challenges in their ecosystem. First, the climate change-induced erratic rainfall patterns lead to unpredictable fishing seasons. Second, frequent floods often wash away the nets, boats, and breeding nests, sweeping fisherfolk off their means of production. Third, extended droughts cause water bodies to shrink, reducing spawning habitats. According to the FGD participants in Kashmir, floods bring foreign water into Manasbal, making it unfavourable for aquatic life. In contrast, a drought significantly lowers water levels, creating disequilibrium in the fish population. The quality of the fish community is affected negatively since the construction has blocked channels linking smaller wetlands. They noticed that the recharge points naturally available to feed the lake have dried up or been blocked, thereby affecting the lake's hydrological regime and ecological rhythm. Fourth, rising temperatures affect fish reproduction cycles and increase algal blooms.

The fishers of the Kahar community narrated the catastrophic year of 2023, when the dam overflow destroyed dozens of nets and led to a total loss of income for nearly two months. With no insurance or compensation mechanisms, such events push families into debt traps with local moneylenders.

A similar story is found in Medinipur (West Bengal), where frequent floods, droughts, cyclones, and erratic rainfall have severely disrupted the fishing calendar.

During droughts, canals and ponds dry up, reducing fishing months from six to two or three. Though floods in Medinipur increase fish availability, they drastically reduce the market prices of the catch. Moreover, agricultural runoff containing pesticides and fertilizers pollutes the water, damaging fish reproduction.

While climate change was not the main focus of the study, its impact also emerged when conversations delved into the fisherfolk's experience and perceived reasons for the decrease in the average number of fishing days per month. This exercise is of special importance given the rising global acceptance of the relevance of local perceptions and local knowledge in understanding climate change (Bevilacqua et al., 2016; Madhanagopal & Pattanaik, 2020).

Using our structured questionnaire, we collected data on the perception/ experience of fisherfolk by enquiring if the average number of days per month that the respondents used to fish has changed in the last 5 years. About 77 percent of the interviewees responded affirmatively. Out of these, almost 99 percent of these respondents reported that the average number of fishing days per month has decreased in the last 5 years. Focus group discussions revealed detailed accounts of change in the fishing pattern. For example, the Kahar community of Madhya Pradesh revealed that there has been a drastic reduction in the number of fish caught by them. Elder respondents of their community recalled that in earlier times the daily catches reached up to 50–100 kilograms, which has now shrunk to merely 4–5 kilograms per day in the present.

We further enquired about the reason for the reduction in the number of average fishing days. It was found that 93 per cent of the respondents who confirmed the decrease in fishing days believed that there has been a reduction in the quality and/ or quantity of fish. (see Figure 4.11) The reduction in water in the waterbody and contamination of the waterbody were considered as the secondary major reasons for the reduced number of average fishing days. Besides, reduced access to water resources due to government regulations, as well as due to construction activities, also results in a reduced number of fishing days for the small-scale fishing communities. This is also reflected in FAO's study on inland fisheries. As per the study, fish stocks are depleting due to habitat loss, habitat degradation, low flows, and pollution of the aquatic environment, especially in the river ecosystem, calling for immediate restoration of riverine ecosystem processes (FAO, 2015; 2024).

About 97 percent of the respondents report that the quantity/quality of fish in the waterbody has been affected by some adverse environmental/climate change event(s) in the last 5-7 years. (See Figure 4.11) Given that climate change has a multimodal impact on fisherfolk, we find a diversity of environmental changes

Figure 4.11: Reported Reasons for Decresed Number of Fishing Days

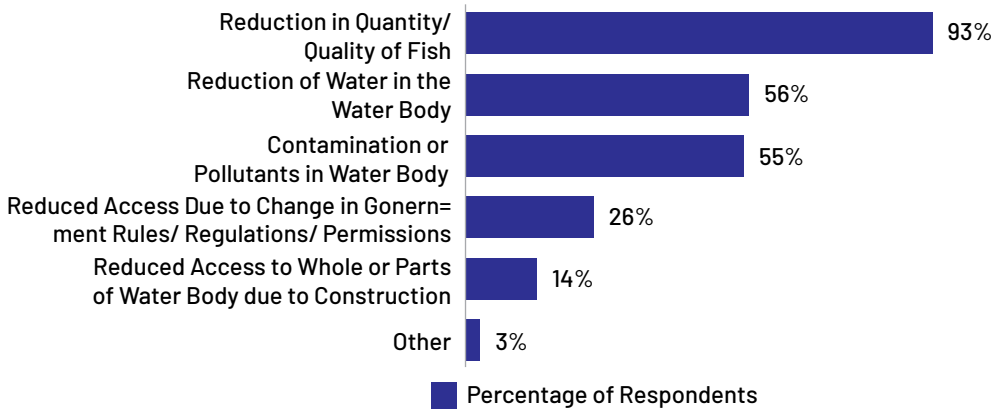
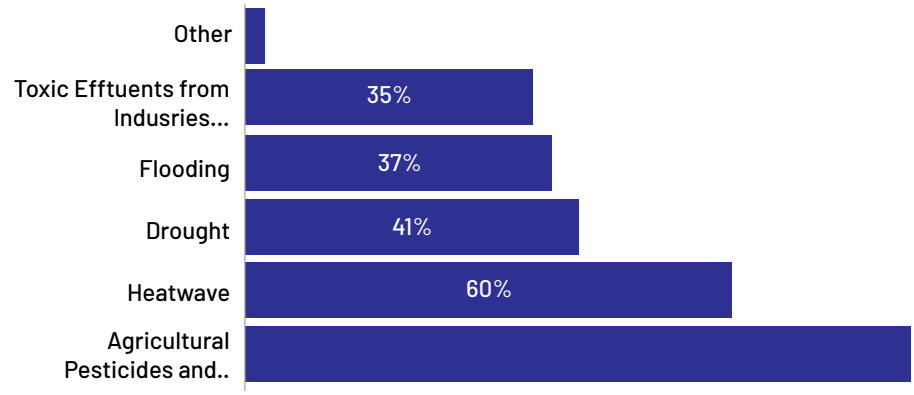


Figure 4.12: Kind of Environment / Climate Change Impact Causing Change in Quality / Quantity of Fish in Last 7 Years



that have caused the change in quantity/quality of fish in the last 5-7 years (Figure 4.12). About 81 percent of the respondents believe that agricultural pesticides and other chemicals released in water bodies are the major kind of environmental/ climate change impacts that have deteriorated the quantity/quality of fish. The rising temperature, causing heatwaves, and rainfall-related calamities like floods and droughts, are also considered responsible for the deteriorated quantity/quality of fish. Industrial waste contaminating the water body with toxic effluents is also one of the major kinds of climate change causing deterioration. During FGDs, an elder respondent expressed their fear that due to the current trend of increasing pollution, lake encroachment, and changes in water levels, fishery activity might be completely wiped out in the next decade in Kondbal in Kashmir. They added that young people from their community no longer know about fishing as a means of earning a living, and it has become a dying tradition.

Role of Governance and Policies

The experiences of inland fishing communities increasingly demonstrate how governance and policy decisions shape not only ecological outcomes but also the survival of traditional livelihoods. Fishworkers are often positioned at the intersection of multiple and sometimes conflicting policy regimes involving conservation, tourism development, industrial expansion, water governance, and environmental regulation. While state interventions may seek to restore degraded ecosystems or promote economic development, fishing communities frequently have limited participation in decision-making processes and bear the consequences of both ecological decline and regulatory restructuring. The case of Kondakarla Ava illustrates how failures of environmental governance, followed by conservation-oriented interventions, can together transform access to commons, redefine livelihood practices, and reshape the relationship between fishworkers and the water bodies on which they depend.

Kondakarla Ava, is a freshwater lake southwest of Visakhapatnam. It has long supported fishing and paddy cultivation for several villages on its fringes. Large scale encroachment, indiscriminate municipal and industrial waste discharge and eutrophication in the Kondakarla Ava Lake area and surrounding lands throughout the last two decades has been major drivers of lake pollution and ensuing reduction in fish abundance.

A 2015 report in *The New Indian Express* warned that indiscriminate encroachment, industrial and domestic effluents, and eutrophication were "sounding the death knell" of the lake, even as it continued to host more than 100 bird species and about 25 fish varieties ("Kondakarla Lake Dying a Slow Death"). A 2019 doctoral study from Andhra University documented similar degradation patterns and argued for an eco-tourism-based conservation model that would still keep local livelihoods in view.

Since 2022, the state's forest department has pushed for stronger legal protection, resulting in the district collector announcing plans to declare Kondakarla Ava a conservation reserve under the Wildlife (Protection) Act, 1972, in May 2025 (L. Pranathi; U. Peri). Around 700 acres have been demarcated, with a multi-departmental framework involving forest, irrigation, fisheries, tourism, and panchayat raj institutions, and explicit acknowledgement that over 100 local fishing households rely on the lake using traditional palm-leaf boats and harvesting more than 20 identified fish species. In May 2025, the district collector announced plans to declare Kondakarla Ava a conservation reserve under the Wildlife (Protection) Act, 1972. Recent years' state-level initiatives to map and protect wetlands, such as Andhra Pradesh's 2025 identification of 16 new wetlands and plans for eco-tourism

corridors and a stronger Kolleru Lake authority, signal a broader turn toward conservation-cum-tourism framing. Kondakarla Ava's conservation-reserve proposal is part of this trend.

Around 700 acres have been demarcated, with a multi-departmental framework involving forest, irrigation, fisheries, tourism and panchayat raj institutions, and explicit acknowledgement that over 100 local fishing households rely on the lake, using traditional palm-leaf boats and harvesting more than 20 identified fish species. The proposal promises both ecological safeguards and livelihood support—jetties, eco-tourism jobs, waste-management improvements—but it also shifts authority toward protected-area style governance. For small and marginal fishers, this combination of earlier unregulated degradation and now top-down conservation planning has produced a double squeeze: first the resource declines, then access may be restricted or re-regulated in ways they cannot easily influence.

The proposal promises both ecological safeguards and livelihood support in the form of jetties, eco-tourism jobs and waste-management improvements. But it also shifts authority toward protected-area style governance. For small and marginal fishers, this combination of earlier unregulated degradation resulting in fish declines followed by top-down conservation planning allowing stringently regulated access has only further reduced opportunities to fish regularly and in sufficient volumes and quality to ensure decent and sustained livelihoods.

The case of Kondakaria Ava, shows how in many situations, government policies related to small-scale fishing communities have not only been unsupportive but also highly distortionary.

Consider the case of access and use of water bodies for the Kahar community. Unsupportive government policies have led to severe economic loss to the local fishing communities of Madhya Pradesh. For instance, access to water bodies has undergone a dramatic transformation since the dissolution of the Kahar Fishermen's Cooperative in 2011. Previously, this cooperative served as a collective mechanism for resource sharing, equitable leasing, and community regulation. Its closure marked the beginning of systemic exclusion. Today, fishing rights in Raisen's reservoirs and rivers are administered through the Madhya Pradesh State Fisheries Federation Cooperative Limited, which operates under a leasing system. However, instead of empowering local fishers, the system has been captured by powerful contractors, landlords, and politically connected groups, leaving traditional fishers marginalized. The analysis of the Focus Grouped Discussions conducted with the members of the Kahar community indicated multiple faulty practices leading to the exploitation of the community fisherfolk. First, the huge markup charged by the

contractors in the retail market vis-à-vis meagre payments made to the fisherfolk. The Contractors often purchase fish at ₹15–₹25 per kilogram, while the same fish sells in markets at a price 5-6 times higher at ₹100–₹400.

Similarly, in Kashmir, the fisherfolk in Wular and Manasbal Lakes depend primarily on *thekedars* to deal with their catch. These intermediaries acquire fish at a wholesale price of approximately 150-180 rupees per kilogram and later sell the goods in urban markets at significantly higher prices. In comparison, male fishers typically sell directly to consumers through roadside stalls, vending machines, bicycles, or auto-rickshaws, and the prices can be as high as 500 rupees per kilogram. Female dealers, however, complete fewer transactions and typically sell at around 350 rupees per kilogram for roadside sales or local markets, resulting in gender-based inequalities in the market's earnings. These exploitative practices have forced approximately 30% of local fisher families to abandon fishing altogether. Many now rely on daily wage labour, construction work, or agricultural tenancy to survive. There has been a drastic reduction in the amount of fish caught.

Elders of the Kahar community recalled earlier times when daily catches reached 50–100 kilograms, compared to the present 4–5 kilograms per day. Administrative apathy and lack of legal literacy among fishers compound the problem. Few are aware of their entitlements under the Fisheries Policy (2008) or environmental regulations protecting small-scale fishers. The absence of collective organization leaves them vulnerable to arbitrary enforcement and exclusion.

For Andhra Pradesh, where inland capture fisheries have evolved within a landscape dominated by rivers, tanks, reservoirs, and coastal wetlands, the last three decades have brought sharp institutional and ecological shifts that small and marginal fishers have had to navigate. Official data show that the state is a major inland fish producer, with tens of thousands of tanks and over a hundred reservoirs under the control of the Fisheries Department and local bodies, many of them leased to Primary Fishermen Cooperative Societies (PFCS) and other organised groups (Department of Fisheries, 2025a) Since the 1980s, Andhra Pradesh has also become a national leader in aquaculture, as cooperative freshwater carp schemes and, later, intensive shrimp farming transformed the sector's value chains. For inland small-scale fishers, this has meant a steady shift from loosely regulated access to rivers and tanks toward more formalised leases, tighter competition for waterbodies, and growing ecological pressures from surrounding land use. The governmental agencies have not adequately addressed the environmental losses caused by climate and pollution. During heatwaves, dead fish often wash ashore without any official response. Similar indifference is observed in cases of fish deaths caused by

agricultural runoff and industrial contamination. The fishing community advocates for eco-friendly agricultural practices, prevention of industrial effluents, and the control of domestic waste discharge from residential areas into the reservoir.

The Kondakarla Ava Fishermen's Cooperative Society was formally registered in 1955, and since then, it has been paying an annual lease fee to the government. Through this long-standing arrangement, the community has maintained collective management and sustainable use of the lake's fishery resources. Fishers are granted annual lease agreements for fishing rights in the lake. However, families of deceased members are often denied the transfer of these rights, leading to intergenerational insecurity. Despite repeated demands, the government has not issued official identity cards to the active fishing households. While the government grants lease rights to the cooperative society, there is no provision for financial assistance or institutional credit. The absence of recognition as formal fishers also excludes them from state-level social protection schemes and welfare entitlements.

A fishing ban is imposed annually to allow fish to breed and repopulate the waters, while providing financial support to the fisherfolk during the fishing halt. However, it severely impacts small-scale fishers by halting their primary income source for 2-4 months (or up to 7 months in Odisha due to additional turtle protection). Enforced differently across coasts—April-June on the east and June-July on the west—the ban originated as a trawling restriction but now affects all fishers, leaving millions without viable alternatives. Government relief schemes, like the central savings-cum-relief fund, prove inadequate and inconsistent: Tamil Nadu offers the highest at ~₹13,500/year, Andhra Pradesh ₹10,000 via its own program, and Odisha ₹7,500 plus rice, yet these fall short of living costs for families, prompting demands for ₹10,000-15,000 monthly. States like West Bengal, Gujarat, and Maharashtra provide little to no support, with erratic central funding (e.g., Maharashtra received sporadic aid from 2015-2020), exacerbating poverty. Fishers resort to low-wage labour (₹150-200/day in construction), boat repairs, or debt from middlemen, which forces cheap sales and perpetuates cycles of impoverishment. Climate change worsens this through frequent cyclones, reduced fishing days, gear damage, declining catches, and higher fuel costs, with no tailored secondary livelihoods or aquaculture favouring small operators. Unions call for need-based compensation, fairer schemes beyond BPL criteria, and better enforcement to balance conservation with human welfare (Vohra, 2021).

In Kashmir, the locals expressed a sense of political dislocation, referring to themselves as voiceless stakeholders. They claimed that alien agencies and contractors use the resources of lakes while fisherfolk often face either denial

of entry or punishment due to any ambiguous law. The participants emphasised the need to reestablish cooperatives and to include actual fishers in planning committees to address lake restoration and management.

Policy and institutional changes intensified in the late 1990s and early 2000s, when the Assam state expanded lease-based management of fisheries. Under the Assam Cooperative Societies Act, 1949, and Fishery Rules of 1953, Primary Fisheries Cooperative Societies (PFCSs) were granted priority leasing rights for beels (Chandra and Sharma 4–5). However, by 2008–2012, academic evaluations found that the lease system increasingly favoured elites within cooperatives rather than marginal fishers, who were often reduced to wage labour roles (Chandra and Sharma 7–9). This marked the beginning of a structural shift from customary access toward formalised, capital-intensive tenure systems. The institutional reforms accelerated further during the 2010s. The Assam Sustainable Wetland and Fisheries Transformation (SWIFT) Project, initiated in 2017 with Asian Development Bank support, introduced formal stakeholder committees, stock enhancement norms, and wetland governance guidelines (SWIFT ESMS). While these measures aimed to rehabilitate degraded beels, they also reinforced administrative control over access, diminishing flexibility for marginal fisher households. By 2023, the state's Legislative Assembly reported 20.483 million fish seed units produced and 4.43 lakh tonnes of inland fish, indicating substantial aquaculture growth rather than expansion of the capture sector (Assam Legislative Assembly 2). Thus, the long-term pattern shows a policy trajectory favouring pond-based and stocked fisheries, often sidelining traditional open-water fishers.

Though the state's policies on inland capture fisheries focus on the sector's immense, underutilized potential, the sector remains hampered by a policy focus that often prioritizes commercial aquaculture over the ecological sustainability and livelihoods of traditional, small-scale fishers. While inland fisheries contribute over 75 percent of India's total fish output (combined with aquaculture), the capture component is often treated as a secondary interest in resource management.

State policies often focus on increasing production through aquaculture (stocking ponds) rather than sustainable management of natural riverine systems. This shift has often replaced high-value indigenous species with low-value, small-bodied fish or exotic species, reducing income for traditional fishers. Besides, as mentioned, inland fisheries are often characterised by weak data collection, leading to significant under-reporting of catches in many states. Management, where it exists, is often based on top-down, non-participatory approaches.

A major policy issue is the conflict between traditional, customary, or communal access rights and formal, state-imposed leasing systems (often to cooperatives or high bidders). This often disadvantages small-scale, traditional fishers. Besides, policies often struggle to address the impacts of damming, water pollution, and agricultural runoff, which are major threats to the ecosystem. Climate change is expected to amplify these risks.

In this regard, the future policy should shift from viewing inland fishers as users of a resource to stakeholders in its management (e.g., co-management). As fisheries are not adequately considered when planning water infrastructure, such as dams or irrigation, leading to habitat fragmentation, this needs to be focused on.

While initiatives like the Draft National Inland Fisheries and Aquaculture Policy (NIFAP) and the National Fisheries Policy (2020) show an effort to create a more comprehensive approach, the effective management of inland capture fisheries requires a shift towards co-management, ecological sustainability, and the protection of traditional livelihoods rather than merely focusing on maximizing production.

Chapter 5

Conclusion and Recommendations

Inland fisheries constitute a critical yet persistently under-recognised component of India's rural economy, contributing not only to livelihoods and food security but also to nutrition, ecological stewardship, biodiversity monitoring, and cultural continuity (FAO, 2024; Funge-Smith & Bennett, 2019). The findings from this multi-state study of 641 households across six states strongly reinforce the argument that inland fishing communities—particularly small-scale and traditional fisherfolk—continue to experience deep and intersecting forms of economic, ecological, and institutional marginalisation. The analysis presented in this publication demonstrates that inland fisheries are not merely a livelihood sector but a complex socio-ecological system shaped by inherited cultural practices, precarious labour relations, shrinking commons, environmental degradation, weak governance, and unequal market structures.

Drawing upon both the field findings and the broader literature, one unavoidable conclusion emerges: the need to ensure inland fisherfolk communities a life free from structural deprivation, ecological insecurity, and exclusion from rights over the resources on which they have historically depended. The study reveals that fishing across the surveyed regions is deeply embedded within local histories, cultural memory, ritual practices, and ecological knowledge systems. From the Kahar communities along the Barna River in Madhya Pradesh to the Malo fishers around Deepor and Urpad Beel in Assam, from the Nishad communities along the Kosi River in Bihar to the lake-dependent fishing households around Wular and Manasbal in Kashmir, fishing continues to function not simply as an occupation but as a social identity and a way of life. However, these systems of cultural continuity are increasingly under strain due to declining fish availability, ecological degradation, reduced access to water bodies, and the growing commodification and privatisation of inland fisheries.

The survey findings strongly affirm the centrality of small-scale fisheries within household survival systems. Nearly 69 per cent of surveyed households reported that two members of the family were engaged in capture fishing activities, indicating the extent to which fishing continues to remain central to livelihood

reproduction. At the same time, the findings demonstrate that fishing livelihoods are increasingly characterised by economic precarity and labour diversification. Around 40 per cent of households reported that fishing contributes between 26 and 50 per cent of household income, while nearly one-third reported that fishing contributes one-fourth or less of total household income. This reflects the growing compulsion among fisherfolk to combine fishing with wage labour, agriculture, migration, construction work, vending, or aquaculture due to declining fish stocks and insecure access to commons. In Assam, however, dependence on fishing remains particularly high, with 77 per cent of sampled households reporting no significant income source other than fishing.

The data further reveal the depth of poverty and multidimensional deprivation among inland fishing communities. Nearly 80 per cent of households fall within income brackets below INR 10,000 per month, while approximately 30 per cent survive on monthly incomes below INR 5,000. Low and unstable incomes are compounded by indebtedness, weak infrastructure, and poor access to welfare systems. Around 70 per cent of surveyed households reported being in debt, with loans frequently taken for basic consumption, healthcare, housing, and fishing operations. Although nearly 95 per cent of respondents depend on the Public Distribution System (PDS), only around 21–23 per cent reported access to Fishworker Cards or fisheries-related welfare schemes. This institutional invisibility significantly weakens access to state support, subsidies, insurance, and compensation mechanisms during lean seasons or environmental shocks.

The findings also confirm that inland fishing communities remain overwhelmingly drawn from historically marginalised caste and social groups. Most surveyed households belong to OBC and Scheduled Caste categories, while several communities occupy ambiguous or intermediate caste locations that leave them excluded from both targeted welfare systems and positions of social power. This structural marginality is reinforced through weak political representation, declining cooperative systems, low literacy levels, and limited legal awareness regarding rights over fisheries and water bodies. Nearly 44 per cent of respondents reported not being part of any organisation or collective. Participation in fisheries cooperatives was particularly low, while engagement through SHGs remained the dominant though limited form of collective organisation.

Educational deprivation emerged as another defining feature of the surveyed communities. Nearly 37 per cent of respondents reported having received no formal education, while another 20 per cent had completed only primary education. These patterns were particularly acute in regions such as Assam and Kashmir, where generations of livelihood insecurity, low incomes, weak infrastructure, and

limited state engagement have constrained educational mobility. Yet, the field findings simultaneously point toward an important transition: younger generations increasingly aspire to education-based occupations outside fisheries. While this reflects aspirations for dignity and economic security, it also indicates a gradual erosion of traditional ecological knowledge systems and inherited fishing identities.

The study also reveals a pronounced gendered division of labour within inland fishing economies. Consistent with national-level estimates, women continue to play a central yet undervalued role in fisheries-related labour. Men largely engage in capture fishing, while women dominate post-harvest work, including cleaning, sorting, drying, processing, vending, and management of household finances. Women also participate actively in SHGs and informal economic activities, especially during lean seasons. Yet their labour remains largely invisible within official statistics, governance structures, and welfare systems. The data on Fishworker Cards clearly reflects this exclusion: although women constituted a substantial proportion of respondents, only about 15 per cent reported access to such cards. Across regions, women repeatedly expressed the need for greater recognition, training, institutional support, and inclusion in decision-making processes related to fisheries governance and cooperatives.

One of the clearest findings emerging from the study concerns the growing erosion of commons and increasing barriers to access over traditional fishing grounds. Approximately 70 per cent of respondents reported that access to water bodies has become more difficult over time. Fishers across states described how private leasing systems, enclosure of water bodies, conservation restrictions, aquaculture expansion, industrial activities, and politically mediated contracts have progressively undermined customary access rights. In Madhya Pradesh, fishing rights have increasingly come under the control of contractors and politically connected actors. In Assam and Kashmir, restrictive regulations and weak cooperatives have similarly reduced access for small fishers. In Andhra Pradesh, conservation and tourism-oriented governance frameworks around water bodies such as Kondakarla Ava have reshaped traditional use patterns while limiting fishing rights. These developments collectively point toward a structural transition from community-based access systems toward formalised, market-oriented, and exclusionary resource regimes.

The study further demonstrates that inland small-scale fisheries are increasingly characterised by unequal incorporation into market systems dominated by contractors, intermediaries, and traders. Across the surveyed regions, fisherfolk reported receiving extremely low returns for their catch despite high market prices downstream. In Raisen district of Madhya Pradesh, fishers reported earning as little

as ₹30–₹50 per kilogram, while the same fish sold for several times more in retail markets. Similar exploitative structures were documented in Assam, Kashmir, Andhra Pradesh, and West Bengal, where middlemen dominate fish marketing and fishers lack storage, transport, and cold-chain infrastructure. The inland small-scale fisheries economy thus reflects a growing contradiction between subsistence-oriented production systems and increasingly commercialised value chains that extract surplus from fishing labour while concentrating profits elsewhere.

In this sense, the study strongly indicates that inland fisheries are witnessing a broader process in which traditional communities are being separated from the resources and ecological relationships that historically sustained them. Fishing communities increasingly confront shrinking commons, declining fish stocks, ecological degradation, and the concentration of control over fisheries within contractors, commercial operators, and state-mediated leasing systems. Human labour becomes detached not only from the products created through fishing, but also from long-standing cultural and ecological relationships tied to rivers, lakes, wetlands, and floodplains. Many fishers are therefore pushed toward precarious wage labour, migration, or low-paid informal work under conditions of deep insecurity.

Environmental degradation and climate change emerged as perhaps the most universally shared concern across all study regions. About 97 per cent of respondents reported that the quality or quantity of fish had been adversely affected by environmental or climate-related events during the past five to seven years. Similarly, nearly 77 per cent of respondents stated that the average number of fishing days per month had declined over the past five years, and among them, almost all reported a significant reduction in fishing days. Fishers repeatedly linked these changes to pollution, agricultural runoff, industrial contamination, rising temperatures, erratic rainfall, floods, droughts, siltation, invasive species, embankments, and sand mining. Across Assam, Kashmir, Andhra Pradesh, Madhya Pradesh, and West Bengal, respondents described visible declines in fish diversity, fish size, and catch volumes.

The climate crisis compounds these vulnerabilities in highly unequal ways. Floods destroy nets and boats, droughts shrink water bodies, rising temperatures affect fish breeding cycles, and heatwaves cause mass fish deaths. The burden of these changes falls disproportionately upon communities whose livelihoods remain directly tied to ecological systems. The findings therefore reinforce the argument that environmental degradation within inland fisheries cannot be understood merely as an ecological issue; it is fundamentally a question of social justice, livelihood rights, and survival.

The study also demonstrates that many governance and policy interventions have failed to adequately protect traditional fishing livelihoods. Instead, several policy trajectories—including leasing systems, conservation-oriented regulations, export-oriented fisheries growth, and aquaculture expansion—have often intensified exclusion. While policies increasingly emphasise production growth, tourism, or ecological conservation, inland fisherfolk frequently remain excluded from planning processes and deprived of meaningful participation in governance. The evidence from Kondakarla Ava, Wular Lake, Deepor Beel, and the Barna River clearly demonstrates that both unregulated ecological degradation and top-down conservation regimes can produce similar outcomes for traditional fishers: reduced access, declining livelihoods, and weakened autonomy.

The central issue emerging from this study is therefore the unequal control over the means of production within inland fisheries. Small-scale fisherfolk continue to compete with more powerful commercial actors possessing greater access to capital, political networks, infrastructure, and institutional recognition. Simultaneously, they bear a disproportionate burden of environmental decline and climate change while struggling to retain sovereignty over the waters on which they have historically depended. Leasing systems, privatisation of commons, and contractualisation of fisheries increasingly transform socially maintained aquatic ecosystems into commodified resources governed through exclusionary arrangements.

Yet despite these pressures, the findings also point toward forms of resilience and collective possibility. Across regions, fishers continue to rely upon communal labour arrangements, ecological knowledge, reciprocal practices, and informal support systems. Women's SHGs, local fishing societies, and some cooperative structures continue to provide limited but important spaces for collective survival. Communities repeatedly expressed the need for stronger cooperatives, legal recognition, community-led fisheries management, access to institutional credit, cold-chain infrastructure, women's inclusion, and ecological restoration.

Ultimately, this study situates inland fisheries not as residual subsistence sectors but as critical arenas of ecological stewardship, social justice, labour rights, and cultural continuity. Inland small-scale fisheries contribute directly to several Sustainable Development Goals, including poverty reduction, food security, gender equality, decent work, and ecological sustainability. However, achieving these goals requires a structural shift in fisheries governance. Such a shift must move beyond production-centric and market-driven approaches toward rights-based, community-led, and ecologically sustainable management systems that restore control and dignity to fishworkers themselves.

The findings strongly support the need for strengthened institutional frameworks rooted in co-management, equitable access, environmental sustainability, and democratic participation. This includes protecting customary rights over water bodies, revitalising cooperatives, expanding access to Fishworker Cards and welfare systems, recognising women's labour, regulating intermediaries, addressing pollution and climate impacts, and ensuring that conservation measures do not dispossess the very communities that have historically sustained aquatic ecosystems. Most importantly, the study underlines the urgent need for a coordinated, multi-state, multi-year inland fisheries census and capture survey that systematically enumerates households, labour processes, fishing sites, gear types, seasonal patterns, market pathways, gendered divisions of labour, debt, health, education, and rights conditions. Only through such recognition can inland fisherfolk move from being invisible labouring communities at the margins of policy to recognised stakeholders in the governance and future of India's inland waters.

Recommendations

The improvement of fishing technologies in inland fisheries has historically received far less attention vis-à-vis marine fisheries. The paucity of research and innovation in fishing technologies remains a crucial constraint for inland capture fisheries. As a result, inland fisheries continue to operate at suboptimal levels of production potential, leading to low incomes for fisherfolk while simultaneously contributing to unsustainable and destructive practices that undermine the long-term sustainability of fish stocks (FAO, 2024).

Any meaningful policy intervention must therefore begin with a broader conceptual shift: the recognition, valuation, promotion, and celebration of small-scale inland fisheries as socially necessary, ecologically sustainable, and culturally significant systems of livelihood. This requires moving beyond narrow production-oriented approaches toward frameworks that recognize fisherfolk not merely as economic actors, but as workers, ecological custodians, rights-bearing communities, and knowledge holders. Greater autonomy for fisherfolk over local aquatic commons and customary fishing territories must form the cornerstone of such an approach.

Small-scale inland fisherfolk function as vital environmental defenders rather than extractive agents. Through low-impact harvesting practices and the application of traditional ecological knowledge, these communities maintain intimate relationships with freshwater ecosystems and often align their activities with seasonal and ecological rhythms. Their practices contribute to biodiversity conservation, habitat protection, informal ecological monitoring, and the maintenance of riverine and

lacustrine ecosystems. Yet these contributions remain largely invisible within conventional economic accounting systems.

A major shift in public discourse is therefore necessary. "Green fishing" must be reframed as a legitimate and desirable future growth pathway within a resilient bio-economy. Such a transition would recognize that long-term food security, climate adaptation, and ecological restoration are deeply dependent upon the preservation of inland waterways and the communities that sustain them. The ecological benefits generated by artisanal fishing communities should be integrated into market valuation systems so that ecosystem stewardship itself becomes economically recognized and rewarded. Internalizing these positive externalities within pricing structures can help ensure that the custodians of aquatic commons are economically empowered to continue protecting fragile ecosystems.

Within this broader framework, the following conceptual and policy shifts become necessary:

- Public discourse and policy frameworks on capture fisheries should move toward principles similar to those embodied in legislations such as PESA, emphasizing sovereignty, customary rights, and democratic control over resources for traditional fishers.
- There is an urgent need to clarify the definition of "traditional capture fishers" in order to prevent exclusion of communities through narrow administrative categories.
- Policies must recognize that capture fisheries alone may not provide sustainable livelihoods, and therefore livelihood diversification must be integrated into welfare frameworks.
- Traditional capture fishers should be recognized as ecosystem service providers, with dedicated ecological incentives similar to policy support extended to mangrove conservation in the Union Budget 2024.
- Interventions should focus on enabling traditional fishers to move upward within value chains while addressing entrenched caste- and gender-based inequalities.
- Compensation frameworks for ecological destruction, climate impacts, and "loss and damage" should be strengthened and aligned with ecological justice principles.
- Policies for the protection of water bodies must address overlapping concerns regarding commons, pollution, encroachment, and declining water quality and quantity.

- State-specific fisheries policies should incorporate regional ecological and socio-cultural realities, many of which have been identified within the present study.
- Measures are needed to prevent the capture of cooperatives by elites, contractors, and politically dominant groups.
- Traditional fishers should be supported as part of India's cultural and civilisational heritage through dedicated national programmes for cultural and ecological preservation.

Thus, communities must be empowered to participate meaningfully in decision-making processes and assume responsibility for the sustainable management of fisheries resources (FAO, 2015). Policy interventions for small-scale fishing communities should therefore be guided by a human rights-based approach centred on inclusive well-being, dignity, and democratic participation while addressing inequalities structured through caste, class, gender, and region.

Across India's inland fisheries, socio-economic marginalization, environmental degradation, and inequitable governance converge to constrain livelihoods. Nevertheless, fisherfolk continue to remain central to freshwater stewardship. Existing literature repeatedly demonstrates that small-scale fishers are not passive victims of ecological decline but active custodians of aquatic ecosystems whose resilience is rooted in traditional knowledge systems and adaptive practices. A rights-based and dignity-centred policy framework—grounded in tenure security, ecological incentives, and participatory governance—can therefore strengthen both ecological sustainability and human well-being.

Although India's inland fisheries are regionally diverse, the household survey and FGDs conducted as part of this study identified several common structural vulnerabilities. Climate change, environmental degradation, unsustainable development practices, and gender inequality function as covariate shocks affecting inland fisherfolk across geographies. Consequently, policy interventions must operate simultaneously at two levels. First, there is a need for a broad-based and inclusive national policy framework to secure the welfare and rights of fisherfolk across the country. Second, there must be localised and region-specific interventions that respond to ecological, cultural, institutional, and livelihood variations among communities.

The overarching objectives of fisheries policy should therefore include:

- Protecting fishing communities from multidimensional vulnerabilities relating to economy, governance, ecology, and climate change.

- Enhancing the contribution of small-scale fisheries toward an economically, socially, and environmentally sustainable future (FAO, 2015).

The first priority within this framework must be the strengthening of public awareness and knowledge systems concerning the culture, contributions, and ecological importance of small-scale fishing communities (FAO, 2015). Such interventions require systemic thinking. Addressing only one dimension of deprivation while ignoring interconnected vulnerabilities will not generate sustainable outcomes. For example, unless ecologically appropriate agricultural practices are adopted in surrounding farmlands, toxic chemical runoff will continue to damage fisheries ecosystems and livelihoods. Similarly, without secure tenure rights over fishing grounds, economic stability, educational access, and long-term social security for fisherfolk remain impossible.

Equally important is the need for formal recognition of fisherfolk through welfare systems, fishworker cards, strengthened cooperatives, and participatory institutions. Such recognition enhances their political voice in struggles against ecological degradation, pollution, displacement, and exploitative market practices.

Thus, the future of inland fisheries development must be grounded in principles of inclusion, ecological sustainability, and democratic participation. Policies should remain environmentally conscious, technically appropriate, economically accessible, and culturally acceptable to fishing communities. Since small-scale fisheries remain deeply intertwined with local ecosystems, they already embody many principles of sustainable development. However, multidimensional deprivation continues to constrain their potential. Strengthening capacities, building institutions, creating equitable value chains, and improving infrastructure are therefore unavoidable policy priorities. As suggested by FAO (2024), integrated watershed management—from village-level governance to river basin planning—is essential for long-term ecological sustainability. At the same time, climate vulnerability within inland fisheries requires far greater research attention, along with sustained investment in awareness generation, institutional strengthening, and climate-resilient fisheries practices across India's diverse geoclimatic regions.

Ecological Stewardship and the Transition Toward Green Fishing

Small-scale inland fisherfolk provide ecological value addition that extends far beyond food production. Unlike industrial fisheries, traditional inland fisheries typically rely on low-impact gear and localized ecological knowledge that help maintain biodiversity and avoid overexploitation of species. Fishers act as "eyes on the water," informally monitoring pollution, illegal activities, habitat destruction, and invasive species. Their continued dependence on healthy ecosystems also

incentivizes the protection of wetlands, floodplains, mangroves, and river systems.

In this regard, green fishing emerges as a critical future growth pathway. A transition toward a "blue-green" circular economy would allow inland fisheries to become drivers of sustainable development. Low-impact harvesting practices—including biodegradable fishing gear, non-motorized vessels, and solar-powered technologies—can significantly reduce the carbon footprint of food systems while preserving aquatic biodiversity.

Traditional fishers are uniquely positioned to lead this transition. Their operational characteristics—low-energy intensity, reliance on Traditional Ecological Knowledge (TEK), biodiversity stewardship, and community-based resource management—already align with principles of sustainability. Unlike industrial operations focused on a narrow range of commercially profitable species, small-scale fishers often harvest diverse indigenous species, thereby supporting ecosystem resilience. Their intimate dependence on water bodies also makes them natural frontline defenders against pollution, habitat destruction, and invasive ecological threats.

Active Government Support and Participatory Governance

Since fisheries remain a "state subject," state governments play a critical role in shaping the growth and governance of inland fisheries. Given the deepening vulnerabilities faced by fisherfolk communities, positive and sustained government intervention is indispensable.

Revival and strengthening of government support programmes must therefore become foundational policy priorities. Such support should include both financial and infrastructural interventions: direct financial aid, provision of boats and nets, livelihood diversification programmes, technological improvements, and capability-building initiatives. Suboptimal investments in fishing technologies and the prevalence of inappropriate gear continue to constrain sustainable harvesting potential (FAO, 2024).

A particularly important area where the state can play a transformative role is in reshaping public narratives concerning fisherfolk. Inland fishers must be institutionally recognized as traditional custodians of water resources rather than marginalized occupational groups. Policies should move beyond rhetorical acknowledgment and actively institutionalize this recognition within legal and governance frameworks. Inland fisheries policies should explicitly acknowledge the inseparable relationship between fishing communities and the ecosystems they inhabit.

Formal recognition of traditional custody rights over water resources is therefore essential. Fisherfolk should receive legal tenurial rights over fishing grounds, along with protection against arbitrary confiscation of nets, boats, and fishing equipment. Reorganization and democratization of fishing cooperatives are equally important for ensuring equitable distribution of resources and political representation.

Fisherfolk must also be treated as active participants rather than passive beneficiaries within policy-making processes. Evidence from regions such as Kondbal in Kashmir highlights the importance of participatory governance models rooted in indigenous ecological knowledge and community-led restoration processes.

The draft National Fisheries Policy (NFP, 2020) similarly emphasizes conservation and management through community partnerships, effective cooperatives, and participatory governance. However, implementation gaps remain significant. Many states have regulations on mesh sizes to prevent juvenile fishing, yet enforcement remains weak. Destructive practices such as poisoning and electric fishing continue to be reported in FGDs. Environmental Impact Assessments (EIAs) for river development projects, statutory pollution control mechanisms, and conservation regulations for endangered fish species must therefore be implemented more rigorously (FAO, 2024).

A rights-based approach to fisheries governance must also incorporate the concrete demands repeatedly raised by fishing communities themselves. These include:

- Legal recognition of small-scale fishers as a distinct category with rights to tenure, water bodies, and social protection.
- Free fishing rights and conflict-free access in sanctuary regions.
- Abolition of contractor systems and recognition of community rights over inland water bodies.
- Allocation of at least 3 percent of the Union Budget toward the welfare of fish workers.
- Regulation of fish prices and elimination of exploitative middlemen systems.
- Protection of fishing communities from displacement and forced relocation.
- Establishment of water treatment mechanisms before industrial and urban waste is released into aquatic ecosystems.
- Comprehensive compensation and rehabilitation frameworks for floods, river

erosion, and ecological disasters.

- Legal recognition and institutional support for traditional ecological knowledge.
- Recognition of subsistence fishing as a nutrition security issue in addition to a livelihood issue.

India also requires a periodic inland capture fisheries census incorporating gear-specific catch-effort data, tenure status, gender participation, and market linkages. FAO (2024) itself has warned about severe under-reporting within inland fisheries data systems. A national inventory mapping rivers, beels, tanks, oxbow lakes, reservoirs, lease systems, and customary tenure arrangements is equally essential (Chandra, 2022). Without accurate data and secure tenure mapping, inland capture fisheries will continue to remain invisible within policy consciousness despite supporting millions of livelihoods and nutritional needs.

Climate Adaptation Strategies

Climate change has intensified ecological uncertainty across inland fisheries landscapes. Erratic rainfall, flooding, pollution, wetland degradation, and declining water quality increasingly threaten fishing livelihoods. Climate adaptation strategies must therefore occupy a central place within fisheries policy.

Adaptation measures should include the provision of improved safety gear, weather forecasting systems, resilient boats, and disaster preparedness infrastructure. Pollution control and ecological restoration must also become immediate priorities. Respondents in Assam emphasized the urgent need to stop waste disposal into Beels from hospitals and nearby urban centres. Similarly, respondents from Kashmir stressed the importance of lake desilting, quality control, and regulation of sand mining for restoring fragile lake ecosystems.

Since fisheries depend fundamentally on ecosystem health, responsible fisheries management requires habitat restoration, breeding-ground protection, and prohibition of ecologically destructive fishing methods. Communities should also be centrally involved in designing adaptation strategies, including early warning systems, livelihood diversification programmes, and community-led water quality monitoring.

Restoration processes should therefore include:

- Revival of water channels and recharge points.
- Prevention of encroachments and pollution.

- Promotion of eco-friendly livelihood alternatives such as eco-tourism and sustainable aquaculture.
- Strengthening fisher cooperatives and SHGs.
- Ensuring equitable market access and direct marketing systems.

Climate justice demands several immediate interventions:

- Preferential access of small-scale fishers to fish resources.
- Improved weather forecasting systems.
- Elimination of destructive fishing methods such as bottom trawling and purse seining.
- Protection and restoration of aquatic ecosystems.
- Climate-resilient fish drying and storage systems.
- Infrastructure for safe anchorage of boats.
- Compensation for livelihood losses during climate disasters.
- Insurance systems and climate compensation funds for fish workers.
- Climate-resilient housing.
- Participatory disaster management involving fisherfolk communities.

Long-term measures should include:

- Immediate cessation of activities intensifying climate impacts on fisheries.
- Strengthening adaptation capacities of small-scale fishing communities.
- Rapid reduction of carbon emissions through enforceable timelines.
- Full participation of fishing communities in climate-related policy design.
- Independent scientific assessment of India's inland water bodies.
- Fair compensation for loss of nets, boats, and fishing time.
- Prevention of agricultural runoff and pollution.
- Prioritization of education for fishworkers' children.
- Recognition of the "Right to Coast" and protection of spaces for pre- and post-harvest activities.
- Strong mechanisms against caste- and class-based discrimination.

- Ban on destructive practices such as asthir jal upyog, ghera baari, explosives, and electric fishing.

Economic Empowerment and Institutional Strengthening

Economic insecurity remains one of the defining features of inland fishing livelihoods. Organized markets, cooperatives, cold chains, and fair pricing systems are therefore essential for reducing exploitation by intermediaries. Skill development programmes and livelihood diversification initiatives are particularly important for younger generations increasingly moving away from capture fisheries.

Income stability requires institutional credit, interest-free loans, fish producer organizations (FPOs), and infrastructure for storage, refrigeration, transportation, and processing. Existing research from Kamrup, Goalpara, and Tinsukia highlights how inland capture fishers remain trapped within poorly integrated markets dominated by middlemen, weekly haats, and low bargaining power. Unlike aquaculture operators with access to cold chains and organized value systems, capture fishers continue to receive disproportionately low returns.

Although national interventions such as the Pradhan Mantri Matsya Sampada Yojana (PMMSY) have emphasized infrastructure and aquaculture expansion, they provide limited clarity regarding inland capture tenure and customary fishing rights. Consequently, ecological degradation, market exclusion, and conservation-related restrictions continue to marginalize inland fishing communities such as Kaibarta, Rabha, and Rajbongshi fishers around Deepor and Urpad.

Particular emphasis is required on post-harvest management and fish marketing systems. Domestic fish markets remain highly unorganized, necessitating a national strategy for post-harvest management and marketing for small-scale fisheries (FAO, 2024). The large gap between retail fish prices and the prices received by fisherfolk must also be addressed. Distress sales continue because of the absence of refrigeration, transportation, and logistics infrastructure.

The NFP-2020 emphasizes modernization of fisheries value chains, including market creation and infrastructure expansion aimed at reducing post-harvest losses. However, implementation must remain sensitive to the needs of small-scale capture fishers rather than privileging large commercial operators.

Access to affordable credit remains another urgent concern. Many fisherfolk rely on informal debt for fishing operations, while the collapse of cooperatives has intensified their vulnerabilities. Policy responses should therefore include:

- Provision of institutional credit and working capital.
- Priority sector lending for marginal fishers.
- Employment and entrepreneurial opportunities for unemployed fishing youth.
- Inter-departmental coordination mechanisms to reduce agricultural externalities affecting water bodies.
- Fisheries Management Plans for scientific governance.
- Fisheries Spatial Plans for data-driven management and decision-making.

Leasing rights should prioritize SHGs formed by traditional fisher communities. Community-based co-management systems, such as those observed in Manika and Amuwa wetlands in Bihar, demonstrate the importance of participatory governance and equitable access frameworks.

Traditional fishing communities have repeatedly demanded:

- Secure tenure rights and participation in decisions concerning protected areas, tourism, and infrastructure projects.
- Rights to access water bodies for fishing and aquaculture.
- Land rights for pre- and post-harvest activities.
- Rights to protect water bodies and fish resources.

Access rights must include preferential rights over fish resources and security of tenure over leased water bodies. Protection of ponds, wetlands, catchments, and drainage systems from pollution, encroachment, and destructive fishing practices must form an integral part of fisheries governance. A comprehensive national water bodies audit is also urgently required.

Gender and Social Inclusion

Women remain central to inland fisheries economies, yet their labour continues to be systematically undervalued and under-recognized. Institutionalizing women's participation within fisheries governance, cooperatives, and market systems is therefore essential.

ICAR–CIFRI has increasingly emphasized gender-sensitive approaches within fisheries research and development. Women constitute nearly 36 percent of the inland fisheries value chain nationally, with participation levels reaching nearly 50 percent in certain states. Women also bear a substantial burden in fish processing,

vending, drying, and post-harvest labour. Consequently, gender-sensitive policies are indispensable not only for economic efficiency but also for rights-based empowerment and social justice (FAO, 2024).

Policy interventions should therefore include:

- Dedicated policies for women fishworkers.
- Equal wages and equal working opportunities.
- Gender-segregated fisheries data systems.
- Infrastructure support including toilets, transport, drying platforms, and insurance.
- Women-specific welfare schemes and financial assistance.
- Access to technical training, markets, and production infrastructure.
- Social security systems including pensions, housing, health insurance, and educational support.
- Strengthening women-led cooperatives, SHGs, and production groups.
- Protection and targeted support for sectors dominated by women fishworkers.
- Crèches, resting facilities, and sanitation infrastructure in markets and depots.
- Recognition and support for "half widows" whose husbands are lost at sea or in fishing-related disasters.
- Medical camps and healthcare services in fisher settlements.
- Strong safeguards in markets, transport systems, and public spaces for fisherwomen.

Appendix

Indian Inland Fisherfolk: Access to Waterbodies, Supply Chain and Market Access, Related Rights & Policies and Practices Hindering/ Supporting Their Fishing Occupation and Related Socio-Cultural Relationships.

Household Survey Questionnaire

Block A: Sample Identification

A.1. State	
A.2. Investigator Name:	A.3. Questionnaire Number:
A.4. District:	A.5. Block:
A.6. Sector: Urban/Rural	A.7. Village/Town Name:
A.8. Respondent's Address:	
A.9. Respondent's Name (Optional):	
A.10. Respondent's Contact Number (mobile):	
A.11. Contact Number belongs to: 0- N/A, 1- Self, 2- Spouse, 3- Children, 9- Others	
A.12. Can we correspond on this contact number in the future? 1-Yes/0-No	

Block B: Respondent Socio-Economic Profile

B.1. Name (optional): .....

B.2. Age (years): .....

B.3. Religion: 0 – Non-religious, 1 – Hinduism, 2 – Islam, 3 – Christianity, 4 – Sikhism, 5 – Jainism, 6 – Buddhism, 9 – Other (Specify).....

B.4. Social Category: 1 – ST, 2 – SC, 3 – OBC, 9 – Others

B.5. Marital Status: 1- Single/Unmarried, 2- Married, 3- Separated, 4- Divorced, 5- Widowed

B.6 Details of Household Members

Details of each household member – Member ID	Relationship to Head of Family 1. Self 2. Spouse 3. Parent 4. Child 5. Grandparent 6. Grandchildren 7. Other (please specify)	Gender 1. Female 2. Male 3. Transgender 4. Prefer not to say	Age (in years)	Educational Status

B.7. What level of education have you completed or are enrolled in: 1 – Standard 5 or below, 2 – Standard 6 to 8, 3 – Standard 9 or 10, 4 – Standard 11 or 12, 5 – Diploma programme, 6 – Undergraduate degree programme, 7 – Postgraduate degree programme, 8 – Vocational Training Institute

Relationship Between Household Income and Capture Fishing (questions under this sub-head cover respondent's experiences/facts for last 2-3 years)

B.8 How many of your household members apart from you are involved in capture fishing (from now on, 'fishing' means capture fishing)? 1 – One, 2 – Two, 3 – Three, 4 – More than three

B.9. What are the reasons for you and household members to do capture fishing (more than one option can be selected)? 1 – Livelihood, 2 – Consumption, 3 – Artisanal

B.10. Apart from fishing as an income source, what other income sources does your family have?

1 – Aquaculture or other fishing activity outside capture fishing,

2 – Agriculture,

3 – Street Vending (except fish street vending),

4 – Household domestic help,

5 – Construction labour,

6 – Supply Chain/Transportation work,

7 – MGNREGA,

8 – No other source of income,

9 – Others, Specify .....

B.11 How much has fishing contribute to your household income in the last 2-3 years? 1 – 76% and more, 2 – 51-75%, 3 – 26-50%, 4 – 25% or less

B.12 If you and household members fish only for consumption and/or artisanal purposes, what is your household's major source of income?

1 – Aquaculture or other fishing activity outside capture fishing

2 – Agriculture

3 – Street Vending (except fish street vending)

4 – Household domestic help

5 – Construction labour

6 – Supply Chain/Transportation work

7 – MGNREGA

8 – No other source of income

9 – Others, Specify.....

Dwelling

B.13 Type of housing: 1 – Rented, 2 – Owned,
3 – Others, specify.....

B.14 Condition of house: 1- Pucca, 2- Semi-pucca, 3- Kutcha

Fishing Equipment

B.15 What all capture fishing equipment do you own
(specify)?.....

B.16 What kind of fishing equipment do you lease/take on rent
(specify)? .....

B.17 Social Security/Welfare Enrolment (Tick all applicable options)

0 – None,

1 – PDS/Ration,

2 – ICDS/Mid-Day meal scheme,

3 – Health Insurance,

4 – Old Age Pension Scheme

5 – MGNREGS Card,

6 – Urban Employment Guarantee Scheme,

7 – Farmers' Welfare Scheme,

8 – Children's education support,

9 – Workers' Welfare Scheme,

10 – Housing Scheme,

11 – LPG/Cooking Fuel Scheme,

12 – Widow Pension/Remarriage Scheme

13 – Women's Income Support Scheme

14 – Livelihood/Education/Income schemes for Dalits/Tribals

15 – Other scheme(s), specify/name .....

B.18 Total Monthly Household Income [Approximate average per month in past 2-3 years]:.....(₹)

Household Debt Profile

B.19 Amount of household debt: 0 – None; 1 – Less than Rs 10,000; 2 – Rs 10,000 to Rs 20,000; 3 – Rs 20,000 to Rs 35,000; 4 – Rs 35,000 to 50,000; 5 – Rs 50,000 to Rs 1 lakh; 6 – Above Rs 1 lakh

B.20 Major reasons for debt: (on Day 1 of field work in whole study, in Kanakpur village near Contai in WB's Purba Medinipur's district, we directly asked the respondents to specify reason(s) for taking debt instead of giving options but if needed, we can provide these options) 1- Consumption Needs; 2- Healthcare; 3- Inputs for Fishing Operations; 4- Education; 5- Marriage; 6- Funeral; 7- House Construction/Repair; 8 - Repay Existing Loans/Interest; 9 – Others, specify .....
.....

B.21 Major sources of debt (on Day 1 of field work in whole study, in Kanakpur village near Contai in WB's Purba Medinipur's district, we directly asked the respondents to specify source(s) from which loans were taken instead of giving options but if needed, we can provide these options): 1- Friends/relatives/neighbours,

2- FFPO/coop/SHG, 4 – Other traditional money lenders; 6- Non-banking financial institutions; ,7 – Banks, 9 – Others, specify .....

B.22 Do you or anyone in your family hold membership of any FFPO/fishing coop/ SHG/fishing union etc.? Yes/No. If yes, specify .....

Block C: Some Miscellaneous Questions

C.1 Are females in your household involved in your family's capture fishing, home based own processing or direct selling activities? Yes/No.

C.1.1 If 'Yes', in what type of activities (on Day 1 of field work in whole study, in Kanakpur village near Contai in WB's Purba Medinipur's district, we directly asked the respondents to specify activities instead of giving options but if needed, we can provide these options):? .....

C.1.2 If 'No', then why (specify)?.....

[Questions below were in original survey draft submitted by Anchal but were removed from the set of questions used above in survey of two households conducted on first ever field research day of the whole study, in Kanakpur Village of Purba Medinipur's Pataspur block]

Respondent's Access Scenario to Waterbodies, Supply Chain Facilities and Markets (applies to respondent and household's experiences of last 2-3 years)

Rank the only or top two waterbodies that you access for capture fishing (multiple options can be selected)? 1 – River/tributary, 2 – Reservoir (applicable to MP, Telangana and maybe to Assam and/or Bihar), 3 – Lake, 4 – Floodplain/wetland (far away from estuarine areas/sea/ocean – applies to Assam, Bihar, Kashmir and MP), 5 – Ponds/tanks, 6 – Estuary/estuarine wetland (close to and connected to sea/ ocean – applies to WB and Telangana)

C.2 What type of access do you have to the one or two major waterbodies that you access for capture (more than one could be selected)? 1 – Free open access (common for rivers, estuaries, brackishwater lagoons and lakes), 2 – Access as part of membership of FFPO/coop/SHG, 3 – Access as part of whole/part of waterbody leased to local community, 4 – Access either through doing paid work for or subleasing from private leaseholders/owners of whole or part of waterbodies, 5 – Access as individual/household fishing license holder

C.3 What type of post-harvest storage/sorting/drying/cleaning facilities do you have regular access to for your catch? 1 – Professional paid facility, 2 – Own house operation, 5 – Community/Coop/SHG common facility

C.4 If you sell whole or part of your catch for income, what type of transportation mode do you regularly access? 1 – Light commercial Vehicle (small sized truck), 2 – Car or other medium car-sized four-wheeler, 3 – Three-wheeler, 9 – Other, specify .....

C.5 Do you own any of the above transportation mode? Yes/No

C.5.1 If 'Yes' to C.5, then what type (specify)? .....

C.6 If you are able to sell whole or part of your catch for income, what kind of market do you access to sell your catch?

1 – Sell on your own in local village/community market, 2 – Sell to fixed traders contracted by coop/SHG/FFPO, 3 – Sell to any traders who give your best price, 4 – Sell directly to big fisheries/fish product businesses, 5 – Others, specify .....

Block D: Respondent and Household's Change in Waterbody Access Owing to Economic Activity or Govt Rule/Policy Change (applies to respondent and household's experiences of last 8-10 years)

D.1 Has your access to or overall quality of fish in the waterbody in your major one or two fishing waterbodies been affected by any kind of construction activity on or very close to the bodies? Yes/No

D.2 What type of economic activity has legally or physically reduced your waterbody access and/or quality of fish to your two majorly accessed waterbodies? 1 – Building constructed over non-flood water submerged portion of waterbody or in buffer zone (in case of lake, pond or tank) or floodplain (in case of river), 2 – Road/Bridge/Flyover constructed over non-flood water submerged portion of water body or in buffer zone or flood plain, 3 – Agriculture/irrigation project related water runoff, 4 – Dam/barrage constructed over river reducing fish migration both downstream and upstream, 5 – Sand mining, 6 – Introduction of invasive species in the waterbody either through government policy/rule or illegally, 7 – Others, specify _____

D.3 What type of government policy has impacted your access to the one or two major waterbodies that you and your household members have accessed over the years? 1 – Changes in rules governing waterbody/surrounding land access for future planned economic activity like construction, agriculture project, sand mining etc., 2 – Changes in rules governing access to whole or part of a waterbody for environmental conservation purpose, 3 – Changes in rules governing access by transferring whole or part of waterbody to multiple bodies/private leaseholders

Block E: Respondent and Household's Change in Waterbody Access Owing to Environmental/Climate Change Hazards (applies to respondent and household's experiences of last 8-10 years)

E.1 Has your access to waterbody or overall quality of fish in the waterbody in the one or two fishing waterbodies your family accesses been affected by any adverse environment/climate change event(s)? 1 – Increased intensity/frequency of flooding in the river, reservoir lake, tank, estuary, wetland, etc. disrupting fish movements and habitats (includes sea surges in estuaries and estuarine wetlands), 2 – Increased intensity and/or frequency of droughts reducing the quantity of water in the waterbody over the years, 3 – Toxic effluents from industries and other settlements draining into and collecting in waterbody reducing the diversity, quantity and quality of fish, 4 – Higher mean temperature of the waterbody over the years due to more heatwaves and hotter summers killing a significant percentage of different fish species, 5 – Others, specify .....

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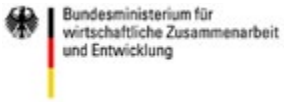

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