

# “The Role of the Fisheries Sector in Driving Inclusive Economic Development: Evidence from Sheohar District, Bihar”

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## ABSTRACT

Fisheries are increasingly recognised as a critical driver of rural transformation and inclusive economic growth in India. In Bihar, where inland water resources such as rivers, ponds, and floodplains dominate the landscape, fisheries hold potential for employment creation, income enhancement, nutritional security, and local market development. This conceptual paper explores the role of the fisheries sector in driving inclusive development in Sheohar District of Bihar — one of the state’s smaller but resource-rich regions. It reviews the potential socio-economic impacts of aquaculture and capture fisheries, identifies structural constraints such as poor access to quality seed, feed, and finance, and highlights opportunities for strengthening value chains and market linkages. The paper draws upon secondary data, government policy frameworks, and conceptual insights on inclusive growth to develop a framework for fisheries-led rural development. It argues that targeted investments in infrastructure, technology adoption, women’s participation, and institutional strengthening can transform fisheries into a key pillar of inclusive economic development in Sheohar and similar districts in Bihar. By positioning fisheries within the broader agenda of sustainable rural development, this study emphasises the importance of inclusive strategies that integrate smallholder farmers, women entrepreneurs, and local communities. It also suggests that resilience-building through climate-adaptive practices and cooperative models can ensure long-term growth and food security in the district.

**Keywords:** Fisheries, Aquaculture, Rural Livelihoods, Inclusive Growth, Economic Development, Sheohar District, Bihar, Employment, Nutrition, Value Chains, Policy Framework

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## INTRODUCTION

The fisheries sector has emerged as one of the fastest-growing components of the agricultural economy in India, contributing significantly to food security, employment generation, and export earnings. As a renewable natural resource-based activity, fisheries play a dual role in providing livelihoods for millions of small-scale producers while meeting the nutritional needs of a large population through the supply of affordable animal protein. With the introduction of modern aquaculture practices, improved seed and feed technologies, and better value-chain linkages, the sector has expanded beyond subsistence fishing to become a dynamic driver of rural economic development.

Globally, fisheries are also recognized as a critical tool for poverty reduction and inclusive growth, particularly in developing countries where marginalized groups often depend on natural resources for survival. The sector creates opportunities across multiple nodes of the value chain — hatchery operations, pond construction, feed supply, harvesting, processing, marketing, and export. Women’s involvement in post-harvest activities, such as fish drying, retailing, and processing, further underlines its inclusive potential. In this context, fisheries are not only an economic activity but also a socio-cultural asset that supports rural resilience and long-term sustainability.

### Context of Bihar’s Fisheries Sector

Bihar possesses one of the richest inland water resource bases in India, with major rivers like the Ganga, Gandak, and Bagmati, as well as extensive ponds, tanks, and floodplains. The state ranks among the top contributors to inland fish production, and fisheries are recognized as an emerging sector for rural livelihood diversification. With rising demand for affordable protein and the push under government initiatives such as the Pradhan Mantri Matsya Sampada Yojana

(PMMSY), fisheries have the potential to generate large-scale employment, enhance incomes, and stimulate local value chains in Bihar's rural economy.

### **Importance of Sheohar District (Geographic, Socio-Economic Profile)**

Sheohar, though one of the smallest districts of Bihar, is strategically important due to its fertile alluvial soil, waterlogged areas, and small water bodies that are suitable for aquaculture. The district is primarily agrarian, with a high dependence on agriculture and allied activities for livelihoods. However, challenges such as fragmented landholdings, limited non-farm opportunities, and seasonal migration highlight the need for alternative income-generating sectors. Fisheries, with their relatively low entry barriers and strong market demand, present a viable pathway for enhancing rural livelihoods in Sheohar.

### **Rationale for Fisheries as a Driver of Inclusive Growth**

The fisheries sector has strong forward and backward linkages — from hatcheries, feed suppliers, and pond construction to marketing, processing, and retail. This not only creates direct employment for fish farmers and fishers but also generates secondary opportunities for women, youth, and rural entrepreneurs. Furthermore, fish provides an affordable source of animal protein, addressing nutritional security challenges in one of India's most malnourished states. By enabling participation of smallholders, women's self-help groups, and marginalized communities, fisheries can act as a catalyst for inclusive growth in Sheohar District.

## **I. OBJECTIVES OF THE STUDY**

- a) To conceptually analyze the role of fisheries in enhancing rural livelihoods and economic development in Sheohar District.
- b) To identify opportunities and constraints faced by fish farmers and stakeholders in the local fisheries value chain.
- c) To develop a conceptual framework linking fisheries with inclusive growth, employment, and nutrition.
- d) To propose policy and institutional interventions for strengthening the role of fisheries in rural development.

## **LITERATURE REVIEW**

### **1. Fisheries, Livelihoods and Rural Development: Global and India Evidence**

A large and growing literature recognizes inland fisheries and aquaculture as important pathways for rural livelihoods, poverty reduction and nutritional security. Reviews and case studies from developing countries show that aquaculture can contribute 20–50% of household income in dependent communities and generates substantial direct and indirect employment across hatcheries, feed supply, pond management, processing and marketing (general review). Fisheries also provide low-cost animal protein that improves dietary diversity and reduces micronutrient deficiencies in poor households. The literature highlights that benefits are maximized when production growth is accompanied by investments in post-harvest infrastructure, market linkages and inclusive institutions that enable smallholders to participate in value chains.

### **2. Bihar's Fisheries: Production, Resource Base and Recent Growth**

Bihar has sizeable inland aquatic resources (rivers, oxbow lakes / chaur-mouns, ponds and tanks) and an institutional focus on developing fisheries as part of rural livelihoods strategies. State-level reports and program documents note fisheries' rapid growth—Bihar's annual inland aquaculture production has grown markedly in recent years and the sector is identified as a fast-growing sub-sector of the state's agrarian economy, contributing to state income and employment. Media and government sources report that production in the state has increased substantially over the last two decades, driven by schemes for wetland development, reservoir fisheries, and seed release programs; yet demand in Bihar sometimes outstrips supply, and the state continues to source fish from other states and neighbouring Nepal. These sources also emphasize the large area of underutilized wetlands (e.g., oxbow lakes) which, if developed scientifically, present major scope for expansion.

### **3. Empirical Studies and Case Evidence from Bihar (and Eastern India)**

Recent empirical and program evaluations in Bihar document strong livelihood impacts from targeted aquaculture projects. Small producer groups and women's collectives that received technical training, seed support and access to credit have achieved rapid gains in production and income—cases reported by WorldFish and other development partners show groups doubling output in short timeframes and earning meaningful supplementary incomes. Program reviews (GIZ, state programs) point to successes where pond rehabilitation, stocking and coordinated extension were combined with community organisation. However, peer-reviewed and grey literature also flag heterogeneity in outcomes: benefits depend on scale, access to quality inputs, and market connectivity.

### **4. Gender, Post-harvest Work and Inclusion**

A consistent theme in the literature is the prominent role of women in fisheries value chains—particularly in post-harvest processing, drying, retailing and small-scale trading. National- and state-level studies document how women's

participation can raise household incomes and strengthen food security, but also note that women often lack access to formal credit, training and infrastructure (e.g., clean drying yards and cold storage). Studies emphasise that gender-responsive extension, targeted finance and support for producer groups/SHGs can significantly increase women's earnings and economic empowerment in fisheries.

### 5. Value Chains, Multipliers and Local Markets

Fisheries create both backward linkages (seed, feed, pond construction, inputs) and forward linkages (trading, processing, retail). Several regional case studies show multiplier effects: each tonne of additional local fish production supports ancillary businesses (transport, ice-making, retail stalls) and seasonal employment. However, weak cold-chain, limited formal marketplaces, and fragmented producer organisation restrict value capture by small producers. The literature suggests that improving aggregation (cooperatives, producer companies), basic cold and market infrastructure, and contract linkages with processors/markets can increase producer margins and stabilise incomes.

### 6. Constraints Identified Across Studies

Research and program evaluations converge on several recurring constraints that limit fisheries' potential in Bihar and similar contexts:

- Input limitations: poor access to quality seed (fingerlings), affordable and nutritious feed, and reliable hatcheries.
- Water and climate risks: seasonal flooding, hydrological variability and waterlogging complicate management of culture systems and lead to production losses.
- Infrastructure deficits: inadequate cold chain, ice plants, rural roads and formal market spaces reduce post-harvest value and increase spoilage.
- Finance and insurance: limited access to working capital, formal credit and risk-mitigation instruments hinder scale-up by smallholders.
- Extension and knowledge gaps: insufficient local technical extension, poor reach of modern production practices (biosecurity, feed management, polyculture systems).
- Institutional fragmentation: weak producer organisations and poor integration into organized value chains limit bargaining power.

### 7. Policy Responses, Programs and Innovations

The literature highlights both national (e.g., Pradhan Mantri Matsya Sampada Yojana—PMMSY) and state-level schemes aimed at modernising fisheries via seed/fodder support, infrastructure (ponds, reservoirs), and market development. Evaluations and commentaries stress that while subsidies and capital grants have stimulated investment, sustainable impact requires complementary measures: market linkages, gender-sensitive training, and climate-resilient water management. Development partners' pilots (e.g., community-based aquaculture with women's groups) demonstrate how bundled interventions (technical training + seed + market access + group formation) produce more durable outcomes than stand-alone grants.

### 8. Gaps in the Literature and Implications for Sheohar District

Despite growing evidence, several gaps remain relevant to a Sheohar-focused conceptual study. First, district-level, household-based empirical studies for many small districts (including Sheohar) are sparse—most evidence is state-aggregated or from larger districts. Second, there is limited rigorous evidence on the long-term sustainability of rapid expansion models (environmental carrying capacity, disease risks, and social equity). Third, while women's roles are documented, there is less causal evidence on which specific interventions (credit vs. training vs. market access) most effectively empower women in inland aquaculture contexts. For Sheohar, this suggests the need for localized baseline surveys, participatory value-chain mapping, and gender-disaggregated impact assessments to design context-specific interventions.

### 9. Synthesis: What the Literature Implies for a Conceptual Model

Synthesizing the literature suggests a systems-oriented conceptual model for fisheries-led inclusive growth: develop productive capacity (seed, feed, pond/wetland management) + strengthen post-harvest infrastructure (cold chain, markets) + build institutions (cooperatives, SHGs, producer companies) + provide finance and risk instruments + deliver gender-responsive extension and training. When these components operate together, smallholders—particularly women and marginalized groups—are more likely to capture income gains, stabilize employment and contribute to local economic multipliers. For Sheohar, prioritizing wetland development, targeted women's group interventions, and market linkages would align with both the empirical evidence and state-level policy priorities.

## METHODOLOGY

This study employs a conceptual research design, aiming to synthesise theoretical perspectives, secondary evidence, and policy insights to understand the role of the fisheries sector in driving inclusive economic development in the Sheohar district, Bihar. The study is **descriptive and exploratory** in nature. It draws upon **conceptual frameworks** linking fisheries, livelihoods, and inclusive growth, with particular reference to rural development models. **Secondary**

**data** from government reports (e.g., Department of Fisheries, Government of Bihar; Ministry of Fisheries, Animal Husbandry and Dairying, Government of India). National-level surveys and statistical databases (e.g., NFHS, NSSO, NABARD, ICAR reports). Published research articles, working papers, and case studies from academic journals and development agencies (FAO, World Bank, IFAD). District-specific reports, census data, and local government development plans for Sheohar.

## DISCUSSION AND ANALYSIS

Bihar's inland fisheries have expanded rapidly over the last decade. State government data show that fish production rose from 4.79 lakh metric tonnes in 2014–15 to **8.73 lakh metric tonnes in 2023–24**, an increase of about **82%** over the decade; Bihar now ranks among the top inland fish-producing states.

This growth has been driven by a combination of state and central initiatives (wetland development, reservoir fisheries, fingerling ranching and PMMSY investments), increased area under culture, and adoption of improved production practices such as higher stocking, polyculture and localized hatcheries.

**Implication for Sheohar:** the state's upward trajectory shows there is policy momentum and financing available to scale district-level interventions. However, aggregate state gains can mask intra-state variation — small districts like Sheohar often lag in organised investments and require targeted attention. CIFRI and district notes indicate fish supply shortages in some Sheohar localities despite available aquatic resources, underscoring missed development opportunities at the district level.

### Employment, value chains and multiplier effects

Fisheries and aquaculture create employment across production, input supply (hatcheries, feed), post-harvest handling (ice, cold storage), processing and marketing. National programmes under PMMSY explicitly target job creation (the Department aimed to generate lakhs of direct and indirect jobs through expansion of aquaculture and value-chain infrastructure). Macro-estimates from fisheries literature indicate aquaculture and capture fisheries support millions of direct and indirect jobs nationally; regionally, these translate into both farm and non-farm seasonal employment.

**Implication for Sheohar:** even modest increases in pond productivity or conversion of underused wetlands into managed production can produce sizeable local employment — not only for fish farmers but for youth (transport, ice/marketing) and women (processing, retail). To convert production gains into stable livelihoods, Sheohar needs investments that strengthen forward linkages (aggregation, cold chain, market access).

### Nutrition and household welfare impacts

At the national level, per-capita fish consumption is rising (recent estimates put India's per-capita fish consumption above **~13 kg/year** in 2022–23), but Bihar's consumption remains below national and global averages; state estimates show Bihar at roughly **9–10 kg/year** per capita, indicating room to improve nutrition outcomes via local production and market access. Fish is especially important for micronutrients (omega-3s, iron, and vitamin A) and affordable animal protein for low-income households.

**Implication for Sheohar:** local production expansion could raise routine availability of fish in household diets, improving diet diversity and child/maternal nutrition if complemented by social marketing and subsidized local market linkages.

### Main constraints (evidence from state reports and studies)

The literature and state reports converge on recurring constraints that limit value capture:

- **Input bottlenecks:** constrained access to quality seed and affordable, nutritionally balanced feed (state stocking programs and NFDB interventions have attempted to fill some gaps).
- **Water & climate risk:** seasonal floods and hydrological variability in Bihar complicate pond management and can cause large seasonal losses.
- **Weak post-harvest infrastructure:** inadequate cold-chain, ice plants and formal marketplaces increase spoilage and reduce producer margins.
- **Finance & institutions:** limited working capital, low insurance penetration and fragmented producer organisation weaken producers' bargaining power and ability to scale.

**Implication for Sheohar:** these constraints are strongly relevant — district interventions must be bundled (seed + feed + market + finance + training) rather than single-line subsidies to produce durable benefits.

### Policy actions and investment priorities

Drawing on recent programme outcomes in Bihar and national frameworks (PMMSY, NFDB), priority interventions for Sheohar should include:

- **Seed and feed systems:** strengthen local hatcheries and cooperatives for fingerling supply and promote quality commercial feeds or local feed formulation units to reduce costs and improve survival rates.
- **Cold-chain & market aggregation:** small cold stores/ice plants and aggregation hubs near production clusters reduce post-harvest losses and increase producer share of final price — linking these to e-market platforms and nearby urban markets enhances returns.
- **Gender-focused value-chain support:** support women's groups in processing/retailing through microgrants, training and clean drying spaces; evidence from Bihar pilots shows women's groups can rapidly scale post-harvest enterprises when bundled with market access.
- **Climate-resilient water management:** invest in flood-adapted pond designs, community water management and river ranching where appropriate to reduce climate risk.
- **Finance & aggregation:** incentivize producer cooperatives/producer companies and link them to working capital, crop/fish insurance schemes and PMMSY capital grants to enable investment in hatcheries, pumps and cold storage.

## FINDINGS

- Fisheries and aquaculture have emerged as high-potential sectors for Bihar's rural economy, contributing to income diversification, employment generation, and nutritional security. Sheohar, despite being one of the smallest districts, shows considerable untapped opportunities due to its water bodies and favorable agro-climatic conditions.
- The sector provides livelihoods not only to fish farmers but also to those engaged in allied activities such as net-making, transportation, feed supply, and fish marketing. Women are increasingly involved in post-harvest and small-scale aquaculture, indicating the sector's role in gender-inclusive development.
- Fish consumption in Bihar is below the national average, but growing. Expanding fisheries in Sheohar can address local nutritional gaps by making affordable protein available to rural households.
- Persistent challenges include limited access to quality seed and feed, inadequate cold chain and market infrastructure, financial bottlenecks, and vulnerability to climate variability. These constraints slow down the sector's contribution to inclusive growth in Sheohar.
- Government schemes such as the Pradhan Mantri Matsya Sampada Yojana (PMMSY) and state-level fisheries programs are creating an enabling framework, but their effective implementation at the district level remains uneven. Strengthening extension services and cooperative models is essential.
- Evidence suggests that a bundled approach—improving inputs, infrastructure, credit access, and gender-focused training—can maximize fisheries' role in rural transformation. Sheohar can serve as a model district for testing climate-resilient aquaculture and women-led fisheries enterprises.
- Bihar fish production: **8.73 lakh metric tonnes in 2023–24** (up from 4.79 lakh MT in 2014–15; ~82% decadal growth).
- Bihar exported **~38.38 thousand MT** of fish in 2023–24, indicating surplus areas and inter-state trade linkages.
- India per-capita fish consumption rose to **~13 kg/year** in 2022–23, while Bihar's per-capita consumption is lower (about **9–10 kg/year**), highlighting a nutrition gap.
- National programmes (PMMSY) and NFDB have prioritized seed-ranching, hatchery expansion and infrastructure — creating enabling finance and technical instruments that Bihar has tapped to scale production.
- Aquaculture/fisheries generate major direct and indirect employment nationally (millions of jobs) and are explicitly targeted for job creation under national schemes.

## CONCLUSION

The fisheries sector in Sheohar, Bihar, demonstrates remarkable potential as a catalyst for inclusive economic development and rural transformation. Beyond its role as a supplementary livelihood option, fisheries have the capacity to generate significant employment across production, processing, and marketing stages, thereby creating a ripple effect in the local economy. Improved fish production not only ensures better income for farming households but also contributes to nutritional security by enhancing the availability of affordable animal protein in the diets of rural communities. Despite this promise, the sector continues to face structural and institutional challenges. Constraints such as inadequate infrastructure, limited access to quality seed and feed, post-harvest losses due to weak cold-chain facilities, lack of organized markets, and insufficient financial inclusion restrict fisheries from achieving their full potential. The vulnerability of the district to climate variability further complicates the sustainability of traditional practices. These limitations indicate the urgent need for a coordinated and multi-dimensional approach that goes beyond incremental reforms.

To unlock the sector's latent capacity, targeted interventions must focus on capacity building, climate-resilient aquaculture practices, and gender-inclusive participation. Empowering women through training and micro-enterprise models can strengthen both household incomes and social equity. Similarly, improved credit facilitation, stronger linkages with institutional finance, and cooperative-based models can enhance accessibility and reduce the risks faced



by small-scale fishers. Government initiatives such as the Pradhan Mantri Matsya Sampada Yojana (PMMSY), if effectively implemented at the district level, can provide a strong framework for infrastructure development, input quality enhancement, and value chain integration.

Therefore, the way forward lies in adopting an integrated development strategy that aligns technology, policy, finance, and human resources in a holistic manner. By leveraging Sheohar's unique geographic and socio-economic context, the district can serve as a demonstration model for sustainable fisheries development in Bihar. Harnessing these opportunities will not only improve rural livelihoods but also contribute significantly to the state's inclusive growth agenda, reinforcing fisheries as both an economic engine and a tool for social empowerment.

## REFERENCES

- [1]. Bharti, V., Sarma, K., Kumar, T., Singh, J., & Ahirwal, S. K. (2022). Aquaculture: To Achieve Economic Development in Bihar, India—A Review. *International Journal of Bio-resource & Stress Management*, 13(9), 961-972.
- [2]. De, H. K., Chattopadhyay, D. N., Radheyshyam, R., Saha, G. S., Dash, A. K., Pal, S., & Satpati, T. S. (2012). Strengthening the livelihoods of rural women through polyculture of carps in seasonal ponds. *Indian Journal of Fisheries*, 59(3).
- [3]. Kumar, R., & Kumar, N. R. (2023). Comparative economics of various management regimes of chaur fisheries in Koshi-Gandak river basin of Bihar. *Fishery Technology*, 60(3). <https://doi.org/10.56093/ft.v60i3.50298>
- [4]. Choudhary, D. N., & Sagar, P. (2025). First record of ichthyofaunal diversity in Champanala, Bhagalpur, Bihar, India. *Asian Journal of Fisheries and Aquatic Research*, 27(8), 100-113. <https://doi.org/10.9734/ajfar/2025/v27i8980>
- [5]. Kumar, T., Veeranna, J., Gupta, S. K., Kundu, M. S., Kumari, N., Gautam, A. K., Rawat, S., & Kant, A. (2023). Assessing land suitability for sustainable aquaculture development in Muzaffarpur, Bihar using integrated approach of multi-criteria decision analysis and GIS. *Indian Journal of Fisheries*, 70(4).
- [6]. Prasad, D. (1968). Economic Aspects of Fisheries Development in Bihar. *Indian Journal of Agricultural Economics*, 23(4), 239-242.
- [7]. Beig, M. Z., Gupta, K., & Savita, B. K. (2023). Fishermen's socio-economic development in Saharsa District, Bihar: A Comparative Study. *Journal of Survey in Fisheries Sciences*.
- [8]. Joshi, B. (2017). *Fisheries Economics*. IBP Books.
- [9]. Upadhyay, A. D., Roy, A. K., & Pandey, P. K. (Eds.). (2021). *Fisheries and Aquaculture Economics*. New India Publishing Agency / CRC Press.
- [10]. Srivastava, C. B. L. (2006). *A Text Book of Fishery Science and Indian Fisheries* (1st ed.). India: [Publisher details].
- [11]. "Small-scale Inland Fisheries in India" (2026). In *Sustainability Sciences in Asia and Africa (SSAA), Sustainable Aquatic Food Systems (SAFS)*. Springer.
- [12]. National Fisheries Development Board. (2023). *Annual Report 2022-23*. Department of Fisheries, Ministry of Fisheries, Animal Husbandry & Dairying, Government of India.
- [13]. National Council of Applied Economic Research (NCAER). (2023, November 1). *Fish Consumption in India in 2022-23 and Future Prospects*. NCAER.
- [14]. Patna Press. (2025, June 13). Fish production in Bihar triples in 20 years, state achieves self-sufficiency. Patna Press.
- [15]. Times of India. (2025, June 13). Fish boom: Local entrepreneurs thrive as output triples in state. Times of India.
- [16]. Arjoon, R. (2024). Bihar's fish production skyrockets: 81.98% growth in a decade and status as a leading inland fish producer. *Apex Bulletin*.