

The Brackish Revolution: Redefining Women's Roles in Coastal Aquaculture

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Abstract

Coastal aquaculture plays a vital role in India's blue economy by utilizing saline and brackish water resources for the culture of shrimp, fish, crabs, and other aquatic organisms. Despite possessing vast coastal and estuarine resources, only a small proportion of India's brackish water potential is currently utilized. Recent initiatives by the Indian Council of Agricultural Research–Central Institute of Brackish water Aquaculture (ICAR-CIBA) and government schemes have significantly enhanced women's participation in aquaculture production, entrepreneurship, and leadership. Women-led interventions in Andhra Pradesh, Tamil Nadu, Odisha, Maharashtra, and West Bengal have demonstrated improved income generation, sustainable resource utilization, and ecosystem conservation. Integrated farming systems such as shrimp–seaweed culture, mud crab farming, and integrated shrimp–rice farming have strengthened livelihood security and climate resilience. However, challenges including limited access to resources, inadequate representation in decision-making, and socio-cultural barriers continue to hinder women's full participation. Strengthening gender-inclusive policies, capacity building, and institutional support can accelerate sustainable coastal aquaculture development. The empowerment of women in brackish water aquaculture represents a transformative pathway toward inclusive growth, environmental sustainability, and resilient coastal communities in India.

Keywords: Coastal Aquaculture, Brackish Water Farming, Women Empowerment, Blue Economy, Sustainable Livelihoods, Climate Resilience

Introduction: A Silent Change along the Coasts of India

Coastal area is the area of land within a distance of two km from the high tide line of the seas, rivers, creeks and back water. Coastal aquaculture mainly includes culturing under controlled conditions in ponds, pens, enclosures in coastal areas, of shrimp, prawn fish or any type of other aquatic species in saline or brackish water. Brackish water aquaculture occupies a unique position, acting as a bridge between inland and marine aquaculture. It is most commonly classified under coastal aquaculture. According to Hand book of fisheries statistics, 2025 India's overall fish output expanded at an average annual rate of 6.47%, driven by inland fisheries, which grew 7.69% per year and marine at 3.05%. In India mariculture activities are confined only to coastal brackish aquaculture, mainly shrimp farming. There is about 1.2 million ha are suitable for land based saline aquaculture but only 15% is utilized. In India there are about 3.9 million ha area of estuaries, 0.58 million ha area of mangroves and has revised coastline of 11,098.81km presenting a major frontier of economic and export growth. World's second largest producer produce roughly 75% of its total output comes from inland aquaculture not from the ocean, even though mariculture has a potential to augment seafood production in the context of decline catch rate from the capture fisheries in India.

There is a need of transformation in this sector now focus should not just the economic output but it's who is leading it. In many coastal communities, men explained that women were told to focus on processing rather than production because of the hard work involved from launching into deep water, setting trap for fish pulling the boat back to shore. Now we all know the condition near shore waters facing like serious over fishing, highly explored and resource depletion. India lack the advanced refrigeration, navigation and heavy-duty gear required to harvest at deep sea depth. Addressing the challenge faced by the traditional fishing brackish revolution is necessary to improve balance between fish production and environmental sustainability. Brackish revolution also solves the problem because it is physically accessible and safer for women in coastal regions like Andhra Pradesh, Tamil Nadu and Odisha. The shift began when ICAR-CIBA (Central Institute of Brackish water Aquaculture), headquartered in Chennai, began actively training women in brackish water farming technologies.

Cultural norms across India have confined women to essential and undervalued work but a small initiative is creating economic pathways for women who have long been marginalized in the sector. Over 12.4 million women now participate in India's fisheries and

seafood sector, moving beyond traditional post-harvest roles into farm ownership, management, and entrepreneurship.

Indian Coastal Communities: Transitioning from Invisible Labor to Visible Leadership

In the year 2021 ICAR-Central Institute of Brackishwater Aquaculture (CIBA), with the STC/TSP and SCSP schemes initiated two interventions “Diversification of livelihoods among coastal Scheduled Tribal families and Scheduled Caste Families through brackishwater aquaculture technologies. which opened the door for many women and children. After that Women group of Tamil Nadu named ‘Velu Nachiyar Irular Tribal women group’ are now pioneering example in mud crab farming at tide fed ponds with the help of ICAR-CIBA initiative program. This program’s success led trained women self-help group to demonstrate crab stocking, handling and feeding to new beneficiaries. MSSRF (M.S. Swaminathan Research Foundation) partnered with CIBA in other districts of Tamil Nadu named Cuddalore and Myladuthurai districts are also implement aquaculture-based livelihood project for coastal women. These women are now earning more than their previous income from casual labor by farming mud crabs in mangrove pens. United Nations has declared 2026 as the ‘UN year for women farmers’ highlighted opportunities availability and appreciate importance of women folk in fisheries and aquaculture. Recently on the occasion of women’s day-2026, ICAR-CIBA reinforced awareness on women’s empowerment and felicitated about 30 fisher women self-help groups while recognizing the value, contributions of women in fisheries and aquaculture sector.

Another project for scientific mud crab farming named Enhancing Climate Resilience of India’s Coastal Communities (ECRICC) initiated under Rajiv Gandhi Centre for Aquaculture (RGCA), Chennai at odisha. Currently, over 304 women Climate Champions are supporting crab farming activities in Ganjam, Balasore, Kendrapara, and Puri. These women not only cultivate organically but also train others, marking a grassroots-led success model. With 70% of the input costs subsidised, the project ensures inclusive access to sustainable aquaculture.

State-Level Economic Transformation in Coastal Aquaculture

Andhra Pradesh: using ICAR-CIBA’s seaweed shrimp integration model (an IMTA strategy), a women’s cooperative in east Godavari now owns and runs 150 hectares of shrimp farms that were previously under male management, increasing productivity by 20%. Culturing

shrimp with seaweed, which enhances water quality, lowers the risk of disease, and generates additional seaweed revenue; thirty SHG women reported 3–8× higher yields.

Tamil Nadu: Thirteen women entrepreneurs from Thoothukudi, Nagapattinam, and Ramanathapuram now operate across multiple high-value nodes of coastal aquaculture—including shrimp and crab farming, hatchery management, and export-oriented value chains. Identified as role models in fieldwork conducted for this study, these women demonstrate trajectories from labour participation to firm ownership and sectorial leadership. Their experiences suggest that improved access to technology, credit, and market linkages can enable women to occupy higher-value positions within coastal aquaculture value chains.

Maharashtra: Eleven women's self-help groups in Ratnagiri and Sindhudurg farm green mud crab in mangrove pens. They earn between Rs. 30,000 and Rs. 83,000 each season while conserving 28.5 acres of mangroves. Dirbanarayan self-help group doubled its seasonal income from Rs. 42,000 to Rs. 83,000 in just one year. This model connects income generation with mangrove conservation. It shows how women's teamwork can match financial benefits with caring for ecosystems in coastal areas. This supports research on women's cooperatives improving sustainability in small-scale fisheries and mariculture.

West Bengal: Women in the Sundarbans developed an integrated shrimp-rice farming method, recognized by FAO, across 29.84 hectares with 42 farmers. They achieved double the profits of traditional aquaculture while keeping 5 to 30% mangrove cover and bringing back local rice varieties. This system merges aquaculture with agriculture and mangrove protection, providing a climate-resilient livelihood strategy in a delicate delta. The case highlights the vital role of women in maintaining agro biodiversity and supporting gender-responsive coastal aquaculture that addresses climate change.

This demonstrate that the blue economy of India can only be truly inclusive, equitable and sustainable if it acknowledges and rewards the invisible labor women do as essential components of an entrepreneurial leadership team. But barriers still persist in terms of decision-making authority, institutional bottlenecks in relation to co-governance, socio-cultural marginalization, poverty inhibiting access to capital and a range of interconnected system-wide challenges that can only be solved through transformative solutions framed within a holistic systems approach.

Gender Inclusive Policy and Farming Model in India For Fisheries and Aquaculture

The back bone of India's fisheries and aquaculture sector is Pradhan Mantri Matsya Sampada Yojana (PMMSY), a scheme that delivering 60% financial assistance to women beneficiaries. Through its Entrepreneur Model, women can also get access up to ₹1.50 crore subsidy on ₹5.00 crore project costs for integrated aquaculture ventures. From 2020–21 to 2024–25, ₹4,061.96 crore benefited 99,018 women nationally, including 11,642 in Tamil Nadu where seaweed farming operates on mission mode. Complementing this, PM-MKSSY offers women-led microenterprises a 35% Performance Grant (₹45 lakh ceiling). The National Fisheries Development Board has trained 5,000+ women in entrepreneurship, enabling transition from labor participation to value-chain ownership. India's brackish water coastal regions present special chances for locally tailored Integrated Multi-Trophic Aquaculture (IMTA), with women farmers spearheading creative integrated systems. Using poultry waste as fertilizer for phytoplankton growth, women in Andhra Pradesh's Krishna and Guntur districts combine shrimp farming with backyard poultry to increase household income by 35%. ICAR-CIBA provides gender-specific technical manuals for this sustainable technology, and women in Tamil Nadu's Pichavaram and Odisha's Bhitarkanika raise mud crabs in raised pens within mangrove ecosystems without destroying these vital habitats. In the Gulf of Mannar region of Tamil Nadu, pilot projects teach women how to grow seaweed for use in food, cosmetics, and bioplastics.

Challenges Faced by Women and Its Mitigation

Gender-Blind Statistics, Limited access to resources, limited participation of coastal women in decision-making, co-governance, and leadership Intensification Displaces Women due to low level of literacy, Double Burden and institutional bottle necks (for example limited participation coastal women in decision-making, co-governance, and leadership) are the major common issues faced by women. The Brackish Revolution's next phase in India requires intentional action on multiple fronts. Focused policy measures, consistent gathering of data broken down by sex, embedding gender equality and decent work criteria into certification processes, bolstering cooperatives led by women, aiding female entrepreneurship in the fisheries sector, and enhancing scholarship and vocational training initiatives will enhance women's involvement, leadership roles, and economic empowerment, thereby fostering a more sustainable and equitable aquaculture industry in India.

Conclusion

The Promise of Brackishwater is not just a success story; it's about creating new livelihoods and pathways to better nutrition, by turning coastal and brackish water resources into engines of livelihood and women as farmers, entrepreneurs and leaders. While hurdles remain, including the lack of adequate gender-disaggregated data and poor institutional recognition, the momentum is undeniable. If supported through the initiatives of ICAR-CIBA, MPEDA, and Department of Fisheries these women are set to lead the next wave of sustainable aquaculture in India, where something other than pure production is recognised as a marker for success—the empowerment will be easier to scale up way ahead if we can define its nexus with true environmental sustainability.

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