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Fish on Every Plate: Strengthening India's Blue Revolution and Nutrition Security

*Usharani A., Prasanna Laxmi U., Neha Padole, Vajinath Aitwar, Chamundeshwari B., Sirisha H. and Kranthi Kumar D.

College of Fishery Science, Narasapuram, Andhra Pradesh, India

*Corresponding Author's email: usharaniajmeera@gmail.com

Food and nutrition security remains a critical challenge in India despite substantial progress in agricultural production. In this context, the fisheries sector has emerged as a vital contributor to nutritional well-being, livelihood generation, and economic development. This article explores the role of India's Blue Revolution in transforming fisheries and aquaculture into one of the fastest-growing sectors of agriculture. It highlights the nutritional significance of fish as a rich source of high-quality protein, omega-3 fatty acids, vitamins, and essential micronutrients that can help address malnutrition and hidden hunger. The article further discusses the vision of "Fish on Every Plate" as a strategy to enhance access to affordable and nutritious aquatic foods through improved infrastructure, awareness programmes, and sustainable fisheries development. Emerging innovations such as Biofloc Technology, Recirculating Aquaculture Systems (RAS), cage culture, digital fisheries platforms, and climate-resilient fisheries villages are also examined for their role in increasing productivity and sustainability. This is to concludes that integrating fisheries development with nutrition-focused policies can transform the achievements of the Blue Revolution into a comprehensive Blue Nutrition Revolution, contributing to healthier populations, resilient livelihoods, and sustainable development.

Keywords: Blue Revolution, Nutrition Security, Sustainable Aquaculture, Fisheries Development.

Introduction

Food and nutrition security remains one of the foremost challenges of the twenty-first century, particularly in developing countries where rapid population growth, changing dietary patterns, and climate related pressures continue to strain food systems. In India, despite remarkable achievements in agricultural production, ensuring access to affordable, nutritious, and sustainable food for all remains a national priority. Addressing the dual burden of undernutrition and micronutrient deficiencies requires the promotion of nutrient-rich foods that can simultaneously support public health and sustainable livelihoods. In this context, fish has gained increasing recognition as a valuable component of food and nutrition security. Rich in high-quality protein, essential amino acids, omega-3 fatty acids, vitamins, and minerals, fish provides a unique combination of nutritional benefits that contribute to healthy growth, cognitive development, and overall well-being. The Food and Agriculture Organization (FAO) has identified aquatic foods as critical contributors to healthy diets and sustainable food systems, with more than three billion people worldwide relying on fish as an important source of animal protein and essential nutrients (Suresh *et al.*, 2025).

India's fisheries sector has emerged as a dynamic and rapidly growing component of the national economy, reflecting the success of the country's Blue Revolution initiatives. Over the past decade, fish production has more than doubled and this sector supports nearly three crore livelihoods and serves as an important source of income, employment, and export

earnings. As the country strives to achieve the Sustainable Development Goals and strengthen national nutrition outcomes, the vision of "Fish on Every Plate" offers a compelling pathway towards integrating fisheries development with nutrition security. By enhancing the availability, accessibility, and consumption of fish, India can build upon the achievements of the Blue Revolution to foster a healthier population, strengthen rural livelihoods, and advance towards a more resilient and food-secure future.

India's Blue Revolution

Over the past decade, India's fisheries sector has undergone a remarkable transformation, evolving from a largely traditional livelihood activity into one of the fastest-growing sectors of Indian agriculture. This transformation, popularly known as the Blue Revolution, reflects a strategic shift towards harnessing the country's vast aquatic resources for sustainable development. With over 11,000 km of coastline, an extensive network of rivers, reservoirs, ponds, and wetlands, India possesses immense fisheries potential. Recognizing this opportunity, policymakers have increasingly focused on enhancing productivity, modernizing infrastructure, promoting scientific aquaculture, and improving market access to unlock the sector's full potential.

A major reason for this transformation came with the launch of the Pradhan Mantri Matsya Sampada Yojana (PMMSY) in 2020. Designed as a comprehensive fisheries development programme, PMMSY aims to strengthen the entire fisheries value chain from seed production and aquaculture to processing, marketing, and exports. The results have been impressive. India's fish production has increased from 95.79 lakh tonnes in 2013–14 to nearly 197.75 lakh tonnes in 2024–25, making the country the world's second-largest fish producer (FAO., 2024). The sector now supports the livelihoods of nearly three crore people and contributes significantly to agricultural growth, rural employment, and foreign exchange earnings through seafood exports. More importantly, the Blue Revolution has demonstrated how targeted investments, technological innovation, and supportive policies can transform fisheries into a powerful driver of economic development and rural prosperity. As India advances towards a sustainable Blue Economy, the success of the Blue Revolution serves as a model for balancing productivity, livelihood enhancement, and resource conservation.

Fish, More Than Just Protein

Despite significant progress in agricultural production and food availability, malnutrition remains a major public health concern in India. Millions of people continue to suffer from deficiencies of essential vitamins and minerals, a condition often referred to as "hidden hunger." Such deficiencies can impair physical growth, cognitive development, immunity, and overall productivity, particularly among children and women. Addressing these nutritional challenges requires not only increasing the quantity of food available but also improving its quality and nutrient content. In this regard, fish occupies a unique position among animal-source foods due to its exceptional nutritional profile and affordability. Increasingly, nutrition experts and international organizations are recognizing fish as an important component of healthy diets and sustainable food systems.

Fish provides a rich array of nutrients essential for human health. In addition to supplying high-quality, easily digestible protein, fish is one of the best dietary sources of long-chain omega-3 fatty acids (EPA and DHA), which play critical roles in brain development, cardiovascular health, and immune function. It is also an excellent source of vitamin D, vitamin B12, iodine,

NUTRITIONAL POWERHOUSE
Fish provides a wide range of essential nutrients

- 
HIGH-QUALITY PROTEIN
Builds and repairs body tissues, supports growth
- 
OMEGA-3 FATTY ACIDS
Good for heart, brain function and reducing inflammation
- 
VITAMIN D
Helps in calcium absorption and strengthens bones
- 
VITAMIN B12
Supports red blood cell formation and nerve function
- 
CALCIUM
Essential for strong bones and teeth (especially in small fish eaten whole)
- 
IRON, ZINC & IODINE
Important for immunity, cognitive development, and thyroid function

selenium, iron, zinc, and calcium, many of which are deficient in the diets of vulnerable populations. Small indigenous fish species, often consumed whole, are particularly valuable because they provide highly bioavailable calcium and micronutrients. Regular consumption of fish has been associated with improved growth and cognitive performance in children, better maternal health outcomes, and reduced risk of several non-communicable diseases. As India seeks to strengthen food and nutrition security, fisheries and aquaculture offer an opportunity to address both hunger and malnutrition simultaneously. By making nutritious fish more accessible and affordable, the country can move closer to achieving healthier diets, improved public health, and sustainable development (Thilsted *et al.*, 2016).

Fish on Every Plate



While India has made remarkable progress in increasing fish production, the true success of the Blue Revolution will be measured by its ability to improve nutritional outcomes at the household level. Despite being one of the world's largest fish-producing nations, fish consumption remains uneven across regions due to differences in availability, affordability, cultural preferences, and market access. Bridging this gap requires a shift from a production-centric approach to a nutrition centric approach that ensures fish reaches the plates of those who need it most. The vision of "Fish on Every Plate" embodies this transition by positioning fish not only as an economic commodity but also as an essential component of a healthy and balanced diet.

Achieving this vision requires coordinated efforts across multiple sectors. Nutrition awareness campaigns can play a crucial role in educating consumers about the health benefits of fish and encouraging its inclusion in regular diets. Where culturally acceptable, fish and fish-based products can be integrated into school feeding programmes, community nutrition initiatives, and maternal health interventions to improve dietary diversity and nutrient intake. Promoting affordable small indigenous fish species, which are often rich in micronutrients and accessible to low-income households, can further strengthen nutrition security. Simultaneously, investments in cold-chain infrastructure, hygienic fish markets, and efficient transportation systems are essential to reduce post-harvest losses and improve the availability of fresh fish in both urban and rural areas. Through the Pradhan Mantri Matsya Sampada Yojana (PMMSY), the Government of India has already established hundreds of cold storage facilities, fish transport units, and modern fish markets, creating a stronger supply chain for aquatic foods.

Innovations Driving the Future

As India's fisheries sector moves towards a more sustainable and technology-driven future, innovation is emerging as a key catalyst for growth. Traditional fish farming practices are

increasingly being complemented by advanced technologies that improve productivity, optimize resource utilization, and reduce environmental impacts. Among these innovations, Biofloc Technology (BFT) has gained significant attention for its ability to recycle nutrients within the culture system, thereby reducing water exchange requirements and enhancing feed efficiency. Similarly, Recirculating Aquaculture Systems (RAS) enable intensive fish production in controlled environments with minimal water consumption, making them particularly suitable for regions facing water scarcity and land constraints.

Another promising innovation is cage culture, which utilizes reservoirs, lakes, and coastal waters for fish production without requiring additional land resources. This approach offers significant opportunities for increasing fish output while maximizing the use of existing water bodies. In parallel, the rapid growth of digital technologies has led to the development of digital fisheries platforms that provide fish farmers with real-time information on weather forecasts, disease management, market prices, and best aquaculture practices. Advanced traceability systems are further enhancing transparency and food safety by enabling fish products to be tracked throughout the supply chain, from production to consumption. Moreover, the concept of climate-resilient fisheries villages is gaining prominence as a strategy to help fishing communities adapt to climate change through sustainable resource management, resilient infrastructure, and diversified livelihood opportunities. Collectively, these innovations are reshaping the fisheries sector by increasing productivity, improving profitability, strengthening resilience, and ensuring environmental sustainability, thereby laying the foundation for the next phase of India's Blue Revolution.

Conclusion

India's fisheries sector stands as a remarkable example of how sustainable resource utilization can contribute simultaneously to food security, nutrition, livelihoods, and economic growth. The success of the Blue Revolution has transformed India into one of the world's leading fish-producing nations, while innovations in aquaculture and fisheries management continue to strengthen the sector's resilience and sustainability. However, the true measure of success lies not only in increasing production but also in ensuring that nutritious fish reaches every household, particularly vulnerable populations that can benefit most from its rich nutritional value. By promoting sustainable aquaculture, strengthening supply chains, enhancing nutrition awareness, and improving access to affordable fish, India can transform the achievements of the Blue Revolution into a comprehensive Blue Nutrition Revolution. Fish is not merely a commodity; it is a source of nutrition, livelihood, and national prosperity. As India advances toward a healthier and more food-secure future, the vision of "Fish on Every Plate" has the potential to nourish millions of lives while fostering inclusive growth and sustainable development for generations to come.

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