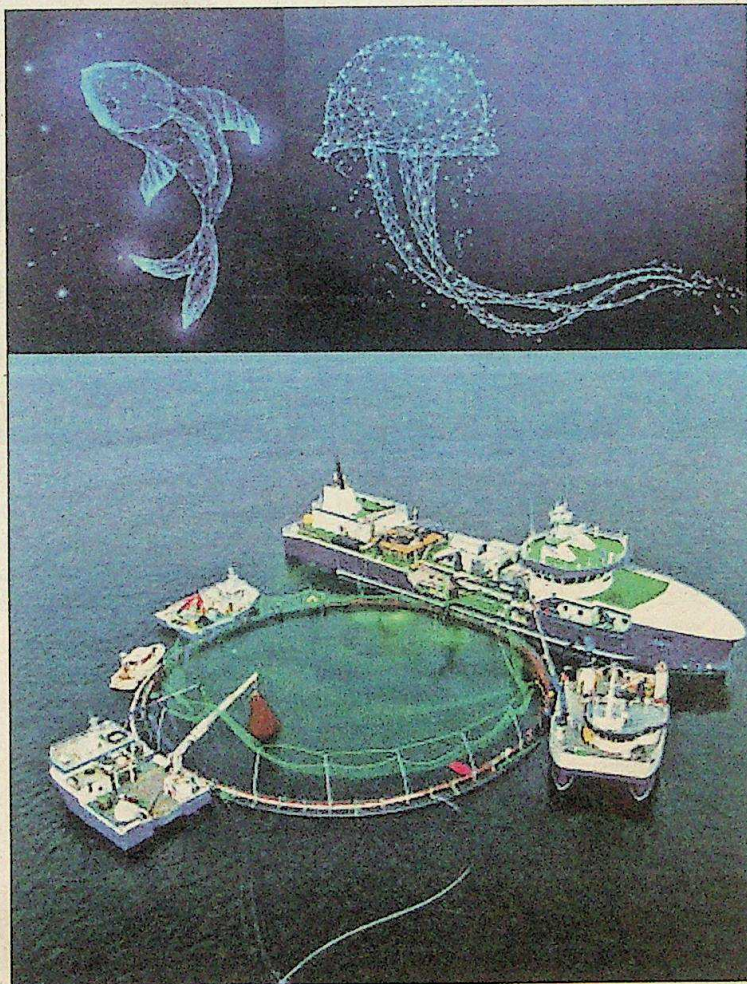


Technological Transformations in Fisheries: A Gateway to New Careers

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The fisheries sector in India stands as a significant component of the economy, not only driving growth but also serving as a lifeline for a substantial segment of the population. Recognised as a powerful generator of income and employment, the evolution of Indian fisheries encompasses environmental, technological, economic, and social factors, reflecting a dynamic process shaped over centuries.

The sector serves as a robust source of livelihood, employment, and entrepreneurship, impacting more than 2.8 crore fishermen and fish farmers at the primary level, with additional employment opportunities along the value chain. India, the world's third-largest fish-producing country, commands an 8% share in global fish production. Moreover, on a global scale, India secures the second position in aquaculture production, solidifying its standing as a leading shrimp producer and exporter.



In recent years, India's fisheries sector has witnessed a significant infusion of investments. The commitment to holistic development of this sector is evident through initiatives such as the Blue Revolution Scheme, Fisheries and Aquaculture Infrastructure Development Fund (FIDF), Pradhan Mantri Matsya Sampada Yojana, and the Rs 6,000 crore Sub-scheme under PMMSY, announced in the Union Budget 2023-24. The flagship scheme, Pradhan Mantri Matsya Sampada Yojana (PMMSY), implemented since 2020-21, represents the highest-ever investment in the country's fisheries and aquaculture sector.

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This strategic investment is yielding impressive outcomes, with projects worth Rs 14,656 crore approved under PMMSY in the last three years alone. The sector's resilience and transformative growth are further underscored by the record national fish production, which has experienced a remarkable 81% increase since 2013-14, touching an all-time high of 162.48 lakh tones at the end of 2021-22. With provisional figures anticipating the production to surpass 174 lakh tones in 2022-23, the Indian fisheries sector not only honours its rich historical legacy but also charts a course of innovation and prosperity in the contemporary era.

In its early stages, fishing was primarily a subsistence activity, with coastal and inland communities relying on rudimentary tools such as spears, nets, and traps. Techniques for fishing were passed down through generations, marking the cultural and historical significance of the sector. In the 21st century, the fisheries industry is undergoing a profound transformation driven by technological advancements. These innovations not only enhance efficiency and sustainability but also open new vistas for individuals seeking meaningful careers in fisheries and allied sectors.

Global Fisheries Conference India 2023

The Global Fisheries Conference India 2023 concluded in Gujarat on 22nd November with a resounding call for technological innovation and collaboration to invigorate India's fisheries sector. With over 14,000 participants, the conference featured technical, industry, and government sessions, along with a diverse exhibition showcasing innovations from start-ups, artificial reefs, to cold chain management.

Industry Connect sessions highlighted critical challenges and opportunities, emphasising innovation, technology adoption, gender sensitivity, and collaboration for sustainable growth. Notably, the session on 'Start-ups in Fisheries and Aquaculture' underscored the importance of user-friendly solutions. A pivotal session on the 'Importance of Cold Chain' stressed upgrading infrastructure to minimise post-harvest losses, enhance product quality, and ensure a steady supply of safe seafood globally. The conference marked a significant milestone in fostering progress and sustainability in India's fisheries landscape.

Latest Technology and Trends

Aquaculture Automation: Automation technologies are revolutionising aquaculture by improving precision and reducing manual labour. Smart aquaculture systems leverage sensors, data analytics, and machine learning to monitor and control parameters such as water quality, feeding schedules, and environmental conditions.

Remote Sensing and Satellite Technology: Remote sensing and satellite technologies provide real-time data on ocean conditions, fish migration patterns, and environmental changes. This information is crucial for fisheries management, helping to make informed decisions on fishing quotas and conservation efforts.

Fisheries Robotics: Autonomous Underwater Vehicles (AUVs) and remotely operated vehicles (ROVs) are increasingly used for tasks such as fish population surveys, habitat mapping, and underwater inspections. These technologies enable safer and more efficient data collection in challenging marine environments.

Blockchain for Traceability: Blockchain technology is being employed to establish transparent and traceable supply chains in the fisheries industry. This ensures that consumers can verify the origin of their seafood, combating illegal fishing and promoting sustainability.

Genomic Tools for Aquatic Species: Advances in genomics are aiding in the selective breeding of fish for desired traits such as growth rate, disease resistance, and nutritional content. This contributes to the development of more resilient and productive fish populations.

The fisheries sector significantly contributes to the global economy by generating employment and income for millions of people. Fishing activities, aquaculture, and related industries create jobs along the entire value chain, from fishers and aquaculturists to processors, distributors, and retailers. This sector's economic impact is particularly vital for coastal communities, where it serves as a primary source of livelihood.

Sought-after Careers in Fisheries

For young individuals interested in exploring for rewarding careers in this sector, is a list of some key opportunities:

Aquaculture Technology: With the increasing demand for seafood, aquaculture has become a vital component of the fisheries sector. Job opportunities in aquaculture technology involve the use of digital tools for monitoring water quality, automated feeding systems, and data analytics for optimising production. Careers in designing, implementing, and managing such technology-driven aquaculture systems are in high demand.

Fisheries Management and Conservation: Digital tools and technologies play a crucial role in fisheries management and conservation efforts. Young professionals can engage in roles that involve using satellite imagery, GIS (Geographic Information System), and data analytics to monitor fish stocks, track migration patterns, and implement sustainable fishing practices. This could include working with government agencies, NGOs, or private

companies focused on fisheries sustainability.

Fish Processing and Value Addition: The digital age has also impacted fish processing and value addition. Youth can explore roles in the development and implementation of automated processing technologies, quality control systems, and traceability solutions. These advancements not only enhance efficiency but also contribute to maintaining high-quality standards in the processed fish products.

E-commerce and Marketing: The rise of e-commerce has opened up new avenues for marketing and selling fish products. Young professionals can explore careers in digital marketing, e-commerce platforms, and online marketplaces dedicated to seafood products. This could involve creating engaging content, managing online stores, and leveraging social media to promote fishery products.

Data Analytics and Fisheries Research: Fisheries research has also embraced the digital era with the use of advanced data analytics and modeling techniques. Youth with a background in data science can explore opportunities in analysing fisheries' data to make predictions about fish populations, optimise fishing strategies, and contribute to scientific research in the field.

Technology Entrepreneurship: The fishery sector presents opportunities for young entrepreneurs to develop innovative solutions. This could include the creation of apps for fishermen, smart fishing gear, or sustainable aquaculture technologies. Starting a technology-focused business in the fisheries sector allows for the exploration of creative and lucrative ideas.

Training and Capacity Building: As the industry adopts new technologies, there is a growing need for training and capacity building. Youth can engage in roles related to educating fishermen and industry professionals on the use of digital tools, safety practices, and sustainable methods. This can be done through workshops, online courses, and training programs.

Aspiring professionals can specialise also in areas such as fish health, sustainable fisheries management, or seafood marketing, allowing for diverse and fulfilling career trajectories.

Popular job roles involving the above discussed disciplines include (not limited to) the following:

- Aquaculture Manager
- Fisheries Scientist/Researcher
- Seafood Quality Assurance Specialist
- Marine Biotechnologist
- Fisheries Economist
- Aquatic Environmental Consultant
- Fishery Management Specialist
- Aquatic Veterinarian
- Fisheries Technology Specialist
- Aquaponics Specialist

With the global population on the rise, the fisheries sector plays a vital role in ensuring food security. Fish is a significant

source of protein for billions of people worldwide, and sustainable fisheries management is essential to meet the growing demand for seafood. Professionals in the field contribute to the development of responsible and efficient fishing practices, thereby addressing the challenges of overfishing and promoting long-term food security.

Fisheries experts are instrumental in promoting environmental conservation by advocating for sustainable practices. Overfishing, habitat degradation, and climate change pose threats to aquatic ecosystems, and individuals in the fisheries sector play a crucial role in mitigating these challenges. By emphasising sustainable resource management and conservation, experts contribute to maintaining biodiversity and preserving aquatic ecosystems for future generations.

Colleges and Courses

In India, there are several colleges, universities, and institutions that offer courses in the field of fisheries. Here is a list of some notable institutions:

Central Institute of Fisheries Education (CIFE), Mumbai: CIFE is a premier institute in Fisheries Education, Research, and Training in India. It offers degree programmes at the undergraduate and postgraduate levels, as well as doctoral programmes.

College of Fisheries, Mangalore: Affiliated with Karnataka Veterinary, Animal and Fisheries Sciences University, this college offers undergraduate and postgraduate programmes in fisheries.

Fisheries College and Research Institute (FCRI), Tamil Nadu: Affiliated with Tamil Nadu Fisheries University, FCRI offers undergraduate and postgraduate programmes in fisheries.

Andhra University, Visakhapatnam: The Department of Marine Living Resources at Andhra University offers postgraduate courses in fisheries.

Kerala University of Fisheries and Ocean Studies (KUFOS), Kochi: KUFOS offers various undergraduate and postgraduate programmes in fisheries and ocean studies.

Tamil Nadu Fisheries University (TNFU), Nagapattinam: TNFU is dedicated to Fisheries Education and Research, offering undergraduate and postgraduate programmes.

West Bengal University of Animal and Fishery Sciences (WBUAFS), Kolkata: WBUAFS provides undergraduate and postgraduate programmes in fisheries.

College of Fisheries, Ratnagiri (Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth): This college offers undergraduate and postgraduate courses in fisheries.

Cochin University of Science and Technology (CUSAT), Kochi: The School of Industrial Fisheries at CUSAT provides postgraduate programmes in fisheries.

Indian Council of Agricultural Research (ICAR) Institutes: Various ICAR institutes across India, such as the Central Institute of Fisheries Technology (CIFT) in Kochi, offer research and training programmes in fisheries.

Before choosing a college or university, it is advisable to check the accreditation, faculty, infrastructure, and placement records. Additionally, you may want to explore specific courses related to aquaculture, fisheries management, marine biology, and other specialised fields within fisheries to align with your career goals.

Scope of Fisheries and Fishing Technology Courses and Eligibility

The Bachelor of Science in Fisheries, commonly known as B.Sc Fisheries, is a comprehensive four-year undergraduate course that delves into the intricacies of fisheries management and understanding. This academic pursuit encompasses a diverse range of subjects, including the study of fishes, ecosystems, diseases, and their nutrition. The course serves as a scholarly exploration into the multifaceted world of aquaculture, incorporating disciplines such as breeding, genetics, farming, and nutrition.

Within the curriculum, students engage with the nuances of fishing processing, covering aspects like curing, canning, freezing, value addition, by-products and waste utilisation, quality assurance, and certification. Additionally, the programme explores fisheries microbiology and fisheries biochemistry, providing insights into the microscopic world and biochemical processes crucial to the field. Fisheries resource management is a focal point, addressing topics such as biology, anatomy, taxonomy, physiology, and population dynamics.

The fisheries environment is thoroughly investigated, drawing from oceanography, limnology, ecology, biodiversity, and aquatic pollution studies. Fishing technology is a significant component, encompassing craft engineering, navigation, seamanship, and marine engines. The curriculum also extends to fisheries economics and management, shedding light on the economic aspects and effective management strategies within the fisheries sector, alongside fisheries extension.

To embark on this academic journey, aspiring students must meet eligibility criteria by securing a minimum of 50% marks in the science stream at the 10+2 level from a recognised board. Admission to the B.Sc Fisheries programme typically involves clearing entrance exams conducted by colleges and universities, ensuring a competitive and well-qualified cohort for this specialised course.

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