



# Indian Fisheries : A Progressive Outlook



Editors  
K.K. Vijayan, P. Jayasankar and  
P. Vijayagopal

CMFRI Diamond Jubilee Publication

# Indian Fisheries : A Progressive Outlook

*Editors*

**K.K. Vijayan, P. Jayasankar and  
P. Vijayagopal**



**Central Marine Fisheries Research Institute**  
(Indian Council of Agricultural Research)  
P.B. No. 1603, Cochin - 682 018, Kerala, India.



---

# Indian Fisheries : A Progressive Outlook

## Published by :

Prof. (Dr.) Mohan Joseph Modayil  
Director  
Central Marine Fisheries Research Institute  
Kochi - 682 018

## Citation :

K.K. Vijayan, P. Jayasankar and P. Vijayagopal (Eds.) 2007. *Indian Fisheries - A Progressive Outlook*, Central Marine Fisheries Research Institute, Kochi, 203 pp.

© 2007 Central Marine Fisheries Research Institute, Kochi

**ISBN : 978-81-901219-4-1**

## Cover Photo :

'Water' 1566. Painting by the famous Italian painter Giuseppe Arcimboldo (1527-1593). Source: Dirk Zeller & Daniel Pauly 2005. Good news, bad news: Global fisheries discards are declining, but so are total catches. *Fish and Fisheries*, 6: 156-159.

*Printed at :*  
Niseema Printers & Publishers, Kochi - 682 018, Kerala, India

---

## Contents

Foreword	iv
Preface	vi
1. National Fisheries Development Board and Fisheries Policy S. Ayyappan and A.D. Diwan	1
2. Possibilities of By-catch Reduction from Trawlers in India M.R. Boopendranath	12
3. Human Resources Development in Indian Fisheries – Past, Present and Future R.S. Biradar and Dilip Kumar	30
4. New Vistas in the Value Addition of Marine Fishery Products K. Devadasan	46
5. Physiological and Endocrinological Approaches in Captive Breeding of Marine Finfish A.D. Diwan	62
6. Relevance and Impact of Fisheries Research: An Indian Perspective J.V.H. Dixitulu	80
7. Significance of International Codes in the Trans-boundary Movement of Species and Quarantine Policy in Indian Fisheries Sector N. Kalaimani and A.G. Ponniah	104
8. Challenges and Opportunities of Marine Biotechnological Research & Developments in India A.S. Ninawe	128
9. Recirculation-Zero Water Exchange System for the Hatchery Rearing of Economically Important Marine Organisms I.S. Bright Singh, V.J. Rejish Kumar, Cini Achuthan, N.J. Manju & Rosamma Philip	139
10. Impact of Ban on Monsoon Trawling Imposed Along Kerala in Providing Respite to Fish Habitat and the Exploited Marine Fisheries Resources B. Madhusoodana Kurup	156
11. Managing Disaster in the Marine Sector M.J. Modayil	181
12. Challenges for Ensuring Contribution of Fish to Nutrition and Livelihood Security M.V. Gupta	191
Author Index	202

---

## Foreword

The Central Marine Fisheries Research Institute, established in 1947 by the Government of India initially under the Ministry of Agriculture in 1947 and subsequently transferred to the Indian Council of Agricultural Research in 1967, has grown significantly in its size, stature and research infrastructure over the past six decades. Looking back, on the occasion of the Diamond Jubilee, we, the members of the CMFRI family, are proud to see the results of the voluminous research that have been carried out by the dedicated workers on all related disciplines taking into consideration the need of the fisheries sector. The society and the changing national and global scenarios have made a lasting impact on the country's marine fisheries sector. CMFRI now enjoys the status of a premier research organization comparable to the best fisheries research institutions in the world.

Looking back, we gratefully acknowledge the yeomen efforts of all those who had contributed to the growth and development of this institution. Looking forward, we are fully aware of and prepared to take up the challenges facing the sector on account of the resource dynamics, anthropogenic impacts, weather, market dynamics, global pressures and changing world scenarios. At a time when the world marine fisheries is passing through a period of crisis and uncertainty, there is need for strategic and proactive research based interventions to make marine fish capture technically sustainable, environmentally friendly, economically profitable, socially relevant and equitable. With the fast changing marine fisheries scenario and emergence of mariculture as an alternate approach for enhancing coastal fish production, the Institute has tuned its mandate in consonance with the needs of the time. The Institute is also in the process of focusing on frontier areas of research such as biotechnology, bioprospecting, bioinformatics, remote sensing, climate change and mariculture. We are prepared and empowered with courage, enthusiasm and dedication to excel in these areas through upstream research outputs and address emerging challenges.

This Souvenir, being brought out on the occasion of the Diamond Jubilee Year, carries invited articles on a wide array of subjects ranging from marine biotechnology to disaster management. I am hopeful that all the twelve thematic articles would be useful to students, stake holders, researchers and the general public to understand marine fisheries in its

---

various dimensions.

On this historic occasion, I am confident that CMFRI would continue its efforts to help the country usher in an era of knowledge based fisheries governance and contribute to marine fisheries sustainability, nutritional security, livelihood and continue to make an everlasting impact on the national fabric.

Kochi  
December, 2007



**Prof (Dr.) Mohan Joseph Modayil**

---

## Preface

Sea has been the source of food from time immemorial. It is also believed that mysteries of the sea are more than those of space. Unraveling them has always been exciting to man. Creation of knowledge on sea based sustainable food production systems is on the rise and the scientific contributions from our country require periodic reviewing. This book is one such effort by eminent researchers from India. The subjects covered have been chosen considering the need for distilling status of knowledge in one publication from a wide array of areas ranging from marine biotechnology to tsunami-induced emerging emphasis on disaster management of coastal zones.

Drs. S. Ayyappan, Dy. Director General (Fisheries), ICAR and Chief Executive, National Fisheries Development Board (NFDB) and A.D. Diwan, Additional Director General (Marine Fisheries), ICAR, who are involved in managing research, development and policies of Govt. of India incisively portray the potential of India in terms of its natural resources available to sustain growth in fish production from capture and culture systems. Moreover, the prerogatives of the newly formed NFDB are also explained. We hope that NFDB is all set to achieve what NDDB did for the Dairy Sector in India.

Dr. M.R. Bhoopendranath's contribution on reduction of by-catch from trawl fisheries is very comprehensive. Devices developed, policies to be evolved, animals to be excluded which get caught inevitably are all areas looked into with his research expertise. If this knowledge goes down to all the stake holders, very meaningful objectives will be achieved.

Drs. R.S. Biradar and Dilipkumar are associated with the Central Institute of Fisheries Education (CIFE), Mumbai - the best spot from where the training and human resource development needs, both formal and informal, are met and planned for the fisheries sector. Explaining the complexities of the current scenario, realistic changes required to sustain the targeted growth of this fastest growing food production system are unveiled.

Food technology applications for value addition of fish is an area with enormous potential for export, small enterprises and employment generation. Dr. K. Devadasn, Director CIFT explains in his article the

---

options available along with technicalities involved. We would not be mistaken to add the dimension of upliftment of women to it because fish processing plants are synonymous with womens' workshops.

Dr. A.D. Diwan's expertise in aquatic endocrinology is replete in his article on physiological and endocrinological aspects of breeding marine fishes in captivity. The complexity and limits in knowledge are well depicted and described for a discerning student of biology whose inclination is towards physiology in general and endocrinology in particular.

Mr. J. V. H. Dixitulu, the chief editor of 'Fishing Chimes', one of the respected fisheries and aquaculture monthly, takes stock of what the research and development organizations mainly funded by the government perform and how it impacted the fisheries scenario in the country. His summary in the article appears to be the shortest and simplest depiction of the changes for the better brought about by fisheries research in India.

Drs. A.G. Ponniah and N. Kalaimani in their article on trans-boundary movement of aquatic species and quarantine policy in Indian fisheries describe the complexities involved. With so much of exotic animals being imported and exported either for ornamental rearing or for aquaculture, the need for prudence in introducing new species of animals even within the country into fragile ecosystems like 'biodiversity hotspots' is over emphasized. Ecological impacts of invasive species especially the carnivores and the need for pre-quarantine and quarantine if at all any introduction happens highly stressed upon. As ecological disasters are frequently taking place the world over, this article is timely and authentic.

Challenges and opportunities in biotechnological research in the marine biotechnology sector are reviewed by Dr. A.S. Ninawe who was with the Department of Biotechnology, Govt of India. This area has immense opportunities where India is yet to make a beginning in terms of tangible outputs.

Dr. I.S. Bright Singh and his colleagues of National Centre for Aquatic Animal Health (NCAAH) at Cochin University of Science and Technology (CUSAT) describe a commercially viable technology for water management in hatcheries. Bacterial consortia aiding in water quality management are not novel, but development of an indigenous technology recognizing its local need is exceptional in its quality.

Dr. B. Madhusoodana Kurup's article on the impact of ban on



---

monsoon trawling imposed along Kerala coast in providing focus on fish habitat and the exploited marine fisheries resources is a status report. Discussing the pros and cons of policy changes which impacted fisheries has come easy for an academician turned planner holding a key position in the Govt. of Kerala.

Disaster management has already become a topic of learning in schools. Post-tsunami scenario in India, the lack of preparedness and absence of warning systems became glaring realities to be dealt with. In this context a disaster caused by sea, its management and related issues have been dealt with by Prof. (Dr.) Mohan Joseph Modayil in his article. The complexity of the problem is enormous and the way to go about tackling it is very enlightening even to a layman.

Challenges and opportunities of fisheries sector to meet the ever growing demands of nutrition and livelihood security have been dealt with in his article by Dr. M.V. Gupta. What are needed are patience, endurance, great commitment and persuasiveness in our efforts to reduce hunger and malnutrition of the global population.

We hope this book with unique and varied collection of articles relevant to Indian marine fisheries could provide students, fishers, aqua farmers, coastal communities and policy makers a good platform for further advancement of their spheres of work. We record our grateful appreciation to the Director, CMFRI, Cochin for his support.

K.K. Vijayan  
P. Jayasankar  
P. Vijayagopal

December, 07/