Brainstorming Session on

Strategies for Deploying Artificial Reefs and Sea Ranching in South Asia: Learning from the Experiences

14 February 2023 Venue: Marina Hall

With the firm threat imposed on fishery resources and marine ecosystems by fishing pressure and climatic variations, there is an urgent need to rebuild fish stocks in order to meet the raising food demand and maintain the ecological balance. The potential solution for the above mentioned issues are deploying artificial reefs and sea ranching of juveniles from depleted stocks.

This side event is intended to discuss various dimensions related to past experiences, emerging challenges and enabling policies in deploying artificial reef and also discuss about the different aspects which will correspond to the successful ranching programs in future.

The Context

The increasing global concern over the threats to sustainable marine fisheries, actions towards mitigating the effects of natural and anthropogenic impacts on the marine ecosystems, particularly coastal ecosystems, are gaining momentum. ,The coastal waters of most of the major marine fish producing countries are being subjected to several stressors, ranging from non-judicious fishing practices, habitat destruction through pollution and destructive fishing methods, rupture of trophic food webs by increased exploitation in response to market demand, increased incidences of natural disasters and the impacts of climate change. Artificial reefs (AR) that are set on the sea bed to enhance the growth of marine floral and faunal benthic communities which simulate natural settings for promoting fish aggregations, and provide the base for propagation of resident populations within sheltered structures. They are internationally categorized under other effective area based conservation measures (OECMs) for the purpose of governance and management in ways that achieve positive and sustained long-term outcomes for the in situ conservation of biodiversity, to promote habitat recovery and to enhance reef-dependent resources. The advantage of artificial reefs is in developing fishing grounds close to shore, easily accessible to traditional and non-destructive fishing methods, which also ensures sustainability of both, the habitat, and the resources therein. Artificial reefs to increase fish yields or for algal culture began no later than 17th-century Japan, when rubble and rocks were used to grow kelp. As per available estimates, approximately 500,000 reef structures have been deployed in 3,400 artificial reef projects across more than 70 countries, In India, since 1990s, ICAR-Central Marine Fisheries Research Institute (CMFRI) has been working on habitat enhancement and improvement of coastal productivity and livelihoods, through artificial reefs and fish stock revival and restorations, and evolved standard protocols for site selection, design, fabrication, deployment and impact assessment of artificial reefs. Being a front-runner in this area with more than two decades of experience CMFRI is well placed to cater to the increasing demand for deploying more reef projects around the coastal waters. This side event organized as part of the ICES-FAO-BOBP Workshop is intended to discuss various dimensions related to past experiences, impact in the Indian context, emerging challenges and enabling policies that are necessary for further development in artificial reefs and related areas.

Sea ranching involves introducing juveniles (either hatchery-produced or wild-caught) into the natural environment where they are allowed to grow without containment structures. The juvenile fish, which are produced in hatcheries and are released into marine waters, are allowed to propagate or grow on natural foods until they reach harvestable size It is a widely adopted practice in countries such as the United States, Canada, Japan, USSR, New Zealand, Iceland, the Baltic countries and some of the South-east Asian countries, especially for conserving species such as salmon, sea cucumber, pearl oyster, blue crab and shrimps, many grouper species, flat fishes, sea bream etc. In India, ICAR-CMFRI, has been carrying out regular sea ranching programs involving *Penaeus semisulcatus* post-larvae (PL-20) since early 1990s. Currently, the program has been strengthened with the financial support of DoF, Government of India and the Mandapam Centre of CMFRI has been carrying out sea ranching of this precious shrimp species with an approximate number of 50 million hatchery produced PL-20 per year. The Institute is also assessing the impact of sea ranching in commercial fishery of the species using advanced genetic markers. Other commercially important species being ranched by CMFRI include squids, cuttle fishes, pearl oyster, sacred chank, cobia, emperor sea bream and Indian pompano. As a way forward, there is a need to standardize various parameters for optimal impact such as suitable size of release, area specifications, species-specific favourable seasons, and to explore advanced ranching techniques for greater impact. This event will discuss and deliberate upon various above-mentioned aspects so as to enable successful ranching programs in future.

The broad objectives of the event are:

- To understand the issues and challenges for deploying artificial reefs based on practical experiences
- To understand the issues and challenges for stock enhancement and sea ranching based on practical experiences
- Developing strategies towards deploying artificial reefs and sea ranching for the region and with special reference to India.

Programme

14.00 – 14.30	**Registration**	
14.30 – 15.00	**Opening Session**	
14.30 – 14.35	**Welcome & Agenda Setting**	**Dr. A. Gopalakrishnan** *Director ICAR-CMFRI, Kochi*
14.35 – 14.45	**Opening Remarks**	**Shri. Jatindra Nath Swain,** IAS *Secretary, Department of Fisheries, Govt. of India*
14.45 – 15.00	**Artificial Reefs – A Global Review of practices**	**Prof. William Seaman** *Univ. of Florida, and Montreat, North Carolina, USA*
15.00 – 15.30	**Coffee Break**	
15.30 – 16.45	**Technical Presentations**	
	Co-Chairs:	**Dr. J.K. Jena** *Deputy Director General (Fisheries), ICAR, DARE, GoI* **Dr. E. Vivekanandan** *Senior Scientific Consultant, ICAR-CMFRI & BOBP-IGO*
15.30 – 15.45	**Sea ranching – A Global Review of practices**	**Dr. Takuma Sugaya** *Japan Fisheries Research and Education Agency, Japan*
15.45 – 16.00	**Artificial reefs for conservation and restoration of marine ecosystems**	**Dr. Wantana Chenkitkosol** *Marine Fisheries R & D Division, Dept. of Fisheries, Bangkok, Thailand*
16.00– 16.45	**Experiences and Plans on Artificial Reefs and Sea Ranching:**	
	a) Bangladesh	**Mr. Yahia Mahmud,** *DG, BFRI, Bangladesh*
	b) India	**Dr. A. Gopalakrishnan,** *Director, ICAR-CMFRI, India* **&** **Dr. G. Dharani,** *NIOT, India*
	c) Maldives	**Mr. Riyaz Ahmed Jauharee,** *MMRI, Maldives*
	d) Sri Lanka	**Mr. Sushantha Kahawatta,** *DG, MFARD, Sri Lanka*
16.45 – 17.15	**Discussion**	**Strategies for Artificial Reefs and Sea Ranching** **Who / How / Where**
17.15 – 17.30	**Closing Session**	
17.15 – 17.25	**Summary & Conclusions**	**Co-Chairs**
17.25 – 17.30	**Words of Thanks**	**Dr. Joe K. Kizhakudan,** *ICAR-CMFRI, India*

ICES CIEM

DEPARTMENT OF FISHERIES

Food and Agriculture Organization of the United Nations

ICES/FAO Working Group on Fishing Technology and Fish Behaviour (WGFTFB23)

and

Symposium on Innovations in Fishing Technologies for Sustainable and Resilient Fisheries

13-17 February 2023 | Taj Gateway Hotel, Kochi, India