CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)

KARWAR RESEARCH CENTRE

KARWAR, UTTARA KANNADA, KARNATAKA, INDIA

Karwar Research Centre of Central Marine Fisheries Research Institute is a dynamic R & D institute in the field of marine fisheries research.

HISTORICAL BACKGROUND

The Centre was established in the year 1948 as "Mackerel Research Unit" along with the inception of Central Marine Fisheries Research Institute (CMFRI). Later, in 1965 the Center was raised to the status of a sub-station, and was renamed as Karwar Research Centre of CMFRI. Karwar Research Centre has done pioneering work in fisheries resource management. It regularly estimated the fish landings in Uttarkannada district of Karnataka

State, from Majali in the north to Bhatkal in the south. Besides this, the Centre has done path breaking research on the culture of finfish and shellfish in protected areas in the Arabian sea. The work done and the technologies developed at the centre has attracted national attention and are being implemented all along the Indian coast.

INFRASTRUCTURE



Marine Hatchery Complex


Cold Storage


Microbiology Laboratory


Fish Health Laboratory


Marine Museum


Conference Hall


Training Hall


Library


Marine Farm

MAJOR ACHIEVEMENTS

Capture Fisheries

Oil sardine, mackerel, tunas, seer fish, cat fish, carangids and pomfrets composed major pelagic fishery resources of Karwar.

- Oil sardine *Sardinella longiceps* and Indian mackerel *Rastrelliger kanagurta* formed 80% of the pelagic resources landed.

- Flat fishes, lizard fishes, threadfin breams, silver bellies, and butterfish are the major demersal resources off Karwar coast.
- *Parapenaeopsis stylifera*, *Metapenaeus dobsoni*, *M. affinis, Portunus pelagicus, P. sanguinolentus* and *Charybdis cruciata* were found to be the major crustacean resources.
- *Loligo duvacelli* was the only species representing cephalopods in trawlers and bivalves which contributes for the major Molluscan resources.
- As part of the resource management, currently centre is paying more attention on the GIS based resource mapping of distribution and abundance of finfishes and shellfishes, especially in trawl fishing grounds of Uttarkannada.
- Occasional landings of whales, dolphins, turtles and whale sharks were studied and reports prepared.

Fishery Environment Management

- Monitoring of the hydrographical and biological parameters including zooplankton collection and productivity is regularly being done along the Karwar coast.
- The scientists of the Centre made significant contribu tions in the preparation of monograph on the plankto nic shrimp of the genus *Lucife*r (Family Luciferidae) from the Indian EEZ.

Marine Biodiversity

- Study on the species and intra species diversity of carangids of 23 species was done and contributed fishery details of carangids for the preparation of Carangid monograph.
- Also contributed in developing a data base for marine finfish and shellfish biodiversity in the Indian seas.
- A total of 16 species of sclerectinian corals were recorded at Nethrani with 3 new records for Indian waters and one species new to science.

Mariculture

- The work carried out by the Centre helped CMFRI in developing and perfecting open sea cage culture technology in the country.
- Karwar Research Centre had perfected cage culture technology for Asian sea bass, cobia, pompano, sea breams and snappers and transferred these technologies to fishermen, farmers and entrepreneurs of all maritime states of the country.
- The first marine cage farm in the country was established by the Centre at Karwar in the year 2010.
- The Centre also made significant contributions in bio-diversity and carrying capacity studies in the marinecage farm.

- The achievements made and technologies developed by the Centre in open sea cage culture and related aspects has gained national and international recognition.
- The Marine cage farm established by Karwar Research Centre is being used as a national facility for conducting training programmes and capacity building.
- The high growth rate obtained in Sea bass and cobia farming at Karwar is considered as one of the best compared with the world records.
- The Centre also motivates cage farming by private entrepreneurs on a participatory mode.
- The Centre has trained more than 1000 fishermen and farmers from across the country in various aspects of cage farming.
- The Centre has been recognized as a demonstration centre for open sea cage culture by NFDB, MOA and ICAR.
- The Centre has carried out a survey along Karnataka, Goa and South Maharashtra coast and identified potential mariculture sites.

Fish Health Management

Health monitoring of finfish and shellfish in marine cage farm and hatchery is a crucial part of the cage culture activity. Foreseeing the fast growth in the cage culture sector the Centre established a disease diagnostic laboratory to monitor the health status of cage cultured fishes of all the marine farms under the consultancy guidance of the Centre, from Ratnagiri to Kumta.

- Bacterial load of water and sediments was evaluated periodically.
- Monogenean flukes like Pseudorhabdosynochus and Dactylogyrus species in gills of seabass and red snappers were recorded.
- Biochemical and immunological responses of Asian seabass subjected to stress caused by high stocking density in cages have been evaluated.
- The Centre regularly gives health advisories to the cage farmers so as to enable them to follow good cage culture practices.

Marine Hatchery

The CMFRI annex building at Kodibag Karwar was converted as an experimental hatchery with sea water pumping facility, Most advanced sea water filtration, Sea water storage sump, Overhead storage facility, Algal stock culture room, Live feed culture area and a nursery for about 50,000 fish seed. The dedicated hard work of the staff of the centre has paid rich dividends to the institute in the following areas.

- Brood stock development of marine finfish species viz., Lutjanids and Sea breams.
- Nursery rearing of marine finfish and live feed culture.
- Succeeded in achieving 100% survival of fingerlings and juveniles during nursery rearing.
- The nursery facility has done nursery rearing of about 2,00,000 fin fish seeds and supplied to the cage culture programmes of Goa and Karnataka.

TECHNOLOGIES DEVELOPED

i. Achieved breakthrough in successful demonstration of open sea cage culture of Asian seabass, *Lates calcarifer*.
ii. Developed cost effective steel cages and successfully demonstrated to fishermen from different states
iii. The Centre also developed cost effective steel cages of 6m, 10 m and 12 m diameter, which can be dismantled and reassembled.
iv. Recorded highest growth rate for seabass for the first time in open sea cage culture.
v. Standardized culture period and developed management strategies for water and sediment quality required for candidate species in marine cage farming.
vi. Developed a shore based nursery rearing technology for marine fin fishes to support open sea cage farming.
vii. Standardized seed transportation technology for marine finfish covering long distances.
viii. Standardized feeding schedules and FCR for marine cage farming of finfishes.

MARINE CAGE FARMS UNDER THE SUPERVISION OF KARWAR RESEARCH CENTRE


Ratnagiri (Maharashtra)


Talpone (Goa)


Polem (Goa)


Karwar (Karnataka)


Kumta (Karnataka)

CONTRIBUTIONS AT NATIONAL LEVEL

The Centre made significant contributions in preparing the road map for mariculture development of the country. The proposal made by the centre for introducing 1000 cages in the country during the years 2014 to 2017 as introductory cages is accepted and is being implemented.

The mariculture policy document for guiding the scientific growth of mariculture in the country was prepared by the scientists of the Centre.

CONSULTANCY SERVICES IN OPEN SEA CAGE CULTURE

The Centre is providing consultancy services to three states i.e. Maharashtra (MFDC), Goa (Dept. of Fisheries) and Karnataka (Dept.of Fisheries) to implement open sea cage culture programmes sanctioned by the central government under RKVY, NPM and NFDB. 25 cages are established off Ratnagiri, 50 cages in Goa (Talpone – 25 and Polem – 25), and 10 cages in Karnataka (Kumta -5 and Karwar - 5). Sea bass and Cobia are the species being cultured in these cages.

IMPORTANT EVENTS

- The Centre organized several workshops, brain stor ming sessions, exhibitions and training programmes on open sea cage culture.
- The Centre had organized for the first time in the history of ICAR a national consultation for the integrated development of Uttarkannada district in September 2012, in which Directors and Scientists from 15 ICAR institutes participated under the chairmanship of DG, ICAR and a project titled 'Uthan' was formulated for the overall integrated development of the district.
- Seabass harvest festival was inaugurated by Shri. Anand Asnotikar, Hon. Minister for fisheries, Govt. of Karnataka in July 2010

Seabass harvest festival

National workshop on open sea cage culture

National Consultation

Training programmes

Hon'ble MP visiting marine farm

Visit by DG, ICAR to marine farm

Hon.Agri. minister at Marine farm

Visit by Norwegian delegation

Exhibition stall at Aqua Goa

- Centre organized a National work shop on open sea cage farming in July 2010
- More than 30 Training Programmes on open sea cage farming and three mariculture workshops were organized at the Centre.
- Shri. Anant Kumar Hegde, Member of Parliament visited the marine farm of the Centre in August 2012.
- Dr.S.Ayyappan, Secretary, DARE and DG, ICAR visited the the marine farm of the Centre in September, 2012.
- Honourable Minister of Agriculture, Sri Sharad Pawar visited the marine farm during April, 2013.
- 15 member Norwegian delegation visited Karwar Center and marine farm during January,2014.
- Karwar Research Centre participated in the Aqua Goa Mega fish festival, 2014 at Navelim, Goa.

CONSULTANCY AND EXTENSION PROGRAMMES

1. This centre is giving technical consultancy for the biggest marine, brackish water and freshwater aquarium construction at Surat, Gujarat.
2. Rapid EIA study on the pilot project on open sea off shore cage culture off Uttara Kannada coast for MPEDA has been completed.
3. The centre also provided guidance for the renovation of the marine and fresh water aquarium at Karwar under the control of Zilla Panchayat.
4. The centre provided consultancy services to Govern ment shrimp hatchery at Kumta.
5. The centre provides consultancy services to the Maharashtra Fisheries Development Board for implementing open sea cage culture in Maharashtra.
6. The centre provides consultancy services to the Department of Fisheries, Government of Goa for implementing open sea cage culture in Goa.
7. The centre also provides consultancy services to the Department of fisheries, Government of Karnataka for implementing open sea cage culture in Karnataka.

MUSSEL FARMING

Integration of finfish cage culture with mussel farming alleviates any excess productivity in the farming area. Mussel is a filter feeder and do not need any feeding. Mussel farming was integrated with cage farming at Karwar by deploying 220 mussel ropes in the marine farm.

TRANSFER OF TECHNOLOGY

The cage culture technology developed by the Centre has been transferred to fishermen/farmers/entrepreneurs/ officials of different maritime states. Technology was transferred to fishermen and entrepreneurs through several village level meetings, farmer meets, exhibitions, training programmes, workshops and seminars.

Cage farming: The cage farming technology developed by the centre has been adopted by fishermen self help groups at Karnataka, Goa and Maharashtra for culturing finfish species like cobia, Asian seabass and pompano.

TRAINING PROGRAMMES

The centre has been recognized as demonstration centre for open sea cage culture. Mariculture training programmes




were conducted for the groups of fisherman, fish farmers and officials from Karnataka, Goa, Kerala, Andhra Pradesh, Tamil Nadu, West Bengal, Maharashtra, Gujarat and Lakshadweep. About 1000 people from different states have been given hands-on training on various aspects of cage culture.

PARTICIPATORY PROGRAMMES

The centre also motivates cage farming by private entrepreneurs on a participatory mode. Two farmers who undertook training at the Centre were selected for participatory farming at Karwar. Mr.Ramana. V. Reddivari from Bangalore and Mr. Sanal Kumar from Tuticorin are doing cage farming under participatory programme under the guidance of CMFRI.

CURRENT RESEARCH THRUST AREAS

The centre has a focussed approach in the research and developmental activities being carried out.

i. Development of large scale cage farming along the west coast of India in collaboration with the concerned state departments.
ii. Technology transfer and extension programmes for mariculture
iii. Modern technologies in open sea cage farming
iv. Integrated farming of finfish and shell fish.
v. Development of capture based coastal and estuarine aquaculture.
vi. Development of national fin fish brood banks, Captive Breeding and Seed production techniques for selected marine food fishes (Sea breams and Snappers).

INAUGURATION OF THE RENOVATED LABORATORY CUM ADMINISTRATIVE BUILDING OF KARWAR RESEARCH CENTRE

Karwar research centre although started in 1948 was lacking basic facilities like good laboratories, administrative offices, library and other facilities. With the development of cage culture related work, additional facilities were essential. Institute has taken special care in renovating the old facilities. New facilities like microbiology lab, fish health lab, museum, library, conference room, training hall, guest room, hatchery, nursery, etc were added and

transformed the centre to a state of the art research facility. The renovated lab-cum administrative building was inaugurated by Dr.S.Ayyappan, Secretary, DARE and DG,ICAR on 01-09-2012 in the presence of Dr.B.Meenakumari, DDG, fisheries, Dr.Madan Mohan ADG(MFY), Dr.G.Syda Rao, Director, CMFRI, Dr.K.K.Philipose, Scientist in Charge, Karwar Research Centre.

TEAM OF KARWAR RESEARCH CENTRE

a) Scientists : 5 b) Technical staff : 13
c) Administrative : 1 d) Supporting : 8
e) Research scholars : 2

AWARDS/PATENTS/RECOGNITIOS

The Centre has developed a galvanized 6 m cage for open sea cage culture. This cage technology is being used for the cage farming initiatives taken up in the entire country. The centre had filed a patent application for this invention *vide* patent application No. 5196/CHE/2012.

PUBLICATIONS

More than 300 research/ technical articles have been published by the Centre in peer reviewed national and international journals. The Centre has published a handbook on 'Open sea cage culture' which is a ready reference for the aspiring farmers and entrepreneurs in open sea cage farming.

DEPUTATION ABROAD

- Dr. S.R.Krupesha Sharma was deputed to University of Stirling, U.K for a three month period from August to November 2010 to work in the area of 'microbial molecular taxonomy'.
- Dr. Jayasree Loka was deputed to NOVA University Fort Lauderdale, Florida, USA for a three month period from October 2013 to January 2014 to work in the area of 'microbial bioremediation'.
- Dr. Divu Damodaran was deputed to University of Stirling, U.K. during October 2013 to January 2014 to work in the area of 'Marker assisted selection'.

WAY FORWARD

- Development of large scale open sea cage farming in the area.
- Development of artisanal mariculture programmes.
- Establishment of national fin fish brood bank for breeding and seed production.
- Pathogen profiling, diagnostics and health manage ment in maricultured finfish and shell fish.
- Development of strategies for environmental manage ment programme in cage farm and marine hatchery
- Development of strategies for ensuring sustainability in the exploitation of marine resources of the area.

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