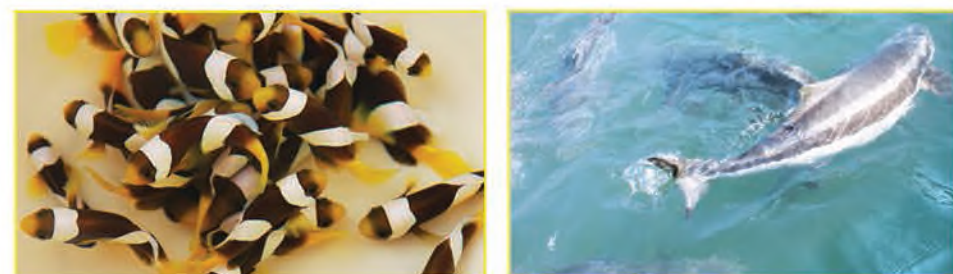


- Breeding and seed production techniques of a dozen species of marine ornamental fishes. (Clown fish, damsels and dotty backs)
- Designing and fabrication of cost-effective sea cages and successful participatory demonstration of sea cage farming at different locations of Indian coast.
- Identification of Arachidonic acid as the active ingredient in the littoral oligochaete from *Pontodrilus bermudensis* from Gulf of Mannar and development of a protocol for its culture for application as broodstock feed for penaeid shrimp for accelerated maturation and spawning.
- Estimated the 'Total Factor Productivity' of Marine Fisheries in India.



## Emerging Thrust Areas of Research

- Marine fisheries management advisory for marine fisheries management in the States of Gujarat, Karnataka and Tamil Nadu.
- Under mariculture, improved protocols for increasing survival rate in high density larviculture of cobia, silver pompano, grouper and Indian pompano for enhancing seed production.
- Technology for mass culture of the calanoid copepod, *Temora turbinata* and its nauplii for use in marine finfish hatchery.
- New techniques for production of image pearl nuclei for mabe pearl production from marine pearl oysters.



- Under Marine Biotechnology, specific, sensitive and cost-effective DNA based diagnostic kit (RT-LAMP) for the rapid detection of beta nodavirus infection among the broodstock, larvae and farmed finfishes.
- Under Fishery environment management, National level map indicating marine litter threats to coastal habitat.
- Impact adaptation and mitigation options of Indian marine fisheries to climate change.
- Broodstock development, breeding and seed production techniques of prioritised species for mariculture.
- Site selection for sea cage farming along the Indian coast based on GIS and social logistics.
- GIS based resource mapping of distribution and abundance of finfishes and shell fishes off Indian coast for suggesting operational based strategies for fisheries management.
- Development of the fish market grid for the country.
- Development of Communication tools for Capacity Development in Ecosystem Based Responsible Fisheries Management.
- Gender mainstreaming and impact of Self Help Groups in marine fisheries sector.

## Consultancy Services

Consultancy services are available as per guidelines of ICAR in a wide range of specialized areas such as fisheries management, Fish Aggregating Devices (FADs), taxonomy, biodiversity, fish stock assessment, hatchery protocols, coastal aquaculture, mariculture technology, fish nutrition, fish health management, modeling and software development, scuba diving, environmental monitoring, feasibility studies, impact analysis etc.

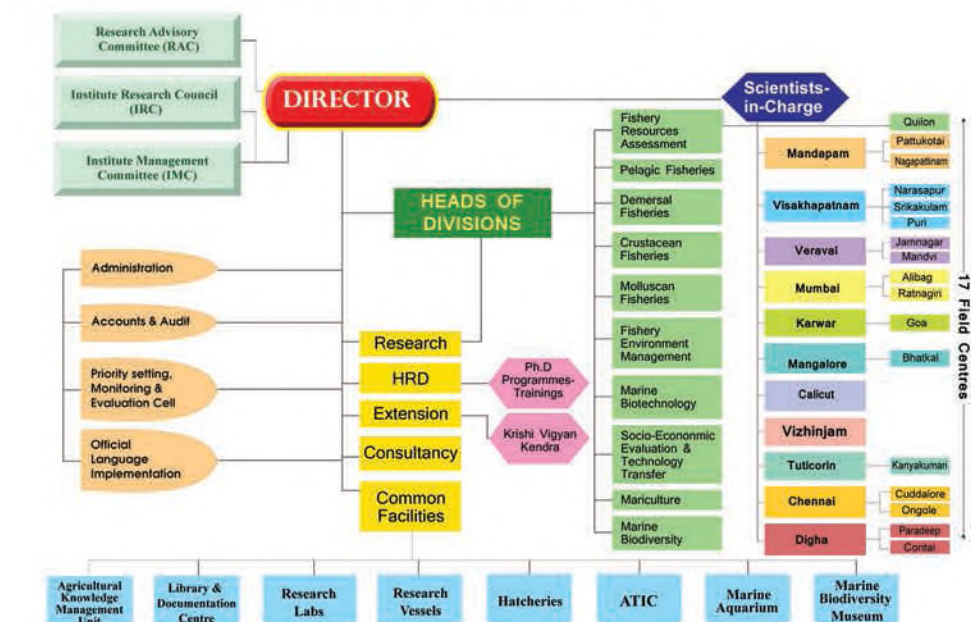
## Outreach Activities

The Agricultural Technology Information Centre (ATIC) located at the headquarters serves as a single window delivery system for the technologies and services of the institute which plays as an interface between fish farmers, fishermen, entrepreneurs and scientists of the Institute. The ATIC also takes part in fish farmer melas, exhibitions and extension activities at various places in the country which generated a revenue over Rs. 35 lakhs from sales and services. The Marine Aquria and Marine Biodiversity Museums also attract thousands of visitors annually.



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# A Glimpse of CMFRI



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## CMFRI...

The Central Marine Fisheries Research Institute (CMFRI) established in 1947, has been carrying out pioneering research and development work in the arena of marine fisheries with the objectives of ensuring fisheries resource, ecosystem and livelihood sustainability in the country. Since 1971, the headquarters of the Institute is in Kochi, Kerala State. Presently the Institute has three Regional Centres at Mandapam Camp in Tamil Nadu, Visakhapatnam in Andhra Pradesh and Veraval in Gujarat. Research Centres are located at Mumbai, Karwar, Mangalore, Calicut, Vizhinjam, Tuticorin, Chennai and Digba. In addition to these there are seventeen field centres located throughout the coastal belt of the country.



## Our Vision

Sustainable marine fisheries through management intervention and enhanced coastal fish production through mariculture for improved coastal livelihoods.

## Our Mission

To develop an information based management system for changing over from open access to regulated regime in marine fisheries, augment coastal fish production through mariculture and sea ranching and restore critical marine habitats.

## Our Objectives

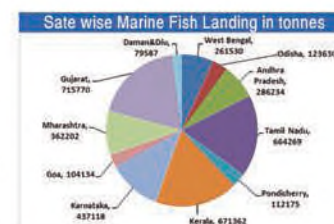
- Marine Fishery Resource Assessment.
- Productivity and Production Enhancement through Mariculture.
- Conservation of Marine Biodiversity.
- Transfer of Technology, Training and Consultancy.

## Research Divisions

- Fishery Resources Assessment
- Pelagic Fisheries
- Demersal Fisheries
- Crustacean Fisheries
- Molluscan Fisheries
- Marine Biotechnology
- Marine Bio-Diversity
- Mariculture
- Fishery Environment Management
- Socio Economic Evaluation & Technology Transfer

## Major Research Achievements

- Works on 32 in-house projects, 32 externally funded projects and 10 consultancy projects.
- Species wise, gear wise, fishing zone wise estimation of marine fish landings in the country.
- Models developed for fishery forecasting and estimating potential yield from Indian EEZ.
- GIS based resource mapping for information from 1511 landing centres. Inventory of all landing centres along the Indian coast with GPS mapping, types of gear and species caught at each landing centre.
- Rapid stock assessment to classify the resources using time series data for the period 1985-2013 for Kerala, Karnataka, Tami Nadu and Andhra Pradesh.
- Knowledge developed as the status of fisheries resources along Indian coast and management options suggested to maritime states.
- Launched 'Fish Watch', for providing latest price structure of major resources across major harbours, a web portal for highlighting 50 years time series data on marine fish landings.
- Genetic stock structure of Sardine and Mackerel using polymorphic micro satellite markers and mitochondrial DNA markers.
- Abiotic stress tolerance genes mined from halophilic phytoplankton.
- Micro algal fatty acid profiles for appropriate larval nutrition.
- A medusoid jelly fish identified as good larval feed for lobsters.



- Commercialized nutraceuticals 'Green Mussel extract' (GMe) and 'Green Algal extract' (GAe) meant for osteoarthritis.
- 'Varna' series of ornamental fish feeds.
- A freeze dried Microbial Product (MP) from *Pseudomonas aeruginosa* with antagonistic properties and high protein developed.
- An antibacterial compound isolated from *Pseudomonas sp.*
- Integrated Multitrophic Aquaculture (IMTA) initiated at Palk Bay in Tamil Nadu.
- Participatory farming propagation in Andhra Pradesh for Cobia and Silver pompano.
- Bio-inventorying and biodiversity valuation of marine organisms in selected marine ecosystems.
- Successful in deploying the pop-up satellite tags on large yellowfin tuna along the Indian coast to study their movement and migration.
- Impact of climate change on Marine capture fisheries and candidate species for mariculture under National Innovations on Climate Resilient Agriculture (NICRA)
- Valuation of fish landings and economic performance of fishing methods in Kerala, Tamil Nadu, Karnataka, Maharashtra and Gujarat.
- Evaluation of Fishery Governance, livelihood, gender and welfare, capacity development for Responsible Fisheries Management in India.
- An International Project: GULLS (Global Learning for Local Solutions): Reducing Vulnerability of marine-dependent coastal communities.
- Acquired two new fisheries research vessels RV Silver Pompano and RV Cadalmin for climate change studies and ocean monitoring.



- KVK-Ernakulam of CMFRI popularizes fish farming in cages, granite quarries, *pokkali* fields apart from propagating the concept of family farming for sustainable vegetable production in homesteads. So far more than 3000 training programmes have been conducted for the benefit of the farmers/entrepreneurs/women's self-help groups.
- Institute conducts regular training programmes in several areas of fisheries and mariculture. Produced over 200 Masters and 150 Ph.D. degree holders.
- Trophic models of Northwest coast, Karnataka and Gulf of Mannar Ecosystem developed and management simulation carried out.
- Role of artificial reef in enhancing fish catch and livelihood investigated.
- Facilitated MSC Certification of eco-labeling of Ashtamudi clam fishery, near Kollam.
- Preparing to undertake Marine Fisheries Census in the year 2015.
- Research outputs available online through [eprints.cmfri.org.in](http://eprints.cmfri.org.in)
- Techniques for broodstock development, breeding and seed production of cobia (*Rachycentron canadum*), pompano (*Trachinotus blochii*, *T. mookali*), and grouper (*Epinephelus coioides*).
- Release of Cadalmin™ Antidiabetic extract (ADe), a nutraceutical product developed with activity against type II diabetes from seaweeds.

