CIFT at a Glance

Activities and Achievements

Central Institute of Fisheries Technology
(Indian Council of Agricultural Research)
Matsyapuri P.O., Cochin - 682 029

Laurels for CIFT

The Institute was the proud recipient of the Sardar Patel Outstanding ICAR Institution Award twice in the years 2000 and 2006.

Dr. K. Devadasan, Former Director, CIFT receiving the Award

Published by	:	Dr. T.K. Srinivasa Gopal Director, CIFT
Produced by	:	Dr. S. Balasubramaniam Head, Extension, Information & Statistics Division
Prepared by	:	Dr. V. Geethalakshmi, Senior Scientist, EIS Division
Photography	:	Shri Sibasis Guha
Printed at	:	Niseema Printers, Cochin - 18

CIFT at a Glance : Activities and Achievements

History

The Central Institute of Fisheries Technology (CIFT), initially known as the Central Fisheries Technological Research Station, was established at Cochin on 29th April 1957. The Station was upgraded to the status of an Institute in 1962 and its administrative control was transferred to the Indian Council of Agricultural Research on 1st October 1967. With headquarters at Cochin, it has Research Centres at Mumbai (Maharashtra) and Veraval (Gujarat) on the west coast and at Visakhapatnam (Andhra Pradesh) on the east coast, besides one inland Centre at Burla (Orissa) for solving regional and location specific problems. The Institute is the only National Centre in the country where research in all disciplines relating to fishing and fish processing is undertaken.

Organizational set-up

The Institute is headed by a Director with whom all administrative and financial powers regarding research and management are vested. He is assisted by a Senior Administrative Officer for dealing with matters relating to general administration and two Assistant Finance & Accounts Officers for looking after financial accounting aspects as also internal audit of the Institute.

A Technical Section attends to the technical matters including those connected with research projects handled by the Institute at its Headquarters and Research Centres. An Official Language Section monitors the Official Language policy and caters to the requirements of the Institute for bringing out its reports, publications etc. in Hindi.

Mandate of the Institute

- To evolve innovative and cost-effective technologies for fish harvest
- To develop and standardize various aspects of post-harvest technologies
- To develop technologies for extraction of biomedical, pharmaceutical and industrial products from aquatic organisms
- To act as a repository of information on harvest and post-harvest technologies with a systematic data base
- To conduct transfer of technology through training, education and extension education programmes
- To provide consultancy services and to popularize the innovations for overall development of the fishery industry

Research Divisions

Research work of the Institute is carried out in the following Research Divisions:

- Fishing Technology
- Fish Processing
- Quality Assurance & Management
- Biochemistry & Nutrition
- Microbiology, Fermentation & Biotechnology
- Engineering
- Extension, Information & Statistics

Addresses of Headquarters and Research Centres

COCHIN (Headquarters)

CIFT Junction, Matsyapuri P.O.
Willingdon Island
Cochin - 682 029, Kerala
Ph : 0484-2666845 (14 lines)
Fax : 091-484-2668212
E.mail : enk_ciftaris@sancharnet.in
cift@ciftmail.org
Telegram: FISHTECH/MATSYAOUDYOGIKI
Website : www.cift.res.in

VISAKHAPATNAM

Research Centre of CIFT
Ocean View Layout, Pandurangapuram
Andhra University P.O.
Visakhapatnam - 530 003, Andhra Pradesh
Ph : 0891-2567856; Fax : 0891-2567040
E.mail : cift@itpvis.ap.nic.in
Telegram : MATSYAOUDYOGIKI

VERAVAL

Research Centre of CIFT
Matsya Bhavan, Bhidia Plot
Veraval - 362 269, Gujarat
Ph : 02876-231297; Fax : 02876-231576
E.mail : ciftvrc_ad1@sancharnet.in
Telegram : FISHTECH/MATSYAOUDYOGIKI

MUMBAI

Research Centre of CIFT
CIDCO Administrative Building
(Ground Floor), Sector - I
Vashi, Navi Mumbai - 400 703, Maharashtra
Ph : 022-27826017; Fax : 022-27827413
E.mail : ciftmum@bom.nic.in
Telegram : FISHTECH/FISHPROCESS(FT)

Staff Position as on 31st December 2010

Category	Sanctioned	Filled
Scientific	101	59
Technical	132	115
Administrative	83	69
Supporting	72	58
Auxiliary	06	04
TOTAL	**394**	**305**

Salient Research Achievements

- CIFT has developed and introduced 12 standard designs of mechanized wooden fishing boats in the size range of 7.67 to 15.2 m OAL for fishing in coastal and intermediate ranges. It is estimated that over 80% of the nearly 54,000 mechanized wooden fishing crafts in the Indian fishing fleet conform to the popular CIFT designs or its later adaptations.
- Developed designs of steel fishing vessels of size 15.5 m OAL, 20 m OAL and fuel efficient vessel of 18 m OAL.

Sagarkripa - A fuel efficient vessel designed at CIFT

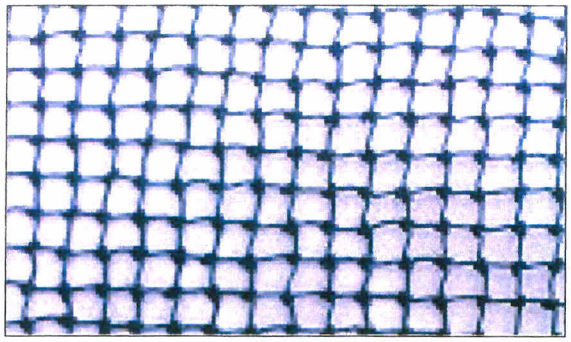
- Design of Aluminium craft for inshore waters and FRP pole and line fishing vessels for Lakshadweep were also introduced.
- Developed a package of technologies for protection against bio-deterioration, fouling and corrosion, and for increasing the life span, substantially reducing maintenance cost of fishing vessels.
- Introduced Aluminium-Magnesium alloy sheathing with cathodic protection and prescribed coating system was developed as a cost-effective substitute for Copper sheathing for wooden hulls as protection against marine borers. This technology is widely used in the small-scale mechanized vessels.
- Developed a Hg free anode 'CIFTAL' an alloy of Al for the cathodic protection of hull and hull fittings. The anode showed highly stable performance and functions at a high current efficiency.
- Epoxy resin based coating developed has improved the life span of cast iron propeller, making it a cost-effective substitute for Bronze propeller in fishing boats.
- Spheroid graphite cast Iron with Nickel (21- 24%) was recommended as substitute for conventional Manganese-Bronze for propellers of fishing boats, resulting in cost savings of 25-30%.
- Superior cost-effective antifouling paint formulations incorporating Cuprous oxide and modified indigenous resins were developed for protection against fouling in fishing boats.
- Substitution of wooden boats by FRP canoes and treated rubberwood canoes for use in backwaters and near-shore waters were succesfully introduced. Rubber wood was found to be a cheap

substitute for Aini (*Artocarpus hirsuta*) for the construction of plank built canoes, after treatment with chemical preservatives. Application of FRP sheating on the inside and outside hull of a plank built canoe made of rubber wood increases durability and renders a maintenance free craft. Technologies for the chemical preservation and upgradation of low cost timbers were developed and these had extended the service life of fishing crafts and contributed towards the efforts against deforestation.

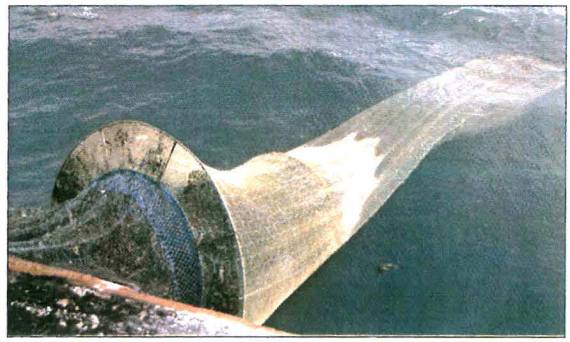
Dual preservative treated rubber wood canoe for traditional sector

- Technology was evolved for upgradation of cheaper secondary species of wood as substitute for boat scantling, by impregnation with styrene-polyester monomers, fortification with Creosote/ Tributyl tin oxide and polymerization with gamma irradiation.
- CIFT has made immense contributions towards the standardization of the netting, netting yarn and netting twine used for fishery purposes. These developments have led to an increase in the productivity of the fishing gear and increase in net profits due to low maintenance and long service life of the nets.
- Development of fishing gear and methods for the traditional sector, traditional motorized sector, small-scale mechanized sector and large-scale industrial sector in Indian fisheries resulted in the increase in fish production.
- Improvements were made in the design and durability of lobster traps as substitute for traditional traps of short life span and low efficiency, for harvesting of spiny lobster.
- A mini-trawl for operation from traditional crafts powered by outboard motors of 8-15 hp, for shallow water shrimp trawling was introduced.
- The mini purse seine was introduced and popularized for operation from traditional plank built canoes (*Thangu vallom*) powered by outboard motors, for efficient harvesting of pelagic shoaling fishes.
- Specially designed trawl for shrimp trawling with vertical opening and extra long wings on either side was found effective for sweeping of wider horizontal area along the sea bed resulting in increased shrimp catch.
- Bulged belly trawl with relatively high opening was designed to improve the catch of fin fishes without compromising on shrimp catch.

- In high opening trawls, vertical opening of the trawl is increased by innovative design improvements, facilitating capture of demersal as well as off-bottom resources.
- Large mesh trawl with relatively large meshes in the front portion resulted in significant reduction in trawl resistance, making use of the herding effect of large meshes on fin fishes.
- By-catch reduction devices such as square mesh cod end, fish eye and Radial Escapement Device for reducing catch of juveniles and young ones, in shrimp trawls were introduced.



Square mesh cod end panel

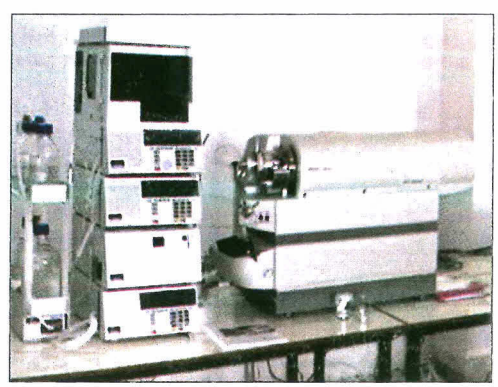


Operation of Radial Escapement Device

- Developed CIFT-TED to exclude the endangered marine turtles, with reduced fish and shrimp catch losses. CIFT-TED is an important conservation tool which is very convenient of effective in protecting sea turtle from trawling mortality.
- Different sizes of flat rectangular boards and vertically cambered otter boards have been introduced by CIFT for the benefit of small-scale mechanized fleet. V-form otter boards with high stability, better hydrodynamic efficiency, low maintenance cost and longer service life are now replacing the flat rectangular boards.
- Purse seines for catching pelagic fishes such as sardine and mackerel, from small mechanized vessel were developed. The CIFT designed large mesh tuna purse seine of 1100 m length and 125 m depth and with 120 mm mesh size became a trendsetter as all the purse seiners at Cochin adopted large meshes in their nets following the highly encouraging results of the net.

Good catch of carangids with large mesh purse seine

- Long lines for sharks using indigenous hooks has been developed as a low energy resource specific alternative to energy intensive, less selective fishing methods such as trawling.
- Troll lines for predatory fishes such as Spanish mackerel and barracuda using buffalo horn, stainless steel spoon and fish head jigs were developed.
- Marine gill net optimized for catching sardine, mackerel, Spanish mackerel, pomfret and hilsa, in terms of material and mesh size were introduced for the benefit of non-motorized and mechanized segments of the industry.
- A simple, durable and cost effective collapsible fish and crab traps developed for inland water bodies for helping the poor fishermen. The traps were developed using stainless steel frames with HDPE netting for fish traps and black nylon netting for crab traps.
- Gear systems have improved the capture fishery production from the inland open water resources significantly over the years. Trammel nets and monolines were also introduced in reservoir systems.
- Technology for the extraction of Chitin from shrimp shell and conversion to Chitosan has successfully addressed a very serious environmental threat due to the careless disposal of the waste.
- Methods of production of value added fish products such as coated products, battered and breaded products, cutlets, pickles, soup powder etc. from marine and freshwater fishes were developed.
- Ready-to-serve fish curry products in retortable pouches can be stored at ambient temperature.
- Isinglass is a product that has got application as a clarifying agent in breweries, mainly in the beer industry. The technology was transferred to an industry for commercialization.
- The technology for extraction of Poly Unsaturated Fatty Acids (PUFA) from fish oil is a very important contribution towards nutritional security by providing a vital nutritional component.
- Collagen-Chitosan film has wide applications as a wound dressing material and in dental surgery. It replaces the imported Teflon membrane used in dental surgery and is very cost effective. It is made of fish air bladder, an industrial waste.
- A sensitive method was perfected for the quantitative analysis of antibiotic residues - chloramphenicol, nitrofuran & metabolites, sulphanamide and tetracyclines - in fish and shrimp by LCMS MS.



LCMS-MS

- Database on biochemical composition of fish serves as the major source of data for product formulation and nutrition labeling.
- Research studies were undertaken for evaluation and screening of compounds of pharmacological importance from marine sources.
- Database on physicochemical properties of proteins from fish from different habitats was developed.
- A single step microbiological assay was perfected for detecting residues of eight antibiotics in seafood, viz. Chloramphenicol, Oxolinic acid, Tetracycline, Oxytetracycline, Furazolidine, Nalidixic acid, Neomycin and Trimethoprim which are commonly found used in aquaculture farms in India.
- Rapid detection of seafood pathogens based on Polymerase Chain Reaction (PCR) was worked out for *Vibrio cholerae, Salmonella, Listeria monocytogens*, etc. A non radio labelled probe based detection method was developed which could detect *Salmonella* from plates of complex, other background flora.

Colonies of *Salmonella* on Agar plate

Replica showing *Salmonella* colonies

- A two step nested PCR method for the detection of White Spot Syndrome Virus in shrimps was developed, standardized, assessed and introduced for commercial use. This method will detect the presence of as small as 10 virions per host larvae. The technology is being used for regular testing of post larvae before introduction to the farms.
- Detailed microbiological profile of marine, brackishwater and freshwater fishes and shellfish was determined with emphasis on the spoilage associations and pathogenic profile. *Shewanella putrifaciens* was found to be a major spoiler present in tropical fish and shellfish.
- A RT-PCR method to test the presence of the devastating Yellow Head Virus in shrimp farms was developed, assessed and commercialized. This is the only test method for YHV now available in India.
- Database on the incidence of antibiotic residues in farmed shrimp was collected. An improved ELISA method for detection of residues of Chloramphenicol, a 'zero tolerant' antibiotic, in processed seafood for export to EU, US and Japan was evolved. This improved method was assessed and commercialized in 2003.

- Quantitative detection of viral load in shrimp samples by Real Time PCR was standardised. The viral envelope proteins which are critical for the entry of the virus to host was amplified.
- The osmotolerant genes for glycine betaine bio synthesis and ectoine synthesis was identified and characterised.
- The 'Chloritest paper' developed for detection of ppm levels of Chlorine in process water, an essential requirement to implement sanitation and hygiene practice in food processing industry, was transferred to M/S Glaxo Laboratories.
- Suitable programmes were organized for implementation of HACCP in the seafood industry. A software and multimedia CD was also developed for HACCP.
- Throughout India, the effluent treatment system attached to seafood processing units is a neglected area resulting in serious environmental problems. To alleviate this problem of pollution by the seafood industry, an efficient effluent treatment plant was designed to treat the effluents confirming to the Pollution Control Board standards.
- The following engineering equipment and instruments have been developed by CIFT for use in fishing and fish processing:
  - SS Tilting Kettle
  - Oil fryer for battered and breaded products
  - Eco-friendly fish dryers
  - Meat bone separator
  - Shell bead nucleus production system
  - 15.5 m fuel efficient steel fishing vessel
  - Fibreglass canoes
  - Environmental data acquisition system
  - Temperature-Salinity meter
  - Water current meter
  - Trawl depth meter
  - Ship borne data acquisition system
  - Speed and distance log
  - Micro algae concentration monitor

Ecofriendly solar fish driers

Fish meat bone separator

- Water activity meter
- Portable Warp Load Meter
- Universal Marine Telemeter
- Ocean Current Meter
- Solar Processing Monitor

The instruments developed in the CIFT have applications in many fields viz., fisheries hydrography, oceanography, coastal engineering, marine meteorology, environmental engineering etc.

- The following research studies in social sciences with management and policy level implications in fisheries have been studied by the Institute:
  - Idle capacity in fish processing plants in India
  - Problems in adopting responsible fisheries technologies by fishers
  - Price analysis of Indian seafood in the export market
  - Economics of artisanal fisheries
  - Economics of operation of fishing vessels on both West and East coast of India
  - Price spread in domestic fish markets of Kerala and Gujarat
  - Adoption of hygiene methods by different stakeholders
  - Fuel utilization pattern by the fishing industry in India
  - Assessment of harvest and post harvest losses in fisheries
  - Estimation of inland fish landings in reservoirs

Data collection in progress

- The Institute has undertaken fisheries extension research studies which provide evaluation data on technology development and transfer among the various categories of client system. The following are some of the works undertaken:
  - Socio-economic profiles of fisherfolk in different parts of the country and development of socio-economic status scale.
  - The areas and extent of participation of women in fisheries related activities.
  - The types and activities of co-operatives and other organizations in fisheries and the role played by them in small scale fisheries.

- Adoption behaviour profiles including extent of adoption, communication, decision making and technological gaps of fishermen in traditional, mechanized, motorized sectors and fish curers in relation to technology transfer by the Institute.
- Evaluation of the training and extension programmes taken up by the Institute in terms of gain in knowledge, awareness, adoption and constraints.
- Studies on ban on monsoon trawling, coastal zone management and socio-legal issues.

Action Research on community based coastal zone management with the specific involvement of women

The coastal communities face a number of issues in their day-to-day life which include low productivity, marginalization from traditional occupations, unemployment, degradation of coastal environment, drudgery, socio-economic backwardness etc. The Dept. of Science and Technology identified the Institute to work out an action research to address these issues by planning and implementing suitable interventions. Women can play a very important role in the development and implementation of the project as they have a stake in the coastal zone, and traditionally carry out the management of households which is the basic unit of the community and have great influence on the development of future generations. The main objectives of the project were as follows:

- Identifying and documenting the existing physical and human resources in the selected coastal area
- Assessing the pattern of dependence of the people living in the area on the resources and traditional and institutional arrangements for protecting the resources.
- Examining the socio-economic and environmental factors involved in the utilization and conservation of the resources.
- Educating the community on the need for sustainable development of the resources and their participation.
- Working out a coastal zone development plan for the selected area based on the information collected and involving community participation.
- The Project Centre at Chellanam was inaugurated on 16th October 2004 by former Minister of Fisheries and Sports, Govt. of Kerala, Shri. Dominic Presentation. A tree planting programme under the project was inaugurated by Dr. Vinitha Sharma, Director, Science and Society, DST, New Delhi. Mangrove saplings which will serve to protect the coast from sea erosion, were also planted by Dr. S. Ayyappan, former DDG(Fy), ICAR and Dr. K. Devadasan, former Director, at Kandakadavu in Chellanam on 21 January 2005 as part of the project activities. A number of local people also participated.

The following thematic areas were identified for development of the coastal zone management plan and selected interventions were implemented for creation of more awareness and further followup action by the Panchayat.

- Responsible fishing
- Alternative livelihood

- Natural resources and sea-erosion
- Sustainable aquaculture/ agriculture
- Drinking water, sanitation and waste disposal

Project centre inauguration at Chellanam

PRA in progress at Chellanam

Aayiram Kandal (Thousand Mangroves)

Chellanam panchayath is one of the coastal villages of Kerala that always bares the brunt of rough seas with sea erosion being a regular occurrence. The CIFT joined hands with Chellanam Panchayath in a unique initiative to guard the shores by planting 1000 mangrove saplings on the coastal stretch from Kandakadavu to South Chellanam.

Training for Coastal Women Groups: Winter camps of 6 days each were conducted for 60 coastal women with the objective to create awareness among the coastal women, the major stakeholders of coastal zone, and involve them in coastal zone management activities by providing them work experiences on the issues related to coastal zone management. Further, training camps were conducted for women self help group members (Kudumbasree) at Chellanam Field Centre premises.

Training on preparation of value added fish products

Participants and faculty of the camp

The trained women group members had registered a women society named as 'Coastal Women Welfare Society, Chellanam' on 8-11-2006. Further technical guidance was given to the members of the society and now they are engaged in the production of value added fish products such as fish pickles, cutlets and dried fish products under the leadership of Mrs. Lilly Varghese, President and Mrs. Lissy Joseph, Secretary of the Society.

Ward Level Workshops on Coastal Zone Management Plan Validation

Ward level workshops were conducted at Chellanam fishing village for validating the plan prepared. A draft on coastal zone management plan for the village was prepared for sustainable coastal development based on the Participatory Rural Appraisal Programmes (PRA) and based on this, discussions were conducted at each ward.

Dr. K. Devadasan, former Director, inaugurating the ward level workshops

Demonstration programmes on community based vermi-compost units, were organized at Chellanam and Puthenthode to popularize model waste management units. Training-cum-demonstration programmes on value added fish products, were periodically given to the Chellanam women society members in the field office at Chellanam. Training on improved gill nets and responsible fishing were organized at Chellanam.

Ongoing Research Projects at CIFT, Cochin

Title of Institute Projects

1) Resource specific large mesh purse seine for large pelagics in Indian EEZ
   Principal Investigator : Dr P. Pravin

2) Studies on handling, processing, preservation and product development of commercially important farmed and wild fresh water fish
   Principal Investigator : Dr George Ninan

3) Improved utilization of fish and shell fish waste
   Principal Investigator : Dr A.A. Zynudheen

4) Post harvest processing of commercially important large pelagic, demersal and by-catch fishes for high value products for modern markets and NEH
   Principal Investigator : Shri P.K. Vijayan

5) Assessment of residual time of antibiotics in farmed aquatic animals by evaluating the metabolites.
   Principal Investigator : Dr K. Ashok Kumar

6) Studies on sustainability parameters for the Indian fish processing industry and the forward and backward linkages.
   Principal Investigator : Dr V. Geethalakshmi

7) Responsible fishing using improved bottom and semi-pelagic trawls
Principal Investigator : Dr M.P. Ramesan

8) Development of sustainable fishing technologies for exploitation of fishery resources in the east coast of India
Principal Investigator : Dr G. Rajeswari

9) Development and evaluation of juvenile excluder devices (JEDs) to reduce the impact of trawling on the marine environment along east coast of India
Principal Investigator : Dr R. Raghuprakash

10) Technological innovations on improved utilization and value addition of marine and cultured fish and fishery products in Gujarat.
Principal Investigator : Dr R. Badonia

11) Studies on the effect of different processing methods, additives and natural preservatives on spoilage and pathogenic bacteria in fish and fishery products.
Principal Investigator : Dr S. Sanjeev

12) Design and development of renewable energy solar-biomass hybrid dryers
Principal Investigator : Dr P.N. Joshi

13) Changing consumer preferences and its impact on domestic fish marketing
Principal Investigator : Dr Nikita Gopal

14) Studies on technology assessment and transfer among the client system
Principal Investigator : Dr S. Balasubramaniam

15) An alternate sustainable livelihood model for coastal fisher folk through market led extension of value added fish products
Principal Investigator : Dr S. Ashaletha

16) Assessment of microbial seafood safety hazards and bio-prospecting of aquatic microbial resources for enzymes.
Principal Investigator : Dr K.V. Lalitha

17) Innovative packaging techniques for processing and preservation of fish products
Principal Investigator : Dr C.N. Ravishankar

18) Bio-evaluation and purification of natural bioactive compounds of therapeutical and nutraceutical significance from aquatic resources
Principal Investigator : Dr Suseela Mathew

New projects:

19) Technologies for utilization of fishery resources at Maharashtra coast
Principal Investigator : Dr R. Chakrabarti

20) Bio-monitoring of bivalve Molluscs and Crustaceans from Indian waters as health promoters and indicators of environmental contaminants
Principal Investigator : Dr P.T. Lakshmanan

21) Studies on the detection, surveillance and implications of hazards in seafood meant for domestic and export market
Principal Investigator : Dr Femeena Hassan

22) Nutritional profiling and hazard assessment of fish and fishery products of marine and lacustrine environs of the east coast of India
Principal Investigator : Dr M.M. Prasad

23) Studies on fortified natural biocides and corrosion resistant composite materials for protection of fishing craft and gear
Principal Investigator : Dr Saly N. Thomas

24) Fishing systems for recreation
Principal Investigator : Dr P. Pravin

NAIP Projects

1. Responsible harvesting and utilisation of selected small pelagic and freshwater fishes
Consortium Principal Investigator : Shri M. Nasser
2. Business Planning and Development unit
Consortium Principal Investigator : Dr. C.N. Ravishanker
3. Bioprospecting of genes and allele mining for abiotic stress tolerance
Co-operating Centre PI : Dr Toms C. Joseph
4. Oceanic tuna fisheries off Lakshadweep seas : A value chain approach
Co-operating Centre PI : Dr T.K. Srinivasa Gopal
5. Mobilising mass media support for sharing agro-information
Co-operating Centre PI : Dr S. Ashaletha
6. Studies on high pressure processing (HPP) of high value perishable commodities
Co-operating Centre PI : Dr J. Bindu
7. Utilisation strategy for Oceanic squids (Cephalopoda) in Arabian Sea:- A value chain approach. Co-operating Centre PI : Smt. K.K. Asha

ICAR - Network Project

1. Nutrient profiling and evaluation of fish as a dietary component
Co-operating Centre PI : Dr T.V. Sankar
2. Capacity building of fisherwomen in post harvest technologies
Co-operating Centre PI : Dr C.N. Ravishankar

MoES/CMLRE Project

Assessment of myctopid resources in the Arabian sea and development of harvest and post harvest technologies
Principal Investigator : Dr M.R. Boopendranath

DOD Project

Resource assessment and biology of deep sea fisheries along the continental slope of Indian EEZ
Principal Investigator : Dr U. Sreedhar

INCOIS Project

In situ time series measurements of bio-optical parameters off Kochi coast
Principal Investigator : Dr Muhammed Ashraf

SAC Project

Euphotic zone production estimation using satellite data as an input to assess potential yield of pelagic herbivores in the Indian EEZ
Principal Investigator : Dr. Muhammed Ashraf

DST Project

Location Specific livelihood interventions for the empowerment of fisherwomen in Kerala
Principal Investigator : Dr. Femeena Hassan

DBT Project

Isolation and characterisation of collagen and gelatin from aquatic sources and development to pharmaceutical and food grade products of commercial importance
Principal Investigator : Dr. Suseela Mathew

Infrastructure and Equipment

Laboratories

The Institute has well equipped laboratories with modern, sophisticated, state-of-the-art equipment for both fundamental and applied research. These laboratories also cater to the needs of the industry by testing processed fishery products, ice, water, and other materials like marine paints, engines etc. Infrastructure for the analyses and information on the chemical contaminants-organochlorine pesticides, polyaromatic hydrocarbons and heavy metal residues-in fish and shellfish are available at CIFT.

Instrumentation Lab

ARIS Cell

The Agricultural Research Information System (ARIS) Cell of the Institute serves as a central facility for computer operations and information technology. Broad band internet service through leased line is available for internet access. All research Divisions and other Sections are provided with internet and intranet access.

Animal House

An animal house at the Headquarters meets the Institute's needs to assess the edibility, nutritive value, probable toxicity etc. of the newer species of fish being harvested, besides routine work on assessment of these factors with fresh and processed fish and fish products.

Animal House

Pilot plant

A NATP Pilot plant attached to the NATP project 'Development and popularization of modern technologies for the production of convenience foods from fish' was inaugurated on 28 July 2004 by Dr. S.L. Mehta, former National Director, NATP.

Engineering Workshop

CIFT has a well equipped engineering workshop at Cochin. Fabrication of the ancillary equipment required as fishing accessories and many of the fabrication needs in the construction of fishing vessels of the Institute have been carried out here.

Digital Library

A Digital Library attached to the main library of the Institute Headquarters at Cochin was also inaugurated on 16 April 2002 by Dr. K. Gopakumar, former DDG (Fy.), ICAR.

Digital Library

Library

The library of the Institute subscribes to all scientific journals relevant to the field. It has access to ASFA and FSTA CD ROMs, which has considerably improved its capacity to provide information on fisheries research and development.

Details of Research Vessels

Name of fishing vessel	Size	Station
Matsyakumari II	17.7 m OAL (steel trawler)	Cochin
MFV Sagar Sakthi	15.24 m OAL (wooden multipurpose fishing vessel)	Cochin
RV Rohita	9.14 m OAL (FRP experimental vessel)	Burla
MFV Sagarkripa	15.5 m OAL (fuel efficient steel trawler)	Veraval
CIFTECH – I	15.4 m OAL (multipurpose steel fishing vessel)	Visakhapatnam

Extension services

Catering to the needs of the industry by dissemination of the research results of the Institute to the actual end users is one of the main activities of the Institute. This is achieved by way of conducting training courses, answering technical queries, supply of various publications including priced and unpriced extension literature, Annual Reports, Research highlights, the quarterly Fish Technology Newsletter, and the Hindi publication 'Jaladhi', arranging exhibitions and film shows, undertaking technical consultancies, observing the National Days, arranging press releases and radio talks.

Training courses

Training is one of the most important methods for transferring the technologies to the actual end users. CIFT organizes demand based regular and adhoc training courses for various categories of personnel sponsored by the industry and organizations, and to other interested entrepreneurs. The courses are arranged in batches based on the number of candidates applied for each training course.

Frontline training courses were organised for the fisheries officials from the State Fisheries Departments, technologists from the seafood processing units, fisherfolk, SHG members and other candidates sponsored by the various organisations. Every year, students from various educational institutions also attend adhoc training programmes on the various subject areas of fishery technology. About 80

Training in Fish Processing Technology

Training to State Fisheries Officials

Training on Responsible Fishing Methods

HACCP training course

to 150 training courses are conducted at this Institute in a year at present.

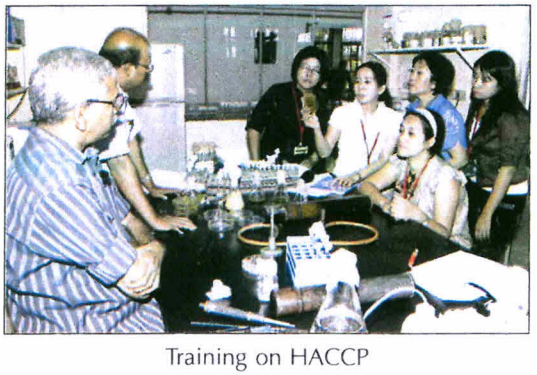
International Training courses

The following International training courses are offered at this Institute and sponsored officials from various countries such as Malaysia, Thailand, Phillippines, Sri Lanka, Bangladesh, Maldives and Myanmar had attended :

- Design and operation of responsible fishing gear
- Seafood quality assurance
- IS/ISO 22000 - HACCP for seafood industry
- Laboratory techniques for the microbiological examination of seafoods

Training on fishing gear

Training programme on value added products



Training on HACCP

Training on extension methodologies

- Laboratory course on the biochemical evaluation of fish and fishery products
- Extension methodologies for coastal fisheries
- Fishery by-products
- Development of fish and shrimp based value added products
- Design and operation of fishing vessels
- Energy efficient and eco-friendly fish drying systems

Technology Assessment and transfer programmes

For assessing the performance of technologies developed at this Institute under the various field conditions, fishing villages were adopted in and around the Headquarters and research centres of CIFT. The following technology transfer programmes were planned and implemented under the special component plan and women component plan in consultation with the development agencies and villagers:

Villages	Technologies transferred
Cochin, Kerala	
Azheekal	❖ Maintenance of fishing craft ❖ Fabrication of square mesh cod end ❖ Hygienic and sanitation in fish handling ❖ Rack drying of fish ❖ Preparation of value added fish products ❖ Preparation of vermin compost

A fish kiosk inaugurated at Azheekal by former DDG (Fisheries)

Chellanam	❖ Production of value added fish products ❖ Fabrication of FRP canoe
Kasaba, Kasargode, Kerala	❖ Improved fish curing methods

Visakhapatnam, Andhra Pradesh

Peddajalaripettah

- Rack drying of fish
- Preparation of value added products
- Hygiene and sanitation in landing centres
- Post-harvest fish handling and preservation techniques

Veraval, Gujarat

Sutrapada Village

- Improvement in fish handling practices
- Drying for internal and export markets
- Rack drying of fish
- Hygiene and sanitation
- Improved utilisation of fish caught in local waters

Burla, Orissa

Kurumkhel, Sapanai, Rampaluga, Thebra and Pujaripali Villages

- Use of insulated ice boxes for fish preservation
- Post-harvest utilisation of fresh water fish and demonstration of ecofriendly fishing gears
- Installation of community fish smoking kilns

Installation of community fish smoking kilns at Kurumkhel, Odisha

Exhibitions

The Institute regularly participates in the exhibitions organised in the different centres/ states of the country by the various organisations. Every year, the Institute organises stalls in about 15 to 20 exhibitions. Through the participation in these exhibitions, the activities and technologies developed at the Institute were explained to the visitors, and had created more awareness about the technologies.

Participation in Exhibitions

Exhibition at Hyderabad

Exhibition at Bhubaneswar

Exhibition at Kolkata

Exhibition at Cochin

Exhibition at Mumbai

Exhibition at Dimapur

Agricultural Technology Information Centre

The Agricultural Technology Information Centre (ATIC) under the National Agricultural Technology Project was allotted to the Institute during the year 2000. The Centre provides on-the-spot display of the latest available technology for all groups of people including traditional users and those in search of new technologies for new ventures.

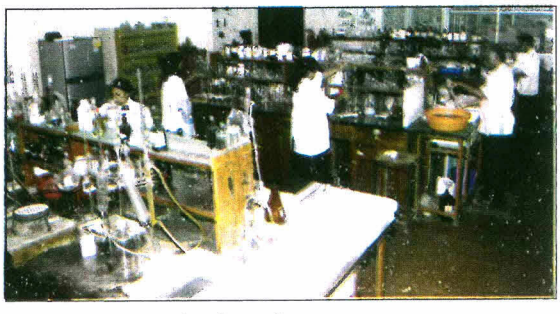
It serves as a single window system with an objective to help both the farmers and stakeholders to provide solution for their problems and make available all technological information along with technology products with facilities such as

- Training
- Diagnostic services
- Sale of fishery products
- Sale of publications
- Advisory services

ATIC Building

Analytical services

The Institute regularly undertakes testing of samples of different types of raw materials and products received from the various fish processing factories, State and Central Government Departments and entrepreneurs, and issued test reports on their quality. The samples tested included fresh and frozen fish and shellfish products, fishing net materials, paints, prawn larvae from hatcheries, swabs from processing tables and workers' hands, chemicals, salt, water, ice, fish packaging materials etc. Considerable number of samples are evaluated for the various prescribed standards including chemical parameters like amines, heavy metals, pesticide residues, antibiotic residues and additives besides the microbiological parameters like TPC, *E. coli, Staphylococcus aureus, Vibrio cholerae, V. parahaemolyticus, Salmonella, Listeria monocytogenes,* etc. Type testing of marine diesel engines was also carried out and performance certificates were issued to the concerned manufacturers in addition to calibration of mercury, alcohol and digital thermometers received from different fish processing plants and the industry.



Analyses in progress

Technology transfer programmes carried out in NEH region

CIFT could successfully transfer many technologies for harvest and post harvest preservation of fish in the NEH region in spite of adverse conditions and limitations. Technologies transferred to NEH states are as follows:

- Fibreglass reinforced plastic canoes
- Rubber wood canoes
- Hygienic production of dry fish

Training at Dimapur, Nagaland

Distribution of FRP Canoes at Imphal

Training on responsible fishing and extension methods

Preparation of value added products demonstration in progress

Training on production of fish ensilage

Handing over the finished rubber wood canoe

Presentation by Dr. Ravishankar on packaging materials

Participants with the CIFT resource persons

- Improved models of fish driers
- Smoke kilns
- Value added fishery products
- Fish ensilage based cattle feed
- Responsible fishing and extension methods
- Community canning centres

Island development programmes

Lakshadweep: With a view to diversify the traditional fishing methods practiced in Lakshadweep, CIFT has designed and field tested improved deep sea gillnets at Kavaratti and Agatti islands of Lakshadweep. Training programmes were conducted for fabrication, rigging, mounting and field operations of different gill nets. Extensive training programmes were carried out for night fishing and operation of collapsible lobster traps and responsible fishing.

Andaman and Nicobar Islands : A project was formulated by CIFT with the assistance of Central Agricultural Research Institute and State Fisheries Department of A&N, for the establishment of fish drying yards and mechanical fish dryers for the fisherwomen in the islands. Technical assistance was given to Directorate of Fisheries, A & N for the construction of FRP and wooden fishing boats as part of Rajiv Gandhi Rehabilitaton Programmes for fishers affected by Tsunami. The Institute provided all necessary inputs to ICAR for preparing documents on the Road map for fisheries developments in A&N and Lakshadweep.

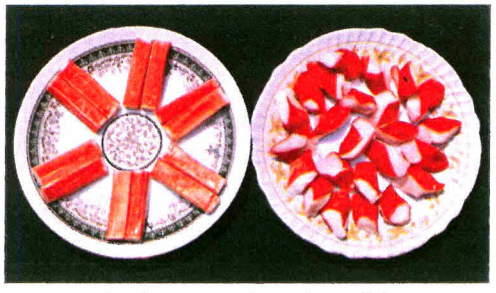
Technologies Popularised/Transferred

- Designs of fishing craft - Designs of more than 12 wooden fishing vessels in the size range of 7.6 m - 15.2 m, Aluminum craft for inshore waters and FRP pole and line fishing vessels for Lakshadweep have been popularised.
- Designs of steel fishing vessels of size 15.5 m OAL, 20 m OAL and fuel efficient vessel of 18 m OAL have been popularised.
- Designs of 'V' form otter boards have been popularised.
- Combination wire ropes were developed and transferred.
- FRP canoes and treated rubber wood canoes for use in backwaters and near-shore waters have been popularised.

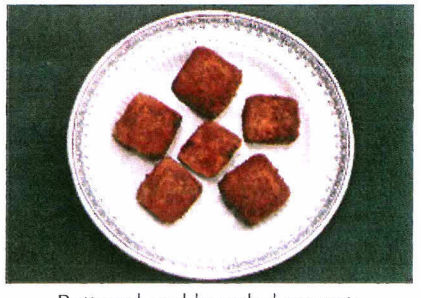
FRP sheathed rubber wood canoe for artisanal sector

- Painting schedules for aluminium magnesium alloy and FRP sheathing for underwater hulls of fishing vessels have been transferred to the boat building industry.
- Antifouling and anticorrosive paints for protection of fishing craft have been transferred.
- Mercury free anodes for cathodic protection of fishing craft have been popularised.
- Protective coating for cast iron propeller has been popularised.
- Fishing gear: With the advent of mechanised fishing, the Institute made notable contribution by developing suitable fishing gear for operation from boats/crafts of varying sizes; long wing trawl, double rig shrimp trawl, shrimp trawl for traditional motorised craft, bulged belly trawl, high opening trawl, large mesh trawl, high speed demersal trawl, midwater trawl, rope trawl, large mesh purse-seine, mini purse-seine, long lines, troll lines and traps. They have been popularised among the fishing community.
- Gill nets for marine and reservoir fisheries: The twine size and mesh size for gill nets and trammel nets have been standardised for common marine fishes like seer, ponpret, hilsa, lobsters, prawns, etc. Likewise gillnets including trammel nets and frame net have also been developed and introduced in reservoirs for the capture of catla, rohu, mrigal, catfish and other miscellaneous fish.
- Turtle Excluder Device (TED) for conservation of marine turtles : Incidental catch of marine turtles is known to occur during commercial trawling operations, particularly along the coast of West Bengal, Orissa, Andhra Pradesh, Tamil Nadu and southern parts of Kerala. CIFT has developed CIFT-TED which is a top exiting, single grid, hard TED of 1000 x 800 mm size, for use by small mechanised trawlers. Popularisation of CIFT-TED is being carried out in maritime states which are affected by fishing induced turtle mortality, in collaboration with MPEDA and respective State Fisheries Departments.
- By-catch reduction devices (BRD) : Incidental catches of non-target species and size groups during trawling operations is an important issue which is linked with conservation of resources and bio-diversity. Juveniles and sub-adults of commercially important fin fishes form a significant proportion of trawl by-catch. CIFT has conducted investigations on several by-catch reduction devices such as Radial Escapement device, fish eye and rigid single grid separator devices, which facilitate the escape of non-target species and juveniles from trawls. Square mesh panels have been developed in order to improve the selectivity of trawl codends and protect the juveniles. These responsible fishing techniques are being popularised.

- Improved methods for freezing, freeze drying, canning, drying and curing of different types of fish and shell fish have been popularised.
- Cleaning schedules for fish processing establishments and boat decks and preparation of deodorant and antiseptic ointment for use in the fish processing industry have been transferred.
- Economic utilization of low grade fish and conversion of fish wastes into useful by-products have been popularised.
- Ready-to-use isinglass from fish maws has been popularised.
- High gel strength agar from sea weeds has been developed and popularised.
- Chitin and chitosan from prawn shell waste : CIFT has developed methods for extraction of chitin/chitosan from prawn shell waste. Chitin can be incorporated in the diet for broiler chicks. Use of chitin for the production of glucosamine hydrochloride which finds application in antibiotics and baby food formulations is already known. Chitosan can be used as a sizing material for textiles. It can be used as a water/wine clarifying agent and also in the preparation of cosmetics, pharmaceuticals, etc. Through consultancies, they have been transferred to interested entrepreneurs.
- Methods for production of value added products such as wafers, pickles and soup powder from fish/shellfish, fish balls, ready-to-cook and fry products, battered and breaded products from marine and freshwater fishes have been developed and transferred to the interested entrepreneurs.

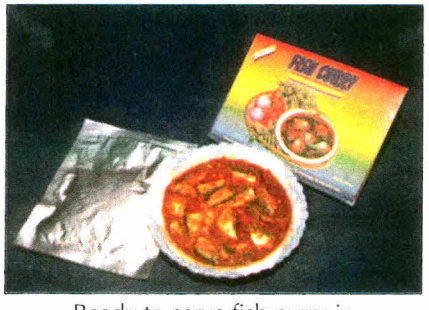


Analogue products from fish



Battered and breaded nuggets

- Ready to serve fish curry in flexible pouches : CIFT has successfully developed a suitable three-layer configuration of flexible pouches which can perform the packaging function equally well as metal cans, and is free from the disadvantages met with in them. This is a retortable flexible



Ready to serve fish curry in retortable pouch

Tuna in oil in TFS cans

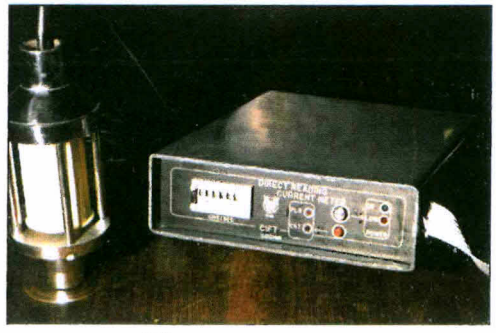
Fish Kure

pouch based on polyester/aluminium foil/Cast polypropelene. Flexible pouches are now manufactured in India employing the configuration developed by CIFT and this has opened the way for commercialisation of heat processed fish curry in flexible pouches. CIFT has standardised the process for the production of fish curry in these pouches using over pressure autoclave and the curry processed in them has remained without any change for over a year at room temperature. This technology has been transferred through consultancy services.

- Improved packaging materials for transportation and storage of fish have been popularised.
- Solar dryers with LPG back-up for energy efficient and hygienic production of dry fish having capacities ranging from 250 kg, 500 kg and 1000 kg per batch have been popularised.

Solar dryer with LPG back-up

- Electronic instruments for application in fishing technology, fish processing technology, aquaculture, marine environmental monitoring, agricultural investigations etc. have been popularised.



Water current meter

- Other technologies/improved methods popularised are as follows : Method for isolation of squalene from shark liver oil for use in cosmetics; Chloritest paper for instant reading of chlorine level in water used in fish processing plants; Method for extraction of shark fin rays; Technology for processing shark cartilage; Package of HACCP practices for food processing industry; Fine grade absorbable surgical sutures from fish gut; Procedure for implementation of HACCP; Design of energy efficient treatment plant for effluent water from processing plants; Collagen - chitosan film from fish skin, bone and air bladder for treatment of burns and as a barrier material in guided tissue regeneration (GTR) in dentistry; Method for preparation of n-3 polyunsaturated fatty acid concentrates from fish oils; Specifications for various types of seafood, process water and ice.

Important awards, honours and recognitions

- The Institute received the prestigious **Sardar Patel Outstanding ICAR Institution Award** TWICE in the years 2000 and 2006.
- Dr. M.R. Boopendranath, Dr. Pravin Puthra, Shri T.R. Gibin Kumar and Shri S. Sabu (SRFs) - **First International Smart Gear Award** instituted by WWF (World Wildlife Fund) for category By-catch devices - for the development of a fishing device which provides facilities for juvenile fish escapement and shrimp sorting in bottom operated commercial shrimp trawl nets
- The Institute received the **Rajarshi Tandon Rajbhasha Puraskar** on five occasions in 2000-2001, 2001-2002, 2004-2005, 2006-2007 and 2008-2009 instituted by ICAR for best implementation of Official Language among ICAR Institutes. The first **Ganesh Sankar Vidyarthi Award** for the best Hindi scientific house magazine was also bagged by the Institute for its house magazine 'Jaladhi'
- Dr. K. Gopakumar, Shri P.V. Prabhu, Shri P. Madhavan and Dr. K.G. Ramachandran Nair - **ICAR Award for Team Research** for 1991-1993
- Dr. T.K. Srinivasa Gopal, Shri T.S. Unnikrishnan Nair, Shri P.K. Vijayan and Dr. C.N. Ravishankar- **ICAR Award for Team Research** for 1999-2000
- Dr. K. Gopakumar - **Rafi Ahmed Kidwai Award** (ICAR) for 1993-95 for outstanding contribution in fisheries science
- **Jawaharlal Nehru Award** (ICAR) for best Ph. D. thesis
  - Dr. P.G. Viswanathan Nair (1983)
  - Dr. K.G. Ramachandran Nair (1986)
  - Dr. Leela Edwin (2000)
  - Dr. Saly N. Thomas (2005)
  - Dr. C.O. Mohan (2009)

Other awards

- Dr. Krishna Srinath - National award of DST for Womens development through application of science and technology for 2000
- Dr. T. K. Srinivasa Gopal, Dr. C. N. Ravishankar and Smt. J. Bindu- K. Chidambaram Memorial Award- 2005 for outstanding work on development of value added fishery products in India by Fisheries Technocrats Forum, Chennai
- Dr. P.N. Joshi, Principal Scientist & Head, Engineering Division received the Kerala State Energy Conservation commendation certificates - 2006 & 2009 instituted by Energy Management Centre, an autonomous Institution under Govt. of Kerala
- Dr. B. Meenakumari
  - Young Scientist Award 1989-by Kerala Science Congress
  - JEB Prize 1989 - Young Scientist Award by Academy of Environmental Biology

- ❖ Panjabrao Deshmukh Women Agricultural Scientist Award 2002, ICAR, NewDelhi
- ❖ Women And Technological Innovation (WATI) National Award (Triennial) for 2007 instituted by Bharathiya Stree Shakthi, Mumbai
- ❖ Received the Smt. Chandaben Mohanbhai Patel Industrial Research Award for women scientist for the year 2003, instituted by Vibidhlaxi Audyogik Samshodhan Vikas (VASVIK)
- ❖ Conferred with Fellowship of the Academy of Science, Engineering and Technology (F. ASET) for outstanding contributions to inland and marine fisheries sectors
- ❖ Received the 6th R.C. Daleela Oration Award 2009 from ICRISAT, Hyderabad

- Dr. Srinivasa Gopal, Head, Fish Processing Technology has been conferred with Fellow of National Academy of Agricultural Sciences in the field of Agricultural Engineering and Technology with effect from 1st January, 2010

Honours and recognitions

- The Institute has been awarded the prestigeous **NABL accreditation** as per ISO 17025 by National Accreditation Board for testing and Calibration Laboratories, New Delhi. The scope of NABL accreditation covers three major fields of testing namely chemical, mechanical and biological fields.
- The Institute was also **recognized as a referral laboratory** by the ICAR for tackling various food quality problems of international importance and for evaluating the seafood processing plants/ factory and fishing vessels.
- CIFT is the member of **Inter Departmental Panel (IDP)** constituted by Government of India for preliminary inspection and final approval of fish processing plants for export to European Union countries as per international norms.
- The Institute is the member of **Bureau of Indian Standards** for periodical revision of existing Indian standards and evaluation of new standards for fresh and processed fish products as well as materials for fabrication of fishing gear.
- CIFT is identified as one of the five **Zonal Technology Management Centres** (ZTMC) of ICAR. 22 ICAR Institutions in the southern zone will transfer their expertise through CIFT, Cochin. There will be convergence with the business planning and development (BPD) component of the National Agricultural Innovation Project (NAIP).

For further information, please contact :

The Director
Central Institute of Fisheries Technology
Matsyapuri P.O., Willingdon Island, Cochin - 682 029, Kerala, India.
Phone: 0484-2666845 (14 lines); Fax: 091-484-2668212; Telegram: MATSYAOUDYOGIKI/ FISHTECH
E-mail: cift@ciftmail.org; enk_ciftaris@sancharnet.in; Website: www.cift.res.in

Dr. Srinivasa Gopal, Director CIFT receiving Rajarshi Tandon award
from Shri Sharad Pawar on 16th July 2010

Central Institute of Fisheries Technology

(Indian Council of Agricultural Research)

Matsyapuri P.O., Willingdon Island, Cochin - 682 029, Kerala, India.
Phone: 0484-2666845 (14 lines); Fax: 091-484-2668212; Telegram: MATSYAOUDYOGIKI/ FISHTECH
E-mail: cift@ciftmail.org; enk_ciftaris@sancharnet.in; Website: www.cift.res.in

January 2011