

Strategic Plan of CIFT

2011-2016



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

Preamble

The Central Institute of Fisheries Technology (CIFT) is the only national Institute working on all aspects related to harvest and post harvest technologies in fish. The CIFT was set up as Central Fisheries Technological Research Station on the recommendations of a high power committee constituted by the Ministry of Food and Agriculture, Government of India. It started functioning at Cochin on 29th April 1957, under the Department of Agriculture of the then Ministry of Food and Agriculture. The initial complement of craft and gear researchers was expanded to include the fish processing in 1958 and extension in 1961. The Institute was given its present name in 1962. The administrative control of the Institute was brought under the Indian Council of Agricultural Research from 1st October, 1967. The Headquarters of the Institute is at Cochin with Research Centres at Veraval (Gujarat), Visakhapatnam (Andhra Pradesh) and Mumbai (Maharashtra). Research work of the Institute is orchestrated through seven Divisions viz., (i) Fishing Technology Division, (ii) Fish Processing Division, (iii) Quality Assurance & Management Division, (iv) Biochemistry and Nutrition Division, (v) Microbiology, Fermentation and Biotechnology Division, (vi) Engineering Division and (vii) Extension, Information and Statistics Division.

The Institute has well equipped laboratories with modern, sophisticated, state-of-the-art equipment for both fundamental and applied research, an excellent library, a workshop and an animal house, an Agricultural Knowledge Management Centre (AKMC) and Agricultural Technology Information Centre (ATIC). The laboratories of the Institute also cater to the needs of the industry by testing processed fishery products, ice, water, and other materials like fishing gear and craft materials, packaging materials, marine paints, fishing craft and engines. A Business Planning & Development (BPD) Unit is also functional in the Institute to ensure commercialization of technologies on a public-private partnership mode. The Institute also facilitates IP management of ICAR Institutes in the Southern region through the Zonal Technology Management Centre (ZTMC).

The Central Institute of Fisheries Technology has played a vital role in the modernisation of Indian fisheries and in the development of both the fishing and fish processing industries to its present stature. The impact of CIFT on the development of fishing, seafood processing, seafood safety and quality control in India is well recognised. The Institute played an important role in facilitating mechanisation and modernisation of fishing fleet and introduction of durable synthetic fishing gear materials and improved gear designs and practices in Indian fisheries. The Institute's interventions have resulted in the adoption of improved methods of trawling, purse seining, gill netting, lining and trap operations and efficient vessel designs; improved methods of fish curing, fish processing, fish based value added products, fish waste utilisation and packaging; sanitary and hygienic standards based on microbiological and biochemical quality parameters and HACCP. CIFT has gained recognition for the production of bioactive and pharmaceutical compounds from aquatic resources. The Institute has developed several instruments and machineries for meeting specific needs of fishing and fish processing sectors. Recent focus has

been on development of conservation technologies such as energy efficient fishing vessels, bycatch reduction technologies, juvenile excluder devices, turtle excluder devices, energy efficient fishing gears, renewable energy based fish processing systems such as solar fish dryers and utilisation of fishery byproducts and fishery wastes, intelligent and active packaging systems and development of innovative quality systems.

Research Centres in different parts of the country caters to redressal of location specific technological problems faced by the industries. CIFT gained the status as referral laboratory in fishery technology. It is also accredited by National Accreditation Board for Laboratories (NABL). The Institute conducts regular need based training programmes in responsible fishing techniques, fish processing, value added fish based products, quality assurance systems, fisheries microbiology and biochemistry and stakeholder empowerment programmes particularly targeting women and weaker sections with specific programmes for backward areas of Islands and North East region of the country. CIFT has been awarded as best Institute in the ICAR system twice, in the years of 2000 and 2006.

While the fisheries sector is facing challenges in terms of excess capacity, resource depletion and changes in the fisheries environment in the coastal waters, under-utilised and unutilised resources in the deeper waters hold potential along with rapid expansion envisaged in the aquaculture sector and culture based capture fisheries from reservoirs. This calls for dual strategies of application of resource conservation technologies in the shelf waters under an appropriate management plan and diversification of fishing to under-utilised resources such as mesopelagics, cephalopods and large pelagics in the deeper waters. Greater focus is required for development of appropriate post-harvest technologies for the new and under-utilised resources and for handling the probable production enhancements from aquaculture and culture based capture fisheries. Seafood safety systems and standards for the domestic market require focused attention, while continuous attention is required to deal with emerging challenges in terms of stricter quality standards, compliance requirements and policy changes by the importing nations. Expanding aquaculture and culture based capture fisheries would bring in its own challenges in terms of the need for development of region specific harvesting systems, market specific processing, value addition, product development, and quality assurance systems. Minimisation of harvest and post-harvest losses and conservation of energy in the harvest and post-harvest operations would be important policy objectives and technology challenges for the future.

Section 1: Vision, Mission, Objectives and Functions

Vision

To facilitate sustainable harvesting and total utilization of fishery resources through innovations in harvest and post harvest technologies.

Mission

Ensure responsible harvesting of fishery resources through eco-friendly, energy efficient and economical means; ensure total utilization of the harvested fish through appropriate processing, value addition, packaging and waste utilization; ensure food safety and nutritional security to the consumer and minimise carbon and water footprint per unit volume; and to ensure equitable benefits to the stakeholders, across the value chain.

Objectives

- To conduct basic, strategic and applied research in fishing and fish processing.
- To develop designs for fuel efficient fishing vessels and fishing gear for responsible fishing.
- To develop technologies for commercial isolation of bioactive compounds and industrially important products from fish and fishery wastes.
- To design innovative implements and machineries for fishing and fish processing and pilot plants for facilitating commercialization of technologies developed.
- To do advanced research in food safety in fish and fishery products.
- To provide training and consultancy services in fishing and fish processing.

Functions

- Develop technologies for responsible harvesting of fishery resources from marine, inland and aquaculture systems.
- Provide technologies for total utilization of harvested fishery resources.
- Facilitate introduction of green technologies in the fishing and fish processing sectors, to minimise carbon footprint of seafood.
- Prospect the aquatic resources for bioactive molecules and novel genes of pharmacological, nutraceutical or industrial value.
- Develop quality systems and standards appropriate for export and domestic markets.
- Facilitate technology commercialization through means such as consultancies, training, demonstration and extension education, semi-commercial production facilities for private incubatees, through proactive Public-Private partnership.
- Capacity building of the scientific manpower as well as the stakeholders.

Section2 : Assessment of the Situation in Fisheries Sector

Likely scenario in the fisheries sector during the next few years may include the following:

- Further intensification of fishing pressure in the shelf and deep seas is possible in the next few years, due to addition of fishing units and enhancement of fishing efficiency in terms of vessel capacities, fishing power of gear systems and acoustic and satellite based fish detection systems and electronic navigation systems. This may raise issues of long term sustainability and impact on biodiversity and may result in diminishing returns in terms of landings and catch per unit effort.
- There will be increasing demand for development and implementation of conservation technologies for minimising negative impacts of fishing on resources, biodiversity and environment. These may include technologies for bycatch reduction, protection of vulnerable species, minimising energy use in harvest and post-harvest operations and minimising environmental impacts and materials protection technologies.
- Problems of scarcity and cost of timber resources for boat building, biodegradation and corrosion may further aggravate and may require intensive work on alternate boat building materials.
- Climate change is likely to show its impacts causing regime shifts of certain commercial species which may affect their regional availability and abundance, which in turn may impact on the fish harvesting and processing sectors, either negatively or positively.
- Requirement for the regionalisation and implementation of the FAO Code of Conduct for Responsible Fisheries, adoption and implementation of Ecosystem based Fisheries Management (EFM) and effective control of illegal, unreported and unregulated (IUU) fishing to management of fisheries may come to the forefront.
- Fishery certification, ecolabelling and traceability may become important issues influencing international seafood trade from India, in the next few years and expertise and infrastructure may have to be developed to address these issues on national and international level.
- Reservoir fisheries may get a boost, due to its high potential in enhancement of national fish production. Cluster based integration in harvest and post harvest operations, value addition and marketing, under value chain concept may have to be evolved. Factors affecting riverine fish production such as pollution, destructive fishing and overfishing may aggravate in the next few years and may need management redressel.
- Unconventional resources such as oceanic cephalopods and myctophids may become significant sources of seafood supply in the next few years, in the context of stagnation and shortfall in the availability of traditional fishery resources, and these developments may demand appropriate

technology interventions for their sustainable harvesting, value addition and utilisation.

- Further enhancement in India-based tuna fishing effort may take place in Indian Ocean region and accompanying effort in improving harvesting and processing of high value tuna products may be required.
- Advanced techniques for seafood preservation such as non-thermal processing may become available and widely applied in seafood processing and preservation. Value addition will be the key principle in guiding product development. A zero-waste approach will be warranted with fishery waste also converted to economical products. Packaging will play an important role in determining consumer acceptability with respect to perceptions on safety as well as maintenance of quality.
- Newer products that have wide ranging applications may be available from the large aquatic resources, including microbes.
- There is need to mainstream fish in the food habits of the Indian population with better understanding of the role of fish in decreasing malnutrition and improving health and creation of awareness about its significance.
- Seafood safety issues may bring in newer challenges with the emergence of new forms and variants of pathogens. The issue will also come into focus with increasing stress on the domestic market for promotion of seafood products.
- Increased awareness of consumer regarding the usefulness of fish as a source of nutrition and the changing demands for newer and convenient products that are easy to cook or consume will call for intensified efforts in this area.
- The national and international policy regimes vis-à-vis trade, climate change, conservation and environment are changing rapidly and these will continue to have an impact on the fisheries sector of the country.
- The traditional systems of technology transfer will undergo changes and innovative models including public-private partnerships will evolve making the process of technology commercialization more dynamic and a truly two way process.
- Intellectual Property protection will see new challenges in the face of the need for judicious commercialization and responding to societal needs.

2A. What external factors will impact us?

a. Political

Enabling policy framework and political thrust on resource and energy conservation, protection of fisheries environment and biodiversity are essential to ensure long-term sustainability of fisheries. Political factors may continue to be conducive for development of fisheries; however better stress need to be given for sustainability of coastal fisheries, minimization waste in harvest and post-harvest operations, energy conservation and protection of fisheries

environment, by evolving appropriate policy framework and identifying thrust areas for development.

b. Economic

India is the third largest producer of fish in the world and the second largest producer from aquaculture. The contribution of fisheries to the GDP during 2009-10 was 0.8 per cent. The fishery has emerged as a sunrise sector which provides food, employment and economic benefits to large sections of the society. It is a source of livelihood for about 15 million people engaged fully, partially or in subsidiary activities pertaining to the sector. Besides, an equal number are engaged in ancillary activities in fisheries and aquaculture. Total fish production in 2009-10 stood at 7.85 million tonnes comprising of 4.87 million tonnes from Inland and 2.98 million tonnes from Marine sector. The export of fish and fish products have shown a steady growth and during 2010-11, 813091 tonnes of seafood valued at Rs.12901.47 crore (USD 2856.92 million) were exported to nearly 100 countries. Marine fishery potential of the Indian Exclusive Economic Zone (EEZ) is estimated at about 3.93 million tonnes. Fisheries encompassing capture and culture sectors will continue to be a major economic driver in India.

c. Socio-cultural

Fisheries is a major source of food and provides employment and economic benefits to large sections of the society in India, irrespective of their income levels, religion or social background. It is also a major endogenous symbol of the food culture. Fish is also very significant nutritionally, being an important source of quality proteins and fats as well as vitamins and minerals. Its role in the food security of all the different cultural and economic segments of the domestic consumers is indisputable. The fisheries development policies need to explicitly recognize this fact while planning growth of the sector.

d. Technological

In the primary sector, the production has witnessed a plateauing of catches from the marine and inland capture fisheries while showing an increasing trend in aquaculture production. The scenario in the marine sector is that unbridled expansion of fishing effort is taking place leading to depletion of resources and inter-sectoral conflicts due to open access nature of the fisheries. About 2,44,000 fishing crafts of various sizes and classes are under operation. Problems of juvenile finfish mortality and bycatch and discards increased with the intensification of shrimp trawling. The need for sustainability and conservation of resources has taken centre stage in the shelf fisheries.

In the inland sector, the productivity of riverine systems remain low and there is general agreement among fishery experts that the overall production from Indian reservoirs could be substantially raised, with adequate management measures such as optimum fishing effort, responsible fishing, stocking support and mesh size regulation. Fishing implements employed for inland fisheries of India are traditional and are mostly of non-selective type, and also include

prohibited practices like fishing with poison and explosives. Fishing crafts are largely traditional with fibreglass canoes catching up in certain areas.

Emerging trends and issues in aquaculture are organic aquaculture; integrated agriculture-aquaculture; open sea cage culture; live transportation of crabs, lobsters and finfishes; marine and freshwater ornamentals; impact of aquatic invasive alien species and associated trans-boundary pathogens.

The export basket which was earlier dominated by shrimp, has diversified to frozen finfish, squid, cuttlefish, fillets and other products. However, shrimp continues to dominate the value realization from the export sector. Diversification into value added products has not really taken off in the country. Low capacity utilization of the industry as a result of non-availability of sufficient raw material continues to be an issue, even though imports have been liberalized. The industry has been facing imposition of newer standards by importing countries and the additional costs of compliance have affected profitability. Adopting food safety systems will become imperative in the coming years with the emergence of newer pathogens.

The industry is also increasingly turning to the domestic sector. Marketing, especially in the domestic sector has been characterized by complex channels and multiple players. The standards of hygiene and sanitation leave a lot to be desired. The setting up of the National Fisheries Development Board gave an impetus to development of domestic markets and one of the critical areas in this process is the development of standards which can be implemented and monitored, for building a network of high quality, world class markets.

International trade requirements like traceability are going to be essential for products to enter major importing markets and to ensure seafood safety. Certification and ecolabelling of fishery products will be directly related to better management practices. These, if implemented in a fair and practical way, sensitive to the needs of small producers, may provide opportunities to support responsible development of the sector, addressing negative environmental and social concerns. Principles, criteria and standards need to be developed and approaches to certification have to be harmonized, within the region.

The potential for isolation of bioactive substances from the vast and diverse aquatic resources is being discovered with scientific advancements in this area of research. Since India is blessed with a wide range of aquatic systems and resources this area holds great potential for research.

e. Environmental

Environmental issues pertaining to fisheries may continue to figure prominently and demand attention during the strategic plan period. Issues may include oil spills, coastal pollution from point and non-point sources, plastic debris in fisheries environment, waste generated during harvest and post-harvest operations and may require stricter enforcement of control measures.

f. Legal

Fisheries sustainability and related environmental issues may require stricter enforcement of existing national and international legislation and introduction of

new legislation to protect fisheries environment and biodiversity and ensure long-term sustainability of resources. Evolution of binding legislation for regionalization of responsible fisheries is envisaged, towards this end.

2B. Who are our stakeholders ?

The stakeholder analysis has indicated that 14 categories of stakeholders may depend on the services offered by the Institute, either directly or indirectly. They include:

- Stakeholders in fishing sector
- Stakeholders in aquaculture sector
- Stakeholders in fish pre-processing sector
- Stakeholders in fish processing sector
- Stakeholders in fish transportation sector
- Stakeholders in fish marketing sector
- Fish exporters
- Fish consumers
- Fisheries Departments of State and Union Governments
- Fisheries related research organizations
- Fisheries related environmental groups
- Fisheries related NGOs
- Fisheries related drug, nutraceutical and industrial groups
- Fisheries related conservation groups

The stakeholders have the power to collaborate in participatory research programmes designed to address the issues in harvest and post-harvest sectors in fisheries, such as resources conservation, protection of fisheries environment and biodiversity and benefit from the adoption of research products. Deficiencies in such collaboration may affect the progress in the area of research and development and in addressing technological issues, in a time-bound manner. The stakeholders expect timely transmission of research products which will be useful for enhancing production, support sustainability, value addition, energy conservation and waste minimization in harvest and post-harvest operations. Explicit cooperation is expected from stakeholders while undertaking the research and development programmes related to fisheries development and conservation and its responsible utilisation.

2C. What are our strengths and weaknesses?

Strengths

- CIFT is the only multi-disciplinary research institute in the country with capabilities for dealing with the entire range of harvest and post harvest technology of fish. The contribution of CIFT on the development of

fishing, seafood processing, seafood safety and quality control in India is well recognised. The Institute played an important role in facilitating modernisation of both harvest and post-harvest sectors in Indian fisheries.

- The Institute has well equipped laboratories with modern, sophisticated, state-of-the-art equipment for both fundamental and applied research, an excellent library, a workshop and an animal house, an Agricultural Knowledge Management Centre (AKMC) and Agricultural Technology Information Centre (ATIC). The laboratories of the Institute also cater to the needs of the industry by testing processed fishery products, ice, water, and other materials like fishing gear and craft materials, packaging materials, marine paints, fishing craft and engines.
- A Business Planning & Development (BPD) Unit is functional in the Institute to ensure commercialization of technologies on a public-private partnership mode. The Institute also facilitates IP management of ICAR Institutes in the Southern region through the Zonal Technology Management Centre (ZTMC).
- Availability of Highly competent and trained R&D staff.
- Strategically located Research Centres to cater to the region specific needs in both marine and inland fisheries.
- A fleet of research vessels for inland, coastal and offshore fisheries investigations.
- Pilot plant facilities for processing and production of fishery products, an animal house for nutritional studies and engineering workshop.
- Identified for manning the Supervisory Audit Team (SAT) and is represented in the Inter Departmental Panel (IDP) of Export Inspection Council of India for approving and monitoring fish processing units exporting to European Union.
- Approved national institute for testing fishery products for exports and recognized by EC and FDA. It also serves as a national agency for standardisation of fishing gear and processed fishery products.

Weaknesses

- Shortage of manpower due to retirement of experienced scientist and staff on superannuation and insufficiency in recruitment.
- The Institute is housed in about 3.93 acres of land which is leased from the Cochin Port Trust (Ministry of Surface Transport). The space is insufficient for a national Institute of CIFT's stature and for future expansion of facilities. Action is needed to purchase or permanently acquire the leased land and additional area from the Port Trust
- There are at present no berthing facilities for fishing craft. CIFT is now dependent on other organizations for this facility.
- Funds are often insufficient for infrastructure development, HRD and R&D programmes.

- The Research centres have to be strengthened with adequate number of scientific and other personnel, providing infrastructural facilities and adequate budget.

Opportunities

- CIFT has the potential to become an International centre of excellence, offering academic programmes, training facilities and consultancy service to tropical Asian countries.
- The importance of fisheries in the national economy is increasing fast and CIFT can play a very vital role in supporting this development.
- There will be increasing demand from the industry for testing fish and fish products as our exports increase and also CIFT can develop the code of practices for packaging. This is an area where very few institutions have built up facilities and expertise. CIFT team can be a leader in this area.
- There is scope for introducing energy efficient 'green fishing craft' and gear for sustainable fisheries. If suitably strengthened, this facility can help in bringing out new generation of energy efficient and eco-friendly designs of fishing vessels and gears.
- A strong domestic market for fresh fish, processed fishery products and ready to eat fishery products is emerging fast. CIFT can play a vital role in bringing about this much needed change of value addition and diversification, through technological inputs.
- Deep sea and distant water fishing will mean special problems of onboard handling, preservation, packaging, quality control, transport and product development which will need more R&D attention.
- CIFT can play a significant role in the all round development of inland fisheries and aquaculture, focussing on harvest and post-harvest aspects.
- R&D for development of new byproducts and for waste utilisation will be needed in the years ahead which can be provided by CIFT, with its strong background in this area.
- CIFT is certain to be called upon to play a greater role in quality assurance, pollution control in water bodies and environmental protection. The seafood safety requirements in overseas and domestic markets has opened up a lot of opportunities for development of package of practices for food safety, rapid detection of hazards and hazard monitoring, efficient processes for waste reduction and treatment of effluents.
- Opportunities for development of novel products with therapeutic, nutritional and industrial importance from aquatic sources have to be exploited.
- CIFT has to gear itself to function as a pivotal consultancy agency in implementing the Environmental Impact Assessment (EIA) when this becomes mandatory in future projects.

Threats

- Recruitment of CIFT staff has been inadequate and patchy, and unless young blood is quickly put in place and a good second line of command established, all past achievements will be nullified.
- Non-sustainable growth of the fisheries sector and environmental degradation may threaten fishery resources and future development of the institute.
- Failure to implement scientific management measures to regulate capture fisheries may lead to fishery collapses and inter-sectoral conflicts.
- Disabling policies, changing political priorities, negative public opinion, market forces and budgetary constraints could affect development and opportunities.

2C. What do we need to learn?

Critical learning agenda need to include latest developments and advances in resource conservation, conversion of waste into wealth and energy conservation strategies and cutting edge technologies in areas such as non-thermal food preservation; nano-technology applications in protection of craft and gear material and seafood preservation and packaging; seafood safety and quality assurance management. Areas of critical learning may also encompass impact of climate change and mitigation measures required in the area of fisheries harvest and post-harvest operations.

3A. What are the potential strategies?

The potential strategies include the following and are based on the immediate and projected requirements of fisheries sector during 2011-16:

- Sustainability of the fishery resources – marine and inland,
- Continued optimization of fishing gear for marine, inland and the aquaculture sector, in terms of selectivity and environmental footprint,
- Conservation of biodiversity through optimization of fishing effort, prevention of capture of juveniles and non-targeted catches by suitable technical measures,
- Development of harvest and post-harvest technologies for the non-conventional deep sea resources,
- Enhancement of shelf fishery resources,
- Value addition along the value chain,
- Utilization of fishery wastes
- Ensuring environmental safety in harvest and post-harvest operations,
- Energy conservation in fish production and post-harvest sectors,
- Ensuring aquatic food safety and traceability,
- Responsible utilization of landed fish,
- Minimizing harvest and post-harvest losses,
- Suitable inputs for policy formulation and
- Effective transfer of technology.

3B. How will we engage our stakeholders?

The stakeholders will be engaged through dialogue and engagement in research programmes in participatory mode.

3C. How will we build our knowledge and capabilities?

A critical learning agenda will be developed to include latest developments and advances in resource conservation, waste minimization and energy conservation strategies and cutting edge technologies in areas such as non-thermal food preservation; nano-technology applications, seafood preservation and packaging; seafood safety and quality assurance management; impact of climate change and mitigation measures in harvest and post-harvest operations; socio-economic dimensions of fisheries development.

Capacity building of the R&D personnel will be continued through national as well as international training opportunities, through ICAR initiatives.

3D. What are the priorities ?

Prioritization based on effectiveness and impact, feasibility and acceptability by stakeholders are enumerated below:

Strategic initiatives	Weightage
Strategic initiative 1. Development of improved craft and gear materials and Responsible fish harvesting systems	: 15
Strategic initiative 2. Development of technologies for processing, value addition and packaging of fish and fishery products and for utilization of fishery wastes.	: 15
Strategic initiative 3. Development of technologies for isolation of bioactive compounds and Industrially important products from Aquatic sources.	: 14
Strategic initiative 4. Development and management of quality and safety system for fish and Fishery products.	: 14
Strategic initiative 5. Assessment of microbial seafood safety hazards and bioprospecting of aquatic microbial resources.	: 14
Strategic initiative 6. Energy conservation in fish processing, through use of renewable energy sources.	: 14
Strategic initiative 7 Studies on transfer of technology (ToT) and socioeconomics in Fisheries sector	: 14

Section 4: Implementation Plan

- Conducting focused, need based and demand driven research programmes in developing harvest and post-harvest technologies for marine, inland and aquaculture resources and in the area of food safety.
 - Research programme formulation with stakeholder participation and prioritization of research programmes to be undertaken at Institute level
 - Continued development of responsible fishing systems for inland and marine capture fisheries incorporating principles of bycatch reduction, protection of biodiversity, minimisation of environmental impacts and energy conservation.
 - Development of appropriate harvesting systems and strategies for aquaculture.
 - Standardisation of craft-gear combinations in terms of fishing power and capacities.
 - Development and standardisation of processing technologies for emerging species from aquaculture and less utilized species from inland and marine capture fisheries.
 - Continued development of processes for utilization of processing waste and low value bycatch for isolation of novel potentially commercial products.
 - Continued development of appropriate packaging technologies for improvement of consumer appeal and better storage.
 - Developing food safety standards for the domestic market along the value chain and standards for processes and products.
 - Rapid techniques for identification of hazards and surveillance of aquatic systems.
- Carry out basic research for isolation of useful bioactive substances and novel genes
 - Extraction and characterization of bio-molecules and genes for therapeutically and industrially significant biological activities, including anti-inflammatory, antiviral, anti-bacterial, anti-oxidant and anticoagulant activities.
- Focused research on green technologies
 - Development of fuel saving technologies and practices for existing fleet and onboard fish processing.
 - Development of green technologies and practices for the fish processing sector, including fuel saving, recycling and reuse of process water.
- Efficient technology transfer and policy analysis
 - Developing innovative models for technology transfer based on need evaluation and impact assessment.
 - Technology incubation

- IP management
- Sectoral level analysis of impacts of policies
- Capacity building for stakeholders
 - Responsible fishing
 - Fish processing, packaging and value addition
 - Fishery waste utilisation
 - Energy conservation in fishing and fish processing
 - Food safety and quality

Section 5: Linkages between Strategic Plan and RFD

- Objectives in the annual RFDs during 2011-16 will be aligned with the implementation plan in the Strategic Plan for the period 2011-16.

Section 6: Cross departmental and cross functional issues

- Initiatives under strategic plan will maintain clear and consistent alignment with 12th Plan and budget and other related documents.

Section 7: Monitoring and reviewing arrangements

- Performance Monitoring and Evaluation System (PMES)
- The PME Cell.
- Results Framework Document (RFD) review process.
- The Research Advisory Committee (RAC) constituted of Chairman and five external members and an in house Member Secretary, which meets annually.
- The Institute Research Council (IRC), which meets annually.
- Quinquennial Review Team (QRT) constituted by ICAR every five years