



The Journal of the Bay of Bengal Programme
Inter-Governmental Organisation

Code of Conduct for Responsible Fisheries

Taking it far and wide

Feedback from fishers - and reflections from the Bay of Bengal News - on 12 years of the Code of Conduct for Responsible Fisheries, the most important international instrument ever devised for development and management of fisheries.



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Code of Conduct for Responsible Fisheries

Taking it far and wide



Reflections on the Code of Conduct – 12 years after its creation.

In October 2007, the Code of Conduct for Responsible Fisheries (CCRF) will be 12 years old. It's time for an objective assessment of its impact.

How well-known or widely known is the Code? How do we adapt it to meet regional and national requirements? How do we take it to the grassroots, where it matters most? How do we ensure and monitor compliance with its principles and practices – by governments, by fisherfolk?

Most fisheries officials perhaps know about something called the Code of Conduct for Responsible Fisheries. But its penetration to the grassroots has been dismal. In some

places, copies of the Code and its technical guidelines have been made available in the vernacular. But there has been little effort to promote or catalyse debate and discussion among fisher communities about the meaning of the Code and its technical guidelines and their implementation.

The Code is a set of principles, conventions and standards relating to various aspects of fisheries. Here is an assortment of comments, criticisms and insights relating to implementation of the Code.

Improve information about the Code, and disseminate it better

Simple print literature is perhaps the first step in documenting the Code.

The short and simplified version of the Code brought out by the FAO was excellent in this context, and helped awareness-raising among fisheries officials and scientists.

Vernacular translations of the Code are essential. BOBP has helped translate the Code into several Indian languages, also into Sinhala, Divehi and Bangla. However, more innovative and interactive tools of communication need to be tapped to make an impact on fisherfolk.

Examples: comics, street plays, beach meetings, video films, posters, pamphlets (which could even be distributed at public places in coastal areas such as bus stands and cinema halls). Plus

radio programmes for fishers out at sea.

The FAO has created a special window through FISHCODE to assist member-countries to implement the Code and its Technical Guidelines. Greater support for FISHCODE would strengthen FAO's hands for implementation of the CCRF.

At the local level, frequent brainstorming workshops with fishers – at district headquarters and fishing villages – would lead to better understanding of fishers' problems and possible solutions.

Catch 'em young

At the one-day consultation with fishers of Tamil Nadu (pages 24-28), it was suggested that the Code of Conduct should be made a part of the school curriculum.

A special syllabus or a supplementary school programme could be considered for coastal areas, with a focus on fisheries. The fundamentals of conservation, management and responsible fisheries could be taught in an interesting way. This is already being done in the Maldives, and its experience could be of interest to



other countries in the region and elsewhere in similar settings.

Fisheries educational institutions in the region ought to be mobilized to improve awareness of the Code of Conduct. CCRF could be a subject of specialization. A core of specialists on the subject would enable a build-up of knowledge and expertise.

Ensure political support for implementation

There may be no political opposition to the Code and its implementation. But the Code – like fisheries itself – may suffer from malign neglect, from low priority. It is up to fishers, fisher bodies and fisheries departments to lobby support from decision-makers on

the Code, and on ways to operationalise it.

Responsible fisheries isn't attained by a Code alone

Codes and conventions cannot on their own lead to responsible fisheries.

A fisheries regime that is fair and equitable to all will prevent illwill and strife among different stakeholders, and replace confrontation by co-operation.

This means a whole set of policies and actions to address the concerns of fishers and improve livelihoods.

At the one-day consultation with fishers, fishers said the most important messages they picked up from the Code related, in order of priority, were fisheries management, fishing operations, post-harvest technology, education and training, sea safety, communication and conservation. This is revealing.

Resource education, conservation and management

Fishers are aware of the dangers of overfishing. But they need education and orientation on resource depletion trends and patterns, on fish behaviour, on management methods and tools.



This means mobilizing resource specialists and fishery scientists in a concerted campaign to educate fishers – a matter for governments and international agencies to consider.

Every department of fisheries needs a resource management wing. A uniform ban on fishing during monsoon months needs to be introduced. Resource enhancement programmes such as artificial reefs and ranching, should be promoted and popularized.

The subsidiarity principle, which takes management to the lowest management level to encourage participation, should be encouraged.

Model legislation on the Code should be introduced after careful study on aspects of the CCRF that are appropriate for the purpose.

Fishing capacity should be systematically monitored to ensure sustainability. Ensuring the co-operation of fishing communities in this task would be a great help. The practice of multi-agency registration of fishing vessels should be ended.

Community-based fisheries management (CBFM) is the most effective management strategy, since the fishers themselves take vigorous part in management, even initiate it, and monitor it. However, CBFM cannot materialize overnight.

Co-management – the practice of government working together with fisherfolk to manage the resource – is a useful first step.

BOBP-IGO has been involved, along with the International Co-operative Alliance, in promoting community-based fishery resource management in Asian countries. Funded by Japan, the project brings experts to an Asian country; select fishers and fishery officials from that country do a study tour of Japan. A workshop is then held in the Asian country. Philippines was the focus of this project during 2006-07. The project's experiences and findings are of interest to CBFM and co-management in all countries of the region.



Plug those information gaps

The connection between development and data (or information) is obvious, but a strong disconnect between the two characterizes fisheries in most developing countries. Gaps in fisheries data should be plugged, to enable better analysis and decision-making. Involving fishers in data collection may lead to more reliable data.

Rationalise governance

The point has been made many times in many contexts, but bears repetition. All fisheries matters in India, now scattered among a slew of Ministries and departments, need to be brought under a single administrative umbrella. Likewise, fisheries administration in other countries too, needs rationalization.

Institution-strengthening and capacity-building in fisheries, essential by themselves, would also help strengthen implementation of the CCRF. This is an ongoing and long-term process. Governments in the region must study needs in this area and methods to bring it about, with perhaps assistance from the FAO and international agencies.

In 2005, the FAO's Committee on Fisheries (COFI) at its 26th session, called for a "decade of implementation" for international fisheries instruments. A special year of implementation for the CCRF may help accelerate awareness, compliance and problem-shooting.

The Code of Conduct took many years, marathon effort, formidable expertise and substantial resources to develop. It deserves substantial effort now to further the purpose for which it was created. All stakeholders need to join in this effort, for the benefit of fishers and fisheries, and for humankind as a whole.

– Y S Yadava

Paintings by school children in India, Maldives and Sri Lanka depicting post-tsunami reconstruction.

Governing Council of BOBP-IGO Meets in Malé, Reviews Work



The Governing Council of the BOBP-IGO held its third meeting (GCM) on 2-3 May, 2007, in Malé, Maldives.

Representatives of the four member-countries (Bangladesh, India, Maldives, Sri Lanka) took part.

The Hon'ble Abdullah Jihaadh, Minister of State, Ministry of Finance and Treasury, Republic of Maldives, chaired the inaugural session. Three other Ministers also took part – Dr (Ms) Fathin Hameed, Deputy Minister, Fisheries and Marine Resources, Ministry of Fisheries, Agriculture and Marine Resources, Mr Mohamed Zuhair, Deputy Minister, Ministry of Fisheries, Agriculture and Marine Resources, and Ms Dunya Maumoon, Deputy Minister of Foreign Affairs.

Welcoming delegates, Dr Y S Yadava, Director, BOBP-IGO, urged member-countries to develop collective action to meet the growing challenges of marine resources management and safeguard the livelihoods of millions of small-scale fishers in countries around the Bay of Bengal (BoB). He said that the BOBP-IGO is fast metamorphosing into a full-fledged regional fishery body; the Governing Council has a special role in accelerating this progress.

Mr Zuhair referred to damage caused by the December 2004 tsunami. He said that technical advice and expertise provided through the BOBP-IGO would help the government to streamline its policies for future development of fisheries.

Mr G Piyasena, Secretary, Ministry of Fisheries and Aquatic Resources, Sri Lanka, and Chairman of the Governing Council, complimented the BOBP-IGO on the excellent



Delegates to the Governing Council meeting.

work done in a short time, and stressed the need for regional co-operation in fisheries management, essential in view of the trans-boundary nature of fish and marine resources.

In his inaugural address, Mr Abdullah Jihaadh, Minister of State for Finance and Treasury, Maldives, said that modern-day fisheries management is a multidisciplinary affair with international and regional implications. Since coastal fisheries are complex, multi-gear and multi-species in nature, participatory and community-based approaches should be promoted. He hoped that the GCM would find common concepts based on regional initiatives and experiences.

The third GCM unanimously selected the representative of Maldives as chairperson.

Presenting the BOBP-IGO's report for Jan 2006-March 2007, Dr Yadava said that much of the effort during the year related to post-tsunami rehabilitation, safety at sea of small-scale fishers and

community participation in marine resources management. The IGO has taken initiatives with international partners to promote safety at sea.

The Maldives delegate said that coastal fisheries in the Maldives are unique because of the coral reefs. In recent years, there has been considerable pressure on reef resources, and this warranted serious interventions. He suggested that master fishermen and crew needed training in multi-day fishing. Maldives would like to see more collaboration with BOBP-IGO in this context.

Responding to a suggestion made by Sri Lanka, the Secretariat said that technical support for strengthening of fisheries cooperatives in Sri Lanka and for sea-safety of small-scale fishers would be taken up during the year. The sea safety project is a FAO-SIDA initiative in the member-countries.

India informed the GCM about a census of marine fisherfolk

conducted recently, which would enable various planning activities concerning small-scale fisheries. India also enquired about the status of work on marine resources management models, assessment of the marine fishing fleet and ornamental fisheries. The BOBP-IGO Secretariat responded that work on resource management models for selected species would be initiated in 2007. This would involve management plans for Hilsa fisheries (of Bangladesh, India and possibly Myanmar) and for shark (India, Maldives and Sri Lanka).

The delegate from Maldives said that his country's national management plans for sharks and groupers and marine ornamental fisheries could serve as resource material for developing the regional management plan on sharks and for finalising the report on the status of ornamental fisheries in India.

On assessment of the fishing fleet, the Secretariat said that this work would be taken up by a proposed regional workshop on monitoring, control and surveillance scheduled during the current year. Data collection on the status of ornamental fisheries in India was complete and a report would be initiated soon.

Following a comment from Bangladesh about the importance of shrimp aquaculture and the shortage of shrimp post-larvae, the delegate from Sri Lanka said that aquaculture contributed 95 percent of the shrimp production in his country. However, shrimp farming in Sri Lanka has been affected by viral disease, resulting in a recurrent loss of crop. To reduce this problem, the National Aquaculture Development Authority of Sri Lanka has developed a crop management plan, which could perhaps help other shrimp farming countries in the region.

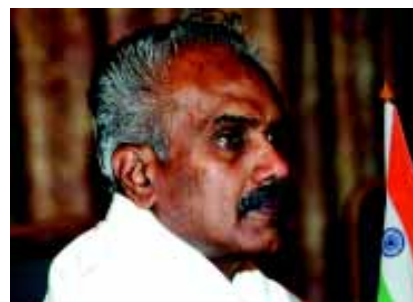
The Director of BOBP-IGO pointed out that since aquaculture-related activities are part of the mandate of the Network of Aquaculture Centers in Asia-Pacific (NACA), it may not be desirable for BOBP-IGO to take



The Governing Council meeting in progress (above and below).



Mr Syed Ataur Rahman (Bangladesh)



Mr G D Chandrapal (India)



Dr Abdulla Naseer (Maldives)



Mr G Piyasena (Sri Lanka)

up this discipline. The Governing Council resolved that the BOBP-IGO should undertake work on preparing a shrimp broodstock management plan in co-operation with NACA.

The Governing Council complimented the BOBP-IGO on the several activities undertaken by an organisation of its modest size. Maldives said that translation of the Code of Conduct for Responsible Fisheries (CCRF) documents in local languages would help member-countries to create awareness among fishers about their responsibility towards marine resource management. This will further help in reform of fisheries policy, which Maldives has recently undertaken.

Bangladesh suggested that in future meetings of the Governing Council, the Secretariat should present a matrix of work endorsed by the Governing Council at its earlier meeting and the activities actually carried out by the Secretariat during the period of reporting.

Report on the Second Technical Advisory Committee (TAC) Meeting

The Secretariat presented the Report on the second meeting of the TAC held at Chennai, India on 5-6 February 2007.

A detailed overview was presented of some of the programme priorities and thrust areas agreed to by the TAC. It included

- Development of regional management plans for important fisheries such as hilsa and sharks;
- Capacity-building for implementation of MCS programmes; and
- Information dissemination and networking to assess and strengthen as necessary, the present networking capacity in BOBP-IGO member-countries.

The Governing Council discussed the role of the TAC and how it can more effectively assist BOBP-IGO in implementing its programme of work. Responding to a query from Bangladesh, the Secretariat said that



the TAC (set up under Article 11 of the Agreement on the Institutionalisation of the BOBP as an Inter-Governmental Organisation) advises the Governing Council. The Council recommended that the Secretariat should present a thorough assessment of the TAC's mandate and functions to the next GCM. It further suggested issue-specific meetings between the Governing Council and the TAC.

About the proposed Regional Workshop on MCS in Bangladesh, the Governing Council advised the Secretariat to present a formal request to the Government of Bangladesh.

The Governing Council accepted the report of the second TAC meeting, subject to the comments above.

Proposed Programmes and Priorities for BOBP-IGO for 2007

Salient features of the proposed programme and priorities of the BOBP-IGO for May - December 2007:

(I) Capacity-Building and Information Services for Fisheries Development and Management in the Bay of Bengal Region.

- Translation and printing in national languages of the FAO-CCRF Technical Guidelines on Marine Fisheries. Plus circulation of printed copies to concerned institutions/ agencies/ fishermen associations, etc.

- Setting up of a regional information network to strengthen national capabilities in development and management of coastal fisheries. The network will provide information for development, planning, research and training.

- Training programme for junior and middle-level fisheries staff of member-countries on implementation of the CCRF. The training will be conducted in collaboration with the Central Institute of Fisheries Education, Mumbai, India.

- Organisation of a fisherfolk week to promote and institutionalise a participatory and community-based system of management of fisheries and aquatic resources. The fisherfolk week will educate, sensitise and influence public opinion, in particular stakeholder opinion, on responsible behaviour in resource management and conservation.

- Information dissemination through the *Bay of Bengal News* and other publications. Reports of activities completed during the period will also be published and disseminated.

(II) Fisheries Resource Management

- Organisation of a regional workshop on Monitoring, Control and Surveillance.
- Preparation of regional management plans for hilsa and shark fishery.

In response to a query from Bangladesh, the Secretariat said that activities relating to awareness-creation could be supported during the fisherfolk week, besides logistics for organising a programme. The Governing Council suggested that information materials produced by the BOBP-IGO on awareness-creation could cover both inland and marine fisheries, as fisherfolk in most member-countries belong to both areas.

About the training programme for junior and middle-level fisheries staff on implementation of the Code of Conduct, the Governing Council suggested that intake of staff from each member-country should be increased to four from the proposed two.

Responding to another query from Bangladesh, the Secretariat said that issues related to food safety in marine fisheries would be addressed in a limited manner in the proposed fisheries management plans for hilsa and shark fisheries. But the Governing Council felt that the BOBP-IGO should include this aspect in its work programme during 2007, in view of rising global concerns on the quality of fish.

The Governing Council suggested the following programmes and priorities for BOBP-IGO in 2007:

- (i) Capacity-building and information services for fisheries development and management in the BoB region.
- (ii) Fisheries resource management.
- (iii) Capacity-building for improving food safety in marine fisheries.

The Governing Council decided that

- Bangladesh's suggestion for a programme on alternative income generation for small-scale fishers in member-countries should be reviewed and submitted to the Third Meeting of the TAC, and also to the next GCM.
- The BOBP-IGO's activities should be linked with funding available

from member-countries, also with funds for specific activities from other sources. It cautioned that some activities might be limited in scope and size because of lack of resources.

- To optimize the efforts of the BOBP-IGO, focal points should be established in each member-country and liaison officers designated to deal with BOBP-IGO activities.

Administrative Matters

- The Auditors' report for 2003 and 2004: Bangladesh suggested that auditing should be more rigorous, including reporting on the performance side too. Sri Lanka remarked that the present audit report was fully in line with audits generally conducted for UN agencies and IGOs. The GCM suggested that a fresh list of auditors be presented to the next GCM. The list should be drawn up after a press advertisement.
- The GCM unanimously agreed to the reappointment of Dr Yugraj Singh Yadava as director of BOBP-IGO for a second term of three years starting from 01 October 2007, on existing terms and conditions. The GCM felt this was essential to maintain the present momentum of the organization. The terms of reference proposed for the post of Senior Programme Advisor were also approved. The Secretariat was urged to circulate information about this vacancy widely.

- Secondment of technical personnel from member-countries to the BOBP-IGO Secretariat for 12 to 18 months – this was agreed to in principle. The Secretariat was asked to provide a detailed proposal to member-countries outlining disciplines, emoluments and other terms and conditions.
- The proposal for a 'living allowance' for staff recruited from India: This was agreed to in principle, but most delegates felt that the proposal did not provide enough details on the increased cost of living. The Secretariat was asked to prepare a detailed proposal for the next GCM.

Other matters

- Tuna fisheries. Some member-countries have started harvesting tuna in significant quantities. Maldives and Sri Lanka suggested that a right forum should be identified to discuss matters relating to tuna fishing, marketing and trade. Recommendations should be made about such a forum at the next GCM.
- Agenda papers for the GCM should be circulated sufficiently in advance.
- The third GCM deeply appreciated the generous hospitality for the meeting provided by Maldives. Bangladesh's kind offer to host the next meeting early in 2008, subject to its government's approval, was accepted.



Marine Research Centre, Maldives

Marine fisheries is one of the cornerstones of the Maldivian economy. From the earliest times, this small entity of coral islands (atolls) has thrived as a source of food, trade, livelihood and culture. Once known only for a traditional subsistence-based pole and line tuna fishery, Maldives today has a number of commercial fisheries and state-of-the-art processing units. The sector is a major source of jobs, and employs about 11 percent of the country's labor force. Nearly one-fifth of the total population depends on fisheries for incomes.

The Marine Research Centre (MRC) of Maldives was founded in 1984 as a research arm of the Ministry of Fisheries, Agriculture and Marine Resources (MoFAMR). Its mandate: to undertake research on living marine resources and to provide scientific advice on marine resource management and on the



*Marine Research Centre,
Malé, Maldives*



state of the marine environment. Initially it was known as the Marine Research Section (MRS) of the Ministry of Fisheries and Agriculture. In 1998, it became a semi-autonomous Government institution.

During the first couple of years, the MRS carried out resource assessments and taxonomic studies on fin and shellfish species. The University of New Castle-upon-Tyne provided the main technical assistance. Funds were provided by the UK's Overseas Development Authority, now known as DFID (for studies on coral reef degradation); by the ICOD of Canada (for reef fisheries identification and cataloguing); by FAO/ UNDP

(for fisheries resource surveys); and by CSIRO of Australia.

The MRC assists the government, the industry and the public in decision-making on rational utilization of the country's marine resources. It also raises awareness on the marine environment through knowledge dissemination.

The MRC is mandated by the President to:

- Plan, coordinate and conduct scientific research on marine resources of the country.
- Undertake marine research directed at the conservation, enhancement and management of the marine environment in general and fisheries exploitation in particular.
- Publish research findings and reference materials and disseminate knowledge to promote public awareness about fisheries and the marine environment.
- Study ways and means to increase the fisheries sector's contribution to the national economy.
- Conduct resource surveys in selected areas within the country.
- Compile and implement a database containing data as well as scientific information on marine resources.
- Undertake research on technological innovations to promote the rational utilisation of marine resources, and introduce these technologies to the fishing industry.
- Undertake research on the rational utilisation of reefs and reef resources.

Dr M Shiham Adam has a BSc (Hons) in Marine Biology from the University of Newcastle-upon-Tyne (UK), an MSc in Fisheries Biology and Management from the University College of North Wales (Bangor, UK), and a Ph D in Fisheries Management from the Imperial College, London. He was a post-doctoral research fellow at the University of Hawaii at Manoa from 2000 to 2003. He then returned to Maldives and took up the position of Director of Fisheries Research at the Marine Research Centre. He was promoted as Executive Director in September 2005.



Dr Adam's research specialty includes spatial management, and the movement and migration of large pelagic species. He takes active part in the international tuna tagging program being undertaken by the Indian Ocean Tuna Commission (IOTC). He is also a member of the steering committee for the International GLOBEC program CLIOTOP (Climate Impacts on Top Ocean Predators).

Organisational Set-up

The MRC is located at Malé, capital of Maldives. It comprises four divisions dedicated to marine fisheries, coral reefs, aquaculture, and education and awareness. At the headquarters, the focus is on tuna research. MRC has a network of 13 field offices that continuously collect and collate data on the biological aspects of tuna and bait fisheries. Reviews are conducted every year for policy making. Coral reef research was initiated under the National Coral Reef Management Programme. The MRC has established 25 coral reef monitoring sites in the country from which data is collected twice a year to observe the growth and health of coral reefs.

The main activity of the Education Awareness Unit is to maintain the library and the museum. The library is extensively used and is armed with wireless local area networks (WiFi) ports and the Agora or hybrid library management system (HLMS). Presently, the library houses some 900 electronic journals related to marine fisheries science. Along with the library, the MRC headquarters attracts visitors to its museum which focuses on the marine resources of the Maldives and the evolution of its marine fishing fleet from small artisanal boats to large modern mechanised vessels.

Besides the headquarters, MRC has a research station located at Bodumohoraa Island in Vaavu atoll. The island is uninhabited. The station has a permanent staff strength of 17, including the research station manager. It presently is active with grouper and pearl culture. The station houses stocks of grouper spawners – they have been held for the last 18 months in an on-shore facility. A grouper hatchery is also located on-shore. Pearl culture was initiated in 1999 to promote alternative livelihood options under the second phase of the UNDP-assisted project. The species farmed is *Pteria penguin*; efforts are on to totally



The Museum at the Marine Research Centre (above and below).



close the life cycle. The objective of the programme is to set up a model raft system and collect biological information. The project is now being extended to Baa Atoll.

The MRC has three vessels, mostly used by field staff. One is a 65-footer, another is a 15-footer equipped with an OBM, the third is a 15-foot whaler. The MRC is now constructing a 85 ft. research vessel at an estimated cost of Rf. 4 million (0.36 million USD), for research in the sea. It will carry 14 researchers on board. Expected to be operational by mid-2008.

Ongoing research activities

The MRC's research work at present relates to coral reefs, aquaculture and fisheries. Under coral reef management, MRC has undertaken ecosystem analysis and monitoring,

habitat monitoring, coral recruitment studies and economic valuation of coral bleaching impacts on tourism. On aquaculture, the organisation has undertaken aquatic animal health and feed management, aquaculture technology development and aquaculture program support service activities. Fisheries research comprises research on reef and pelagic fisheries.

Coral reef research programme

A formal coral reef monitoring program was first implemented by MRC with assistance from the International Centre for Ocean Development (ICOD), Canada, in 1990. Since then reefs have been monitored for natural and anthropogenic impacts on an ad-hoc basis. The Centre, jointly with the



The library of the Marine Research Centre, Maldives.

University of Newcastle-upon-Tyne, is exploring the possibility of rehabilitating degraded reefs (as a result of coral mining) through the use of artificial reef structures of varying complexity. In particular, the project seeks to establish whether mobile rubble — which is characteristic of mined reefs — can be stabilised by artificial reef structures, and whether these structures can recreate the ecological conditions necessary to re-establish fish and coral populations on the reef flat. The programme is funded by the UK's Overseas Development Administration.

To manage the diverse reef system of the Maldives, MRC has initiated a GIS research programme to study and characterize reef types in Maldives by examining their geomorphologies through satellite images. The objective is to generate GIS-based resource and habitat maps that can be used for both environmental and reef resources management. Landsat 7 ETM+ satellite images are being used for this research.

MRC is the key institution responsible for implementing national and regional programs for the Global Coral Reef Monitoring Network (GCRMN), South Asia (<http://ioc.unesco.org/gcrmn/index.html>). National reef monitoring efforts have been complemented and strengthened

through integration with GCRMN from 1997.

The major coral bleaching event of 1998 in the Indian Ocean coincided with the commencement of GCRMN activities in Maldives. Carefully selected monitoring sites were established countrywide to understand the recovery of reefs in the aftermath of coral bleaching. Under a rigorous and standardized training scheme, biophysical changes in reefs and in the socio-economic conditions of user communities, have been monitored regularly during the past five years.

Coral reef resource mapping, quantification and reef growth patterns

Coral reefs are the mainstay of the Maldivian economy. Despite this high reliance on reefs, knowledge about the extent of reefs and their areas in individual atolls is slight. MRC is trying to bridge this knowledge gap by quantifying reef habitats and their resources using satellite and airborne imagery.

Coral reef area and size, sea grass beds, mangroves, reef lagoons, reef islands and other reef habitats are being accurately mapped and quantified so as to generate better estimates of resource inventories. The organisation has also undertaken research on probing the relationships between lateral reef growth and monsoon-generated hydrodynamic regimes.

Understanding such relationships is critical to assess how reefs will respond to rising seas and altered weather patterns because of global warming.

Coral Reef Degradation in the Indian Ocean (CORDIO)

CORDIO (www.cordio.org) is a program created in response to degradation of coral reefs throughout the Indian Ocean by the extensive coral bleaching and mass mortality of corals that occurred in 1998. MRC is the focal point for coordinating and implementing CORDIO activities in Maldives. CORDIO focuses on understanding the ecological and socio-economic effects of coral reef degradation in the Indian Ocean region.

Fisheries Research

A healthy bait fishery is a prerequisite for tuna pole-and-line fishing in the Maldives. MRC has carried out studies, with some local funding, on quantifying the bait usage and seasonal availability of bait. The MRC is at present studying the use of light at night to attract baitfish. An experimental FAD (fish aggregating device) deployed in an atoll lagoon -- rigged with timer-switches and lights to improve night bait fishing — has been shown to be effective in increasing the bait supply. MRC is currently evaluating the economic feasibility of this technique. It is also studying by-catch issues and the potential for interaction with the traditional method of bait catch.

A major impediment to bait-fishery research is the lack of means to regularly monitor the fishery at the national level. There is no provision to record information on bait catch in the established national tuna catch effort recording system. An effective mechanism to gather baitfish catch/ effort data on a routine or regular basis is urgently needed to help management.

Grouper fisheries

Commercial exploitation of grouper for live export started in 1993. During 2001, more than 350 000

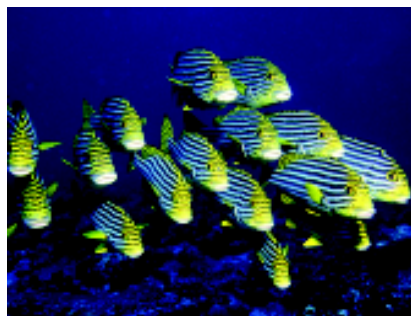
groupers were exported, the value being nearly US\$ 4 million. An assessment of the fishery and holding facilities was carried out in 1994; it included recommendations to develop and manage the fishery. Some of those management recommendations, including registration of holding facilities and improved collection of catch statistics, have been implemented.

Oceanic Resource Evaluation & Assessment

The most recent reviews of the fishery were conducted in 1998. These covered all the major species in the fishery: Skipjack tuna (*Katsuwonus pelamis*), yellow fin tuna (*Thunnus albacares*), frigate tuna (*Auxis thazard*) and Kawakawa (*Euthynnus affinis*). Topics considered included CPUE trend analyses in relation to oceanography – fishery interaction, basic biology and ecology of the species.

The MRC has also conducted two very successful tagging programmes. The first was conducted during 1990-1991 and assisted by the former Indo-Pacific Tuna Management Programme (IPTP). The second was carried out during 1994-1995 under the IDA/ World Bank Third Fisheries Project's Technical Assistance component. The main aims of the tagging programs were to determine the movements of skipjack and yellow fin tuna within and outside the Maldives, to investigate fishery interactions, and to estimate growth rates of skipjack and yellow fin tuna. Analyses of the tagging programs data appear in various reports, conference papers and peer-reviewed journal papers.

MRC conducts regular sampling of the Malé Fish Market, the major fish-landing site in the Maldives. Sampling parameters include size and weight measurements of major tuna varieties (skipjack, yellow fin, bigeye, kawakawa and frigate tuna). MRC also helps to maintain and improve the quality of the tuna catch / effort data collection by training regional field officers and



by providing technical expertise to the statistics section of MoFAMR.

The MRC maintains records of sightings of cetaceans (whales and dolphins) and has an on-going stranding recording programme. MRC has been maintaining records of cetacean stranding since its formation. Special recording forms have now been distributed to every inhabited island. The MRC has also participated in several cetacean survey cruises and supported the Maldives stages of the round-the-world cetacean research conducted during the Voyage of the Odyssey (www.whale.org).

Impact factor

Along with its paternal organisation MoFAMR, the MRC has close ties with the Environmental Research Centre under the Ministry of Environment, Energy and Water, and the Ministry of Atolls, for carrying out activities in the islands and in the Educational Development Centre. The MRC is a household name in the Maldives through radio and TV programmes. More importantly, the Centre is known to fishers as a trusted knowledge and technical service provider.

Fisheries science in the country is taught in all schools at the secondary level. The MRC has contributed substantially to the development of textbook materials for schools. The MRC library serves as a one-stop resource for students for their school projects. The Code of Conduct for Responsible Fisheries is not included in the textbook, but the word 'conservation' is used frequently, it also appears in the Maldivian lexicon as *Zimaadaaru Masverikan*. What's important now

is to promote and internalise the Code of Conduct. The MRC is also well-positioned to give advance warnings on sustainable fisheries and on the environmental impact of global warming and other phenomena.

Major achievements

The MRC catalogue on Maldivian fisheries is a significant achievement. It changed the thinking of Maldivian fishers. The monitoring and analysis of coral reefs is another important achievement. The MRC's work has raised public awareness on the importance of reef conservation and given the government research inputs for policy formulation. Setting up a field station for grouper and pearl research is another major achievement. The field station can contribute significantly to mariculture and alternative livelihoods.

The next step

Having established itself in the Maldives, the MRC should now seek to become a leading institute in the region for research, advocacy, scientific and academic thinking. The MRC is therefore strengthening its human capital base and gearing up to take on more collaborative programmes on coral reef ecosystems. It is also planning to set up a microbiology and fish pathology laboratory at the Aquaculture Centre. However, the MRC is constrained by lack of funds. At present, the Government of Maldives finances the MRC. But stronger participation by donor agencies is needed to help MRC achieve its objectives.

The MRC is one of the constituents of the Technical Advisory Committee of the BOBP-IGO. The interaction is mutually beneficial. The Centre hopes to get wider exposure for its work through the IGO. It also expects BOBP-IGO to facilitate exchange of information among research entities in the Bay of Bengal region and to strengthen the MRC's education and awareness programmes.

Evolving India's Strategies for the Global Debate on Fisheries Subsidies

Samar K Datta and Rahul Nilakantan

Edited and abridged from a paper presented at a Development Economics Symposium organized by the University of Southern California, Los Angeles, June 23-25, 2005.

Though the WTO was set up in 1995 to discipline trade-distorting actions by member-countries, fisheries subsidies escaped the WTO discipline. But during the Doha Ministerial Conference (held in November 2001), members decided to open up the subject for debate. International agencies like FAO and UNEP, and some important countries, have raised mainly two types of issues.

a) Should the regular WTO Agreement on Subsidies and Countervailing Measures (ASCM) be applied to fisheries? Should the discussion on fisheries subsidies limit itself to direct and indirect government financial transfer (the legal definition of subsidies provided by ASCM)?

Or should it also include “implicit subsidies” – which cover benefits to fishers through government actions such as research & development, and regulation? Should the discussion cover government inaction in failing to enforce measures to prevent water pollution, loss of bio-diversity, etc?

b) Another issue relates to non-transparency on subsidy issues and non-availability of data and information across countries (and hence the incomparability of data).

This paper contends that the open-access nature of fisheries is mainly responsible for overfishing and

over-capacity, the main problem that plagues marine fisheries today; subsidies merely exacerbate the problem.

The paper says that the authorities should address the question of property rights in fisheries and remove institutional hindrances to a property rights system. Merely focusing on subsidies won't do.

The paper says that international organizations like FAO, OECD, APEC and UNEP have been preparing for some time for WTO discussions on subsidies.

A large country like India will be required to come up with a policy response to the irreversible process of liberalization and globalization in fisheries. This paper is meant to help the process and provide a perspective on the issue.

The paper suggests strategies for domestic reform in India, as well as

for its international negotiation strategies. Together, these will ensure the long-term sustainability of fisheries (ecological, social and commercial viability), the authors say. These strategies are based on the authors' interaction with major stakeholders in Indian fisheries and on selected case studies from across 10 Indian states; also on a closer examination of India's submissions to the WTO.

What follows is an edited and abridged version of some sections of the paper.

Issues arising out of the debate

A. Subsidies or property rights – what is the principal cause of marine fisheries' problems?

The “Open Access” nature of most of the world's marine fisheries is generally cited as one of the two major causes of overcapitalization of the fishing industry, and therefore



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of over-fishing (the other cause being the massive state subsidies to the fishing industry). Subsidies bring down the total cost of production, encouraging further exploitation of the resource.

Overcapacity is inevitable in an open access fishery – subsidies merely exacerbate the problem.

Obviously, the problem of overcapitalization can't be resolved satisfactorily without limiting entry into marine fisheries and in most cases providing some property rights — or more precisely, exclusive use rights to producers. Ending the open access nature of the fishery would mean that producers would no longer be competing for a share of the resource, but would have an incentive to practice more responsible fishing.

A few countries – notably New Zealand, Australia, Canada, and Iceland – have introduced Individual Tradable Quotas (ITQs) into some of their fisheries.

Do some fisheries subsidies contribute to fishing fleet over-capacity?

Natural resource subsidies are classified into three following broad categories (Porter, 1998):

- (i) ***Direct subsidies*** : These are given through direct government financial transfers, which are expressed in the budgetary outlays.

- (ii) ***Indirect subsidies*** : These subsidies are provided through control of trade in certain natural resource sectors like forests, water and agriculture.

- (iii) ***Implicit subsidies*** due to government inaction or inadequate action.

This third form of natural resource subsidy occurs when, for example, a government permits private businesses to remove a natural resource from the public domain at little or no cost to the producer. Result: the government lets private companies rather than the government or the public to benefit from rent on natural resources.

The efficient allocation of natural resources requires that their prices should account for three distinct components of cost: (i) the direct cost of extraction/ harvesting the resource (ii) the cost of benefits foregone by society by consuming the resource rather than leaving it for future consumption, and (iii) the cost of any environmental externality associated with its extraction and use.

Failure to apply the “User Pays Principle” leads to prices that do not reflect the full social costs of the natural resource, thus creating room for potentially serious market distortions and environmental effects.

Can well-managed fisheries avoid or minimize the problem of over-

fishing, even if the fishing fleets are subsidized?

In theory, the answer to this question is yes, but ground realities militate against the pinning of hopes on ‘well-managed’ fisheries. Porter (2002) argues that very few fisheries management systems have demonstrated the ability to keep catches below levels that put pressure on the stocks. “It would be unwise to base international policy towards the fisheries subsidies regime on the theoretical proposition that well-managed fisheries can neutralize the negative impacts of subsidies.”

Do some fisheries subsidies contribute to reducing overcapacity?

This question assumes importance because it deals with one of the largest categories of financial support to the marine fishing industry. In theory subsidies to reduce capacity, say by retiring vessels, licenses or fishermen, could lead to capacity reduction, but the ground realities and experiences of many major fishing nations indicate otherwise. These programs face difficulties in achieving their targets specifically in fisheries where the “overall incentive structure encourages the race for fish (Porter, 2002).”

The problem of subsidies therefore has also to be tackled simultaneously with the issue of property rights in marine fisheries for a permanent solution to the problems of marine fisheries.

Trade versus environment

The current debate on fisheries subsidies seems to downplay the trade- distorting effect of these subsidies and over-emphasize their environmental effects. Given that the environmental concerns are serious in that the world's marine fisheries are in a state of crisis, this should not deflect attention from two important facts (i) the global trade in fish and fish products is heavily distorted; (ii) not all marine fisheries are over-fished, with some



fisheries in developing countries actually under-exploited.

How to handle the problem of fisheries subsidies?

Porter (1998) suggests that the international community can handle the problem of fisheries subsidies in one of three broad ways: (i) It can negotiate a protocol on fisheries subsidies within the framework of an existing multilateral environmental agreement like the Convention on Biological Diversity (CBD) or the Convention on Straddling Fish Stocks and Highly Migratory Fish Stocks; (ii) It can negotiate a new stand-alone agreement on fisheries subsidies or on the broader question of fishing overcapacity; and (iii) It can deal with the issue within the framework of the global trade regime referred to as the ASCM.

What are the broad issues for India?

The broad issues that face India in the context of the debate on fisheries subsidies can be summed up as follows:

1. Can we take care of our fisheries concerns within the ASCM framework for subsidies, with minor modifications on account of the sector-specific characteristics of fisheries?
2. If the global debate over fisheries subsidies goes beyond the earlier ASCM framework for direct and indirect financial transfers, and encompasses government services, government inaction or inadequate action, can India redefine, recast or even modify fisheries subsidies and convert this challenge into opportunity to set the domestic fisheries management system in order?
3. At the same time, can India lead natural-resource-rich developing countries in protecting the interests of their fisherfolk? (e.g., by highlighting anomalies in fisheries sector property rights between developed and developing countries?)
4. India has entered into a number of international agreements and



conventions to preserve biodiversity and the environment and to follow responsible fisheries practices. Can India use this opportunity to operationalize some of these agreements and conventions?

5. Can India use this opportunity to link subsidies to the global competitiveness (in terms of both price and quality) of her fisheries products using the tools of domestic resource cost ratio and property rights? This will sensitize

Category III and IV Subsidies

Category	Subsidy Type	Effects on Industry Profit	Some examples of such subsidies
III	Government non-financial interventions and regulations	Possible negative effects in the short-term, but positive effects on industry profit in the long run.	<ul style="list-style-type: none"> • Hatchery and fish habitat programs • Environmental regulations • Enhancement of the fisheries community environment • Technology transfers • Protection of marine areas • Gear regulations (e.g. TEDs) • Food safety and hygiene regulations • Environment protection programs, chemical and drugs regulations • Production and feed quota schemes in aquaculture • License requirements for fish farming • Veterinary surveillance requirements for aquaculture
IV	Government inaction, inadequate action or inappropriate action	Allows producers to impose in the short run or the long run certain costs of production on others – this includes the environment and natural resources. This has an effect on industry profits.	<ul style="list-style-type: none"> • Free access to fishing grounds • Lack of pollution control • Lack of management measures • Non-implementation of existing regulations • Free or below market price resource access • Lack of implementation of fish quality standards • Fisheries registration fees not collected • Non-enforcement of existing regulations • No requirement of certificate of competence or fisherman’s license • Use of free public services, e.g. water; sewerage services, for fishers, etc.

Source: Adapted from Westlund (2002).

stakeholders, especially commercial enterprises engaged in processing and exports.

Fisheries subsidies –reporting mechanisms and subsidy figures

The WTO mandates members to notify all subsidy programs (as defined by the WTO, which follows the ASCM definition of a subsidy). But the WTO register records fewer subsidies than APEC and OECD studies.

There are two reasons. (1) The WTO follows a narrow definition of a subsidy, defined by the ASCM, whereas OECD and APEC follow broader definitions. (2) Even programs that meet ASCM criteria for a subsidy are not being reported to the WTO. In fact, Schorr and Cripps (2001) estimated that WTO members were reporting fewer than 10 percent of their fishing subsidies.

The WTO reporting mechanism for fisheries subsidies is thus like a leaky colander – it allows much more to escape than it retains! In fact, the only thing that is certain about the official numbers for fisheries subsidies is that they are grossly inadequate – they capture at best a small fraction of the subsidies actually conferred.

For all countries, there is a large difference in subsidization as per the ASCM and FAO definitions. In several cases, countries reported no subsidies under the ASCM definition, but sometimes large amounts of subsidies under the FAO definition. For developing countries, subsidies as per the FAO definition exceeded ASCM-defined subsidies by \$924.7 million. For developed countries, the comparable figure was \$5 886.0 million.

Towards an operational framework to address FAO Category III and Category IV subsidies

The FAO definition of a subsidy explicitly recognizes the effects on industry profits of ‘Government non-financial interventions and regulations’ and ‘Government inaction or inadequate action’.

International strategies for negotiations

Problem	Strategy
Failure to address property rights problems and focus only on subsidies will not solve problems that afflict marine fisheries. It will only result only in harsh curbs on subsidies	Continuously highlight importance of property rights. Urge greater emphasis on research into allocation of property rights over open seas.
“Traffic light” approach to subsidy discipline will allow travesty of “Green Box” to continue	Oppose Green/Blue Box category of exempt fisheries subsidies, based on faulty assumptions of market structure — especially in the light of subsidies meant to reduce over-capacity which have failed.
Unequal structural features of countries may be perpetuated by AMS style cap	Argue for adoption of comprehensive FAO definition to bring out unequal structural features. Go for tradable permits to prevent lock-in effects.
Linking of trade and environment issues will make trade even less free and fair, given tendency of developed countries to use NTBs like TEDs.	Argue against bad theory of using one instrument (subsidy) to address two policy objectives (trade and environment). Devote energies to creating a new policy instrument for environmental issues that is delinked from trade.
Concern that climate of debate will not permit stock-specific characteristics from moderating disciplines	Many of the world’s marine fisheries are still under-exploited e.g. India’s. So disciplines must take into account the status of stock exploitation.
Concern regarding conspiracy of silence on aquaculture - important for much of the developing world	India has substantial interest in inland fisheries both for nutritional security and trade. Must be more transparent on subsidies given to inland fisheries.
Definition of fisheries subsidy must be theoretically superior and all inclusive to address all sectoral problems / distortions	Argue for adoption of FAO’s most comprehensive definition - work towards operationalizing categories III and IV to overcome opposition to definition
Poor quality of subsidy notifications and lack of transparency which rewards the guilty and penalizes the innocent.	India should lead by example by offering a comprehensive list of all domestic subsidies offered to morally induce data flow from other countries

The box on pre-page shows these categories of subsidies, their possible effects on industry profits and how they arise.

IV. India’s strategies for domestic reform & international negotiations

A. Domestic strategies:

On the domestic front, India’s fisheries sector is unfortunately a victim to large-scale negative implicit subsidies on account of inaction and inadequate action by various authorities. These reduce the already meager support the sector receives. The sector is rife with property rights problems, making it difficult for the Coasian value maximization process to continue unhindered.

B. International strategies

On the international front, India has to actively ensure that its special interests on account of the peculiar stylized features of its fisheries are not compromised. Box above highlights some problems and strategies for India to address those problems.

If these points are addressed in a holistic manner, taking care to follow all the principles of Coasian value maximization, they can usher in an era of prosperity for a country blessed with a vast fisheries resource, but an incomplete and obsolete property rights framework.

Revisiting Mahabalipuram: The challenge of restoring livelihoods

Some 18 months ago, BOBP-IGO and its partners organized a workshop in Mahabalipuram on reviving fisheries and rehabilitating fishing communities after the tsunami. (See *Bay of Bengal News*, Vol. IV No. 7) The workshop followed an international conference on health and safety in the fishing industry.

During the workshop, fisherman P Vasu from Mamallapuram village presented a graphic picture of the tsunami's havoc. He said members of his community needed help to rebuild their assets, restore their health and livelihoods and revive their psyche. Dr George A Conway, Chief, Alaska Field Station of NIOSH, and other expert delegates to IFISH-3 then visited the village.

The expert team observed the damage wrought by the tsunami as well as the reconstruction effort. They were struck by the poor quality of post-tsunami boats in the village, which revealed basic design flaws, says Dr M Paramasivam, BOBP consultant. ("Scantling rules were ignored, skin thickness was inadequate, deck construction was weak. Further, the boatbuilders handled strong chemicals, paints and glue without taking proper precautions.")

In April this year, Dr Conway, Dr Y S Yadava of BOBP-IGO and others re-visited Mamallapuram village and spent a day with the community there to find out how they were faring.

Some basic facts about the village. It has a population of 639, who live

Meetings with officials at GRT Temple Bay (right top and middle) and the Mahabalipuram fisher community (right).



in 149 houses. There are 219 full-time fishers and 19 part-timers. Some 350 fishers are members of the fisheries co-operative society. They use 90 motorized boats and 70 non-motorized boats.

The fishing village receives some assistance from the five-star hotel adjacent to it. Manager Shabin Sarvotham of the GRT Temple Bay said the hotel has provided the village with fencing and toilets; it has given the fishers jobs; it has hired fishers to take the hotel inmates out on pleasure trips.

The visiting team met the Mamallapuram residents and panchayat heads at the local community hall. "We have to come to see and listen and understand," said Dr Conway and Dr Yadava.

What are the community's needs? The fishers said they needed cell phones and GPS (geographical positioning system) tools. They wanted their FRP boats repaired. Bath and toilet facilities in the village, and the underground



Dr Conway inspecting the damaged FRP boat.

drainage system, badly needed improvement and repair.

The fishers talked about their livelihoods – fishing practices and seasons, landings, income and expenditure. They wanted training in fishing technology, in repair and maintenance of outboard engines, in preparing value-added products, in FRP boat maintenance. Also tailoring training for the women. They wanted better marketing and

net-making facilities, and a restaurant that would serve refreshments. Dr Yadava assured the fishers that their requests and information on their needs would be conveyed to the authorities concerned.

On behalf of BOBP-IGO, Dr Yadava presented the community leaders with equipment to help women fish vendors of the village – several sets of ice boxes, weighing balances, aluminium containers and buckets. He requested feedback on the use of the equipment.

Dr Conway told the community that a programme on 'Augmenting Occupational Safety and Health of Coastal Communities in India' would soon be initiated and implemented through BOBP-IGO. Mamallapuram would be covered by the project; the BOBP-IGO would therefore visit the village frequently to discuss their livelihoods and welfare. The fishers welcomed the news and thanked Dr Conway and Dr Yadava, who then went round the village and inspected the boats on the beach.

There's further good news. An FAO- executed IMO-funded project on FRP boats will soon start functioning under the BOBP umbrella at Chennai. It will provide advice and organize training on FRP boat design, maintenance and repair. With the FRP boom in the region – particularly in India and Sri Lanka – the project is timely.

What happens when boats are defective

Just a few days before Dr Conway and Dr Yadava visited Mamallapuram, four fishers of the village almost lost their lives, because of a defective FRP boat. Here's the story of Karunakaran (38), Hari (38), Raghu (35), and Kumaran (30) in their own words.

"We had an FRP boat given to us by Christ India Austria, an NGO. We were not happy with the boat, it had vacant compartments in the deck. But we had to earn our bread, we had to make a living.

"On that day of March, we set out to fish at 3 a.m. We were fishing at a place about 18 km from the shore, and about 18 fathoms deep. To our horror, our boat started leaking, and water started gushing out. We used our raiments to plug the leak but that didn't work.

"The boat sank. So did our hearts, we thought that was the end. But we decided to be brave, we encouraged each other, we managed to keep afloat. To our great good fortune, some other fishers from our village noticed us, rowed toward us and took us aboard. Saved!

"We managed to locate the sunken boat and tow it ashore. We were exhausted when we reached ashore. We were taken to hospital, we had to spend Rs 8 000 on medical expenses, we also spent Rs 6 000 to repair the boat and engine. That took a whole month, and we couldn't fish. But we worked as labourers in other boats to at least earn Rs 50 to Rs 100 per day.

"An experience we won't forget."



Promoting Safety at Sea

Naval architect Revanoor Ravikumar, who has been associated with the BOBP for a long time in varied capacities, has now joined the FAO to promote safety at sea in the Bay of Bengal region.

He is the Regional Project Coordinator for South Asia for the project "Safety at Sea for Small-Scale Fisheries in Developing Countries" (GCP/GLO/158/SWE). It is based at the BOBP-IGO office in Chennai. He'll work closely with the IGO in implementing the project in Bangladesh, India, Maldives and Sri Lanka.

Ravikumar graduated in naval architecture from IIT Kharagpur. Soon after graduation, he worked for a while in England with Water Craft, specialists in FRP boats; then with Gladstone Lyall & Co (who set up India's first FRP boatyard in 1971) for constructing shrimp trawlers in Mangalore; he helped set up Aquamarine, another FRP boatbuilder, in 1975 in Chennai.

His first assignment for the FAO was as a consultant in the late '70s to a UNDP-funded Pelagic Fisheries Project, based in Cochin. Ravi assisted the project by designing an FRP purse seine vessel and installing a prototype chilled seawater system in a carrier boat for small pelagic fish.

Ravi joined the BOBP in 1979 soon after its inception. He helped develop beachlanding craft for India's east coast, and designed the fiberglass IND-20 used in Andhra Pradesh and Orissa. He trained boatbuilders of Andhra Pradesh and Orissa in FRP boat construction.

While with the BOBP, he coordinated a series of IMO-funded projects on 'Cleaner Fisheries Harbours' in India, Thailand, Sri Lanka and the Maldives.

He was also Programme Manager *ad interim* for the Third Phase of BOBP that dealt with fisheries management. He was associated with computerization of BOBP's accounts.

The Safety at Sea Project:

"Safety at Sea" is an often neglected facet of fishery management in South Asia, particularly in the small-scale fisheries sector. More often than not, it is due to a combination of inadequate awareness of its importance; lack of safety guidelines for fishing craft and methods; poor distress-response in terms of both strategies and infrastructure; and lack of enforceable rules and regulations.

FAO has designed a Global Safety at Sea Programme, aimed at improving the livelihood of small-scale fishing communities by decreasing the number of accidents at sea and the effects of such accidents. The SIDA-funded Project for South Asia is a component of that Programme.

Proposed activities of this South Asia project are:

- Awareness-building to promote a safety-at-sea culture within the fishing community and other stakeholders;
- Education and training of trainers, extension workers and fisherfolk to understand sea safety requirements;
- Introduction of FAO/IMO/ILO draft guidelines for design and construction and equipment of small FRP fishing vessels in a manner easily understood by the



small-scale boat building industry;

- Support to the elaboration of proposals for including and implementing safety regulations as part of fishery management measures;
- Review of reporting systems for accidents-at-sea and design of an appropriate reporting and analysis procedure for implementation by appropriate authorities;
- Promote gender and HIV/AIDS awareness raising campaigns in connection with safety-at-sea awareness campaigns;
- Promote adequate representation of women and youth in the safety-at-sea work ethic.

The Project will be implemented in the BOBP-IGO member-countries. To start with, activities concerning awareness building on the need for a safety-at-sea culture within the small-scale fishing communities of the region will be implemented.



Maldives

Photo Essay by S Jayaraj

Focus on larger boats, stronger management

“Maldivian fishers are a lucky lot,” a visitor once said. “They just have to drop a line and they get some fish. No wonder they seem relaxed and cheerful.”

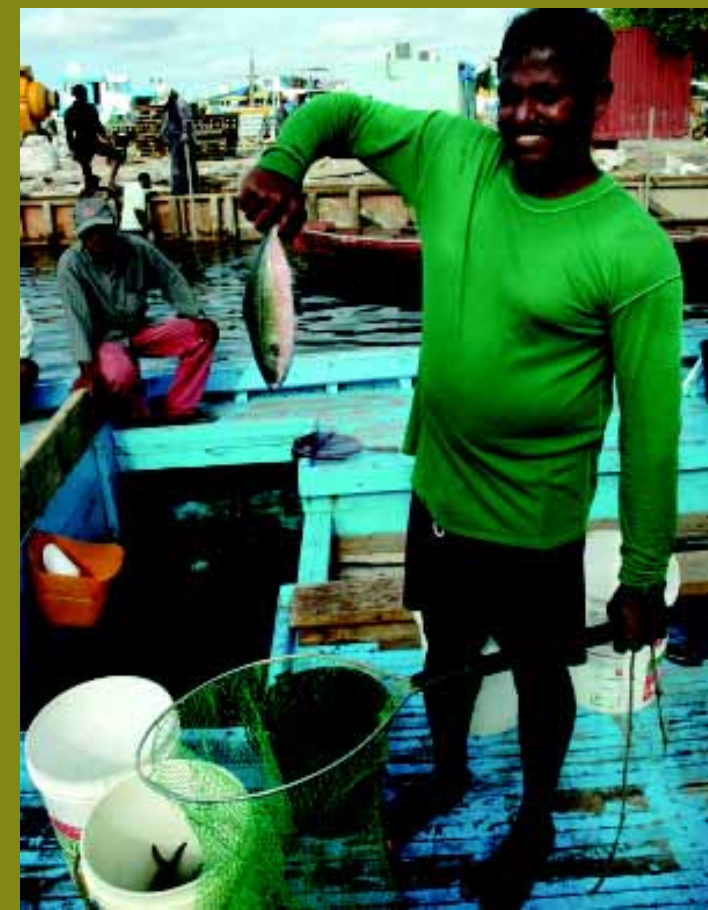
During a recent visit to the Maldives archipelago (1 200 coral islands grouped into 19 widely dispersed atolls), Jayaraj visited a few islands of North Malé atoll on a speedboat. Accompanied by two staff of the Marine Research Centre, Maldives, and BOBP-IGO’s Rajdeep Mukherjee, Jayaraj visited Himmafushi, Thuladhoo, Gaafaru, Gulhi and Guraidhoo islands.

Marine resources are the country’s main natural endowment; there are no inland fisheries in Maldives. Fishing operations take place in off-shore, coastal and reef waters. The economy depends heavily on fishing (tuna is the mainstay; skipjack is the main species, yellowfin is also important) and tourism (Chinese, Japanese and Germans are the most visible). Fisheries accounts for about 11 percent of the GDP, 20 percent of the jobs and 74 percent of the country’s exports. In fact, more than half the catch is exported – mainly to the European Union, Sri Lanka and Southeast Asian countries.

High-value reef fish, mainly grouper, are much in demand among tourists, these are often supplied to tourist resorts by fisher associations. Groupers are also being exported to China, Hong Kong and Taiwan. As tourists and exports go up, grouper stocks dwindle. “We have to spend more time than before to catch the same quantity,” fishers say. Normally solitary fish, groupers tend to gather in “spawning congregations” during full moon, between September and November, and are therefore vulnerable.

Right: Scenic view and sunrise at Malé, Maldives; fish market at Malé. Opposite page: Fishing trips, landing center at Thulusdhoo and reef fish catches at Malé.





The Ministry of Fisheries, Agriculture and Marine Resources (MoFAMR) is promoting a management campaign for grouper, through posters, etc.

The Ministry is concerned about possible over-exploitation of reef fish and of the need for management in general (even baitfish are going down in numbers, tropical aquarium fish, bêche-de-mer and giant clam are also under pressure). It is studying the possibility of co-management and wishes to introduce a system in the Maldives that is practical and effective. But time will be needed for awareness-raising on co-management and for mobilizing the co-operation of all concerned. A stakeholder consultation on the subject was held early this year. A quota system based on monthly average landings is mooted by some. "Daily quotas will be difficult to enforce," some officials say.

Dhonis and masdhonis, in various versions, make up the bulk of the fishing craft. Once a plank-built craft of coconut wood, the dhoni of today is very often an FRP boat. The first 70 ft. FRP masdhoni was built in 1997; MoFAMR decided to introduce and popularize a 85 ft. masdhoni; today wheelhouse-equipped masdhonis of 107 ft are under construction. Larger boats and multi-day fishing have captured the fishers' imagination. An FAO fiberglass expert has prepared a manual on FRP boatbuilding. The government wants a strong focus on craft of sound design and stability, on cost-effectiveness, and proper training for fishers.

The December 2004 tsunami killed more than 80 fishers in the Maldives and caused damage worth \$25 million. Support and technical assistance – mainly for new boats, and housing for fishermen – have been mobilized from the FAO, UNDP, World Bank and IFAD. The government is keen to "build back better," to ensure that everyone is better off than they were before the tsunami.

Right and opposite page: Boat building yard at Gaafaru, boats under construction, plastering in progress by a carpenter, fisher children.





Taking the Code to the Grassroots

Report of a one-day consultation with stakeholders, including fisher communities of Tamil Nadu, on the Code of Conduct for Responsible Fisheries

It was both substantive and productive. And for once, fishers held the stage. It was wonderful to see fishers from Chennai and other parts of Tamil Nadu speaking with flair and feeling on matters that affect them most – fisheries and their livelihoods.

The date: June 29, 2007. The occasion: a one-day consultation in Chennai with fishers, NGO representatives, government officials, and other stakeholders. Subject: The Code of Conduct for Responsible Fisheries and its implementation in Tamil Nadu. Organiser: The BOBP-IGO. Highlight: Release of Tamil-language versions of the Technical Guidelines on Marine Fisheries relating to the Code of Conduct. Participation: nearly 50 persons, including some 35 fishers.

Dr Y S Yadava, Director, BOBP-IGO, welcomed the gathering. In his inaugural address, Mr Ajay Bhattacharya, Joint Secretary to the Government of India, Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, urged the Government of Tamil Nadu to ensure that the fishing community reaped tangible benefits from implementation of the Code of Conduct.

Mr Bhattacharya pointed out that fishing areas and fishery resources are limited. While marine fish production has remained constant during the past decade, the number of fishers and fishing boats has gone up alarmingly, and fishers' incomes have gone down. Result: fishermen have taken to fishing with nets of smaller mesh sizes. The Technical Guidelines of the Code of Conduct translated into Tamil by



Mr Ajay Bhattacharya (right), releasing the Tamil version of the Technical Guidelines on Marine Fisheries relating to the Code of Conduct for Responsible Fisheries.

the BOBP-IGO would enlarge understanding of the Guidelines and induce better awareness among fishermen.

In a Power Point presentation, Dr Yadava introduced the Code of Conduct and explained the specific aims of the many Technical Guidelines relating to the Code, which were now being made available in Tamil.

Dr S Vijaykumar, Tamil Nadu's Director of Fisheries, detailed the government's schemes for the welfare of fishing communities. Examples:

- Sea ranching of shrimps (*Penaeus monodon*). As many as 45.5 million seed at a cost of Rs 1.35 crores have already been released. Fishers say the shrimp population in inshore areas has gone up as a result. Such ranching will help rejuvenate shrimp stocks.
- The Government does not permit shrimp farming in

mangrove areas. A seasonal ban on mechanized fishing has been in force during the past few years. (The ban is from April 15 to May 29 on the east coast of Tamil Nadu, June 15 to July 31 on the west coast. During this period, diesel is not supplied to boats. Fishermen have been co-operating with the ban order.)

- Fishing harbour management committees have been constituted to maintain fishing harbours in the State as per international standards. The Department of Fisheries (DOF) recently conducted a two-day workshop with stakeholders on proper management of fishing harbours and fish landing centers (FLCs). The Department will soon bring out a manual for management of fishing harbours and FLCs, a draft is ready.
- To enhance fish resources, the DOF has taken up a programme

on artificial reefs (ARs) with the help of the Central Marine Fisheries Research Institute (CMFRI) and the Tamil Nadu Fisheries Co-operative Federation. The Department has implemented this scheme in 10 places during the past three years. Fishermen have reported an increase in fish biomass from areas where the reefs are located. The CMFRI is now trying to involve local NGOs in this programme. The Department has given fishers solar dryers, and trained them to reduce fish spoilage.

- Other activities: promotion of tuna fishing to reduce pressure on inshore areas and encourage diversification; setting up of the Fishermen Welfare Board and Fisheries Advisory Committees; welfare schemes such as housing, insurance and saving-cum-relief; strengthening of fisheries research and statistics; a ban on the fishing of endangered species such as sea horses and chanks; a ban on pair trawling to conserve resources.

Dr Vijaykumar said the DOF would like mesh size regulations to curb juvenile fishing to be enforced at the manufacturing stage itself – by the manufacturing units.

Dr Vijaykumar said that a project on development of fisheries policy in Tamil Nadu, to be funded by the World Bank and executed by the FAO, would commence soon. The project could be a role model for other states too. The State Government would also receive Rs 12 crores from Japan under a World Bank Project to set up a modern fish processing complex.

The DOF has set up a ‘Touch Screen’ system, with the help of the Electronic Corporation of Tamil Nadu (ELCOT). (Just touch the screen with a pen or pencil to get highlighted information on various aspects of fisheries.) The DOF is also trying to provide fishers with seamless communication units,

which will be equipped with an inbuilt Global Positioning System.

Dr Vijaykumar said that 90 per cent of the boats in Tamil Nadu are now registered. Such registration, and display of registration numbers on boats, is compulsory. Life jackets are being provided to fishers, also subsidies for ice boxes and nets. 360° lanterns will be given to fishers to ensure their safety during night fishing.

Dr Vijaykumar said the DOF had imposed a fine on fishing boats straying across the India-Sri Lanka international border, but this order had been stayed by a court. Assistance for sales tax exemption had been given to boats registered *before* the Tenth Five Year Plan. Similar assistance for boats registered *during* the latter period had been requested from the Ministry of Agriculture.

Following Dr Vijaykumar’s detailed overview, the fishing community expressed its views frankly – not just about the Code but about all aspects of small-scale fisheries and their livelihoods. Their remarks and suggestions, and those of other participants, have been grouped under six major heads.

(i) Popularizing and raising awareness about the Code of Conduct

1. Hold grassroots-level meetings regularly with stakeholders.
2. Create and raise awareness about the Code through street meetings, beach meetings, theatre, street plays, folk songs, cultural programmes. Involve

community leaders and the media in these meetings.

3. Popularize the Code in villages through TV, ads and pamphlets in public places like bus stands and cinema halls (especially in coastal areas), and slide shows on conservation.
 4. Make the Code of Conduct a part of the school curriculum, so that children learn early about conservation and sustainable fishing methods. Use signboards to teach students.
 5. Conduct meetings at district/ taluk/ village level to create awareness.
 6. Send fishers abroad, particularly to other developing countries, so that they learn about developments there.
 7. Inform fishers about the depletion of shark fisheries, about how birds are being caught by longlines.
 8. Organizations like Fishery Survey of India (FSI) should contact local leaders and through them hold meetings with fishers.
 9. Distribute copies of the Technical Guidelines far and wide.
- (ii) Pollution control**
10. Stop water pollution in Tuticorin caused by fly ash from the thermal plant.
 11. Stop the release of chemicals into the waters by other industries in Tuticorin, and the discharge of industrial and thermal effluents into the sea.

The Tamil language versions of the Technical Guidelines on Marine Fisheries.



All this is depleting fishery resources and affecting fish breeding. It is even affecting the health of the community.

12. Stop the excessive catch of juveniles.
13. Combat the effects of the atomic power plant, which is affecting marine resources.
14. Too many prawn farms. They are harming fishery resources through release of untreated farm effluents and chemicals. Check and monitor such farms.
15. Put an end to prawn farming in mangrove areas.

(iii) Regulation of gear and mesh size

16. Stop purse-seine operations. They are catching small-sized fishes and are impairing fisheries as a whole.
17. Ban trawling, it is disturbing the eco-system.
18. Permit pair trawling with increased mesh size.
19. Put an end to irresponsible fishing and catches of juveniles. Traditional fishermen are doing this, through methods like purse-seining, mechanized fishermen through small mesh sizes. The government is not tackling the problem.
20. Ban dynamite fishing.
21. Introduce mesh-size control.
22. Stop the use of machine-made nets or regulate mesh sizes of manufacturing nets at the factory itself – it is depleting fishery resources.
23. Hook and line and gill nets are the best gear for fishing. 60 mm mesh size should be used for nylon nets, 120 mm for HDP.
24. Nets of small-mesh size should not be manufactured at all. Cotton nets are good for the fishery.

(iv) Safety at Sea

25. Insure FRP boats.
26. An appeal to the Coast Guard – don't frighten fishermen.

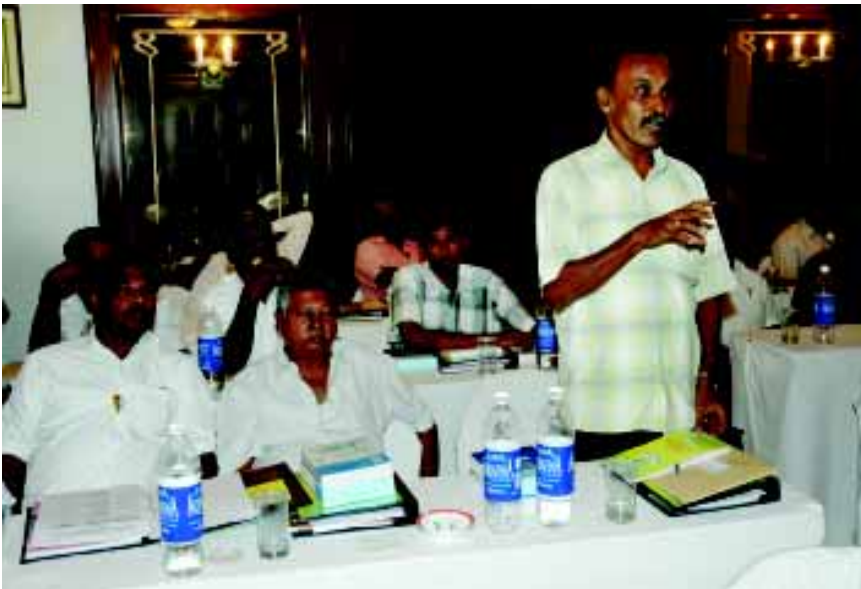


(v) General conservation measures

27. Undertake sea ranching all along the coastline. Done in a few areas, it will not be very beneficial.
28. Implement all acts and rules strictly.
29. Address the problem of fish discards at sea.
30. Fix the quantity of fish to be captured. When a fish ban is in force in Tamil Nadu during the monsoon, Kerala fishers come to Kanyakumari for fishing. Impose a strict ban on fishing for 60 days.
31. Consult all fisher representatives about mesh size before amending the 1983 Acts.
32. The ranching programmes of Tamil Nadu fisheries – a very good initiative. Fishermen should be allowed to take active part in the programme.
33. Create awareness among fishers who have been depleting fishing resources through wrong fishing methods – both mechanized and traditional fishermen are offenders.
34. Police and village committees should regulate fishing. The Government and the Gulf of Mannar protection committee should work together to implement the law and prevent any fishing in the Gulf of Mannar biosphere.
35. Curb poaching of our resources by foreign vessels. Curb poaching in Tamil Nadu by fishermen from neighbouring states.
36. Stop the fishing of juveniles and small fishes.
37. Divide the fishing ban period on the east coast into two periods – one in April, another in September.
38. Introduce a system whereby country craft can fish for four days a week and mechanized boats for three days. This will help conservation.
39. Introduce a token system for sale of diesel to mechanized boats on the basis of criteria such as vessel size, fishing area and number of crew. This will help regulation and monitoring by the authorities and prevent misuse of diesel purchase.
40. Encourage community-based fisheries management.
41. Address the impact of the Sethu Samudaram project on fishery resources.

(vi) Government support

42. Subsidize the kerosene used in OBMs. Extend diesel subsidy to traditional craft.
43. Construct exclusive fish landing centers for traditional



craft. Improve the conditions of all fish landing centers.

44. Provide financial assistance for deep sea fishing.
45. Diesel makes fishing uneconomical. It takes up 70 percent of the expense of mechanized boat fishing. Develop fuel alternatives like gas conversion, etc.
46. Provide subsidies for kattumaram fishing.
47. Provide assistance for FRP boats and diesel, and insurance for these boats.
48. Mr Saravanan of DHAN Foundation, Chennai, said his organization carried out several extension and awareness programmes and had started a number of IT centers in villages. Literature published by BOBP-IGO, including the Technical Guidelines of the Code, could be uploaded on the website of the DHAN Foundation, so that users of the IT Centres could access them. He asked for a set of CDs of the Technical Guidelines. Mr Saravanan said that existing traditional knowledge in fisheries, which was considerable, should be tapped for resource conservation. The Code of Conduct could be incorporated in traditional fishing practices.

49. Mr C M Muralidharan, FAO Consultant, United Nations Tsunami Recovery Support Project, referred to the catch of juveniles by fishers using small-mesh sized nets. He suggested that controls on such gear be introduced at the manufacturing end. Likewise, marketing controls would put an end to the trade in juveniles. Policy should be formulated in consultation with stakeholders at different levels. He said the study on the use of the token system for diesel purchase in Palk Bay could help reduce fishing pressure by trawlers. The study was being carried out by the South Indian Federation of Fishermen Societies with assistance from Netherlands.
50. Dr H Kasim, Principal Scientist, Central Marine Fisheries Research Institute (CMFRI), discussed implementation of the Code in Tamil Nadu. He said that fishermen should exercise self-control and avoid overfishing, they should realize its repercussions. Institutions like the CMFRI and the FSI were willing to extend the results of their scientific research; fishers should invite the experts to their villages for meetings. He said the 45-day ban on mechanized fishing in the east

coast (April-May) and the west coast (July-August) is helping conservation by reducing fishing effort.

51. Deputy Commandant Anupam Rai of the Indian Coast Guard (ICG), Chennai said that the ICG interacts regularly with the fisher community, especially on safety at sea. He would inform the ICG headquarters about the publication of the Technical Guidelines, which would be very useful. He said that the emergency contact No 1718 for distress at sea is now supported by telecom service providers such as VSNL & BSNL. The ICG is also getting the six-digit number 155211 changed to 1554, a number already in use in Saurashtra.

He said the ICG is working with the Indian Space Research Organisation on communication aspects; it is interacting with Bharat Heavy Electronics Limited (BHEL) for the manufacture of low-cost EPIRBS (Emergency Position Indicating Radio Beacons), and with Antariksh/ Defence Research Development Organisation (DRDO) on a low-cost Vessel Monitoring System (VMS). A VMS hub is being set up in Porbandar, Gujarat. So far 15 EPIRBS have been set up on boats on a trial basis. The ICG is also working with mobile companies for setting up a distress alert system.

Mr Rai requested fishers to be accurate while reporting fishers missing at sea. The ICG should be given regular updates on the status of a missing boat, say every eight or 10 hours. He said fishers don't seem to bother much about safety. They don't carry life jackets, and don't wear them even if they have one.

He said the sea-worthiness of fishing vessels constructed after the tsunami was questionable. He complained that some

fishers operate close to data buoys and damage the equipment – the ICG has received some complaints on the issue from the National Institute of Ocean Technology. Fishing close to data buoys and oil rigs should be avoided. In fact, fishing was prohibited within a range of 1 000 meters from oil rigs. Many boats did not bear clear registration numbers. In conclusion, he urged the fishing community to give the ICG information on what was happening at sea, it would serve as intelligence support.

52. Mr P Sivaraj, Zonal Director, FSI, described the awareness campaigns carried out by his organization on safety at sea, including popularization of the Code of Conduct. A meeting on sea safety was held recently at Marakkanam, and provisions of the Code were explained to fishers.
53. Mr R Ravikumar, Regional Coordinator, FAO Safety at Sea Project, said he was most impressed by the views of

fishers at the consultation. Their participation was necessary for policy-making, and should be encouraged at the stage of policy formulation as well as implementation. He referred to Article 6 and Articles 8 and 8.25 of the Code, which concern safety at sea.

54. Mr Muthuswamy, Joint Director of Fisheries, Tamil Nadu, said that while issuing tokens to mechanized boats for supply of diesel, the authorities concerned should ensure that various requirements – such as registration, insurance, etc – were complied with. Mesh sizes should be controlled to prevent catch of juveniles. The Code of Conduct and its Technical Guidelines should be presented in more simple form, such as comic books. Village administrative committees should be utilized for popularizing the Code, and in general for implementing rules and regulations.

Conclusion

Fisher-participants said the consultation was very useful and

would help more effective rehabilitation of fishers. The work initiated by the consultation should continue. In fact, more such consultations should be organised.

Many fishers said that the tsunami was a calamity but an opportunity as well. New programmes for fishers should be considered. The tsunami has brought about a situation where there are no labourers any more; those who never owned boats now do. It has been a great social leveler, and given many poor fishermen rich opportunities. These should be put to good use to bring about a better society.

In concluding remarks, Mr Bhattacharya said that the recent marine census conducted by the Ministry of Agriculture provided a good idea of the size of our fishing fleet. Marine fish production has remained constant for many years, it should be developed sustainably. He requested the Tamil Nadu Government to do what it could to implement the Code and its guidelines.

Dr Y S Yadava proposed a vote of thanks.



CMFRI - India's premier facility in marine fisheries research



The Central Marine Fisheries Research Institute (CMFRI), the largest of India's eight national fisheries research institutes, assists and advises policy-makers in fisheries governance and in sustaining marine fish production. Six decades of R & D in marine fisheries by CMFRI have led to impact on many fronts.

The Institute began in Madras (Chennai) on 3 February 1947. It was known initially as the Central Marine Fisheries Research Station. It was shifted to Mandapam Camp in southern Tamil Nadu in September 1949 and finally to its present headquarters in Kochi, Kerala, in July 1971.

CMFRI has three regional centres (Mandapam, Veraval and Visakhapatnam) and seven research centres (Mumbai, Mangalore, Karwar, Kozhikode, Vizhinjam, Tuticorin and Chennai) with 10 research divisions and a total sanctioned staff strength of 938 (scientific 189, technical 330 administrative 150, supporting 263 and auxiliary 6). The Institute currently has 111 scientists, 306 technical hands, 142 administrative staff and 225 supporting staff.

CMFRI's Mandate

- To undertake basic, strategic and applied research in marine fisheries and mariculture.
- To monitor and assess the fisheries resources of the Exclusive Economic Zone (EEZ) and to understand the stock and its dynamics in relation to environmental and human interventions.
- To develop and commercialize hatchery and production system



Headquarters of the CMFRI at Kochi.

Prof Mohan Joseph Modayil, Director, CMFRI, Kochi

Prof Mohan Joseph Modayil took over as Director of CMFRI in 2000. He was earlier Professor and Head of the Department of Fisheries Resources Management at the College of Fisheries, Mangalore where he served for 30 years. He holds a first class M Sc degree in Marine Biology and Fisheries, a Ph D in Bioscience, and a D Sc in Aquatic Biology and Fisheries.



Prof. Modayil has served in many capacities in India and abroad. Development research being his passion, he was co-coordinator of many international projects sponsored by the UK's ODA (later DFID) and the IDRC in India and Thailand, Philippines, Malaysia, West Indies. He was also as a consultant for IFRTO in the Islamic Republic of Iran.

During the past seven years, Prof Modayil has been instrumental in modernizing the infrastructure of the Institute at its headquarters and at its 10 research centers. He has served on many national committees of the Ministry of Agriculture, and the Ministry of Environment & Forests. He is an elected fellow of the Zoological Society of London and an International Council Member of the Asian Fisheries Society, Philippines. He has to his credit more than 100 scientific publications in national and international journals and has edited 12 books. He can be contacted at mohanjosephmodayil@gmail.com.

technologies for finfish, shellfish and other commercial marine organisms in coastal and open seas.

- To build up a database on marine biodiversity, and carry out research on fragile marine ecosystems for their conservation and restoration.
- To undertake research on utilization of potentially beneficial marine organisms.
- To act as a repository of information on marine fishery resources with a systematic and analytical database for policy interventions and to carry out research on the social and economic costs and benefits of marine fisheries.
- To conduct front line demonstrations and training to develop human resources for R&D in capture fisheries and mariculture.
- To create awareness and provide training and consultancy services.

Facilities

The headquarters has a **modern library** that conforms to international standards and practices, with subscriptions to over 400 journals and periodicals, and 14 Internet cubicles. **The Marine Biodiversity Museum** at the headquarters showcases the unique biodiversity of marine life in the Indian coastal region. It is one of the largest of its kind in Asia with over 1 500 exhibits exclusive to the Indian seas. Its collection of hard corals from Indian waters and ascidians is unique.

A central laboratory was established in 2006 at the headquarters. It uses the latest equipment — such as a bomb calorimeter, automatic tissue processor, refrigerated microtome, trace metal analyzer, ultra freezer, refrigerated centrifuges, spectrophotometers, cryostat microscopes, etc. **An aquarium** with 40 species of ornamental fishes collected from different parts of the



The CMFRI Museum (above and below).



country has been established at the headquarters. CMFRI is the pioneer in developing breeding technologies for marine ornamental fishes.

The marine fish farms of the Institute are located at the following places:

Mandapam Camp: A fish farm of 3.8 ha area and a lagoon of 227 ha are available for mariculture activities.

Tuticorin: A fish farm with a water spread of 2.5 ha.

Narakkal: The 4 ha *Krish Vigyan Kendra* (KVK) Campus at Narakkal has four shrimp farm ponds each of 0.1 ha, besides an open wild watershed of about 2 ha.

Chennai: A shellfish hatchery functions in an area of 1.5 acres at Kovalam near Chennai.

Calicut: An area of 1.22 ha has been partly developed into a fish farm of five ponds, each of 0.25 ha. It is now being fully developed into a modern hatchery system of five broodstock ponds of various sizes and hatching & rearing facilities.

The wet laboratories and hatcheries facilities include onshore hatchery-cum-culture facilities at Visakhapatnam and Calicut. Three bivalve hatcheries have been set up at Tuticorin – one each for pearl oyster, edible oyster and clam – and a shrimp hatchery at Mandapam. A Marine Research Aquarium has also been commissioned in Calicut.

Some recent achievements of CMFRI

- Stock assessment, biodiversity and informed fisheries governance:**

- The Institute has developed, standardized and implemented the **Multistage Stratified Random Sampling Design** to estimate marine fish production along the Indian coast. District-wise, state-wise, gear-wise and species-wise production estimates have been made through this design continuously from 1947. It has developed and tested software for statistical analysis of marine fish landings. It has comprehensively studied the **highly migratory straddling stocks** of tunas and seerfishes. It has regularly monitored **marine pollution in coastal waters**, the hot spots of pollution and their effects on the marine ecosystem. The marine fisheries census 2005 conducted by CMFRI to **estimate fisherfolk population, craft, gear**, etc, serves as a database for policy-makers at the Center and the states.
- **Resources of sponges, corals and echinoderms** have been assessed. Evaluation of **genetic heterogeneity** in marine ornamental fishes like clown fishes and damsels is another achievement. In a pioneering study of the ornamental fish resources of Lakshadweep islands, 165 species were identified and the biology and stock of 40 species studied and documented in the publication “Marine Ornamental Fish resources of Lakshadweep”.
- **Optimum mesh size and fishing effort** have been determined for all major fisheries. Strategies for the conservation and management of overexploited, endangered and threatened stocks have been devised. **Potential fishing grounds** have been identified through onboard surveys in the EEZ of the country.
- Continuous monitoring of oceanographic parameters and estimation of **primary and secondary production in the**

seas around India led to charting on the abundance of the phytoplankton and zooplankton biomass and projection of potential yields.

- Communication tools for the Responsible Fisheries Extension Module (RFEM) have been designed, validated and disseminated.

b) Mariculture:

- **A breakthrough was achieved in captive breeding and hatchery production of slipper lobsters.**
- **A package of practices for culture of green mussel and edible oyster** was developed and commercialized.
- Packages of practices for **cultured marine pearl production** were developed and standardised. The Institute has for the first time developed a technology for land-based pearl production. Success has been achieved in producing large pearls of 5-8 mm size. A breakthrough has been achieved by developing a **tissue culture technology** for marine pearl production using the pearl oyster *Pinctada fucata* and abalone *Haliotis varia* for the **first time anywhere**. Technology for **sea ranching** of shrimp and molluscan seed produced in the hatcheries was developed and tested at Tuticorin and Mandapam.
- The Institute has achieved broodstock development, maturation, sex reversal, spawning, fertilisation and hatching of groupers such as *Epinephelus tauvina* and *E. polyphkadion*. Culture of seaweeds in open coastal waters has been successfully undertaken and its **feasibility demonstrated in the Gulf of Mannar**.
- The Institute has developed technologies for broodstock development, **breeding and larval rearing of marine**

ornamental fishes such as the clownfish (*Amphiprion chrysogaster*) and the one-spot damselfish *Chrysiptera unimaculata*. A second-generation seahorse (*Hippocampus kuda*) has been produced in captivity. The Institute has achieved a **breakthrough in the seed production and larval rearing** of the sea cucumber *Holothuria spinifera* which is in great demand for export.

c) Biotechnology:

The Institute has developed a quick and cost-effective **Duplex PCR Assay** to detect the White Spot Syndrome Virus. It has also developed a simple low-cost shrimp feed (*MAHIMA*) and facilitated the setting up of small-scale industrial units in central Kerala to manufacture the feed.

CMFRI's contributions

(i) Fish stocks assessment and resource management

The Institute has been continuously monitoring the status of fisheries exploitation as well as the ecological health of the stock. This is an enormous task considering that India has an EEZ of 2.02 million sq. km., 3 202 fishing villages and more than 3 000 fish landing centres spread across a coastline of 8 129 km; a multi-species, multi-gear fishery consisting of over 200 commercially important finfish and shellfish species; a fishing fleet comprising 58 911 mechanized boats, 75 591 motorised crafts and 10 4270 non-mechanised crafts; and over five million people who depend solely on fisheries for their livelihood, directly or indirectly.

CMFRI has been responsible for developing time-series databases on marine fish production from India's EEZ, as well as on biology, distribution, abundance, fishery forecasts of potential yield, stock assessment and management. The information thus generated has enabled management decisions by the Government. The Institute's exploratory surveys have helped

discover new and rich fishing grounds and paved the way for a vibrant seafood export industry. CMFRI can now explore deep-sea resources up to a depth of 400m along the southwest and southeast coasts.

The Institute has successfully addressed issues of ecosystem health, biodiversity conservation and coastal pollution. It has published stock estimates for nearly 50 species of finfishes. The potential estimate of marine fisheries resources in India has been revalidated to 3.934 million tonnes. The Institute's GPS-enabled database provides vital information on features of the ecosystem – such as biodiversity hotspots, threatened marine habitats, potential mariculture sites and pollution hotspots along the coast.

(ii) Transfer of technology

A number of public and private sector establishments in the country have relied on CMFRI know-how on environmental impact assessment, hatchery technologies, molecular diagnostics, and biotechnology. The Institute has so far earned Rs. 37 million through consultancy programmes.

Mariculture technologies developed by the Institute for the **culture of finfishes, pearls, mussels, clams, crabs, lobsters, sea cucumber, marine ornamental fishes, seaweeds** and other cultivable organisms in the sea have opened up avenues for entrepreneurship, higher production and more jobs. In the process, they have empowered women, improved the status of fisherfolk and stimulated fishing industry growth.

CMFRI has successfully developed and popularized hatchery technologies for commercially important marine organisms like prawns, crabs, lobsters, ornamental fishes, seaweeds and finfishes. The Institute has achieved a breakthrough in pearl oyster technology by developing a basic technique for tissue culture of pearl.

A global patent has been filed for this technology.

Culture of farmed mussels in the southwest coast has gone up from zero in 1996 to 10 000 tonnes in 2006-07, establishing the commercial viability of the technology. It is now getting immensely popular along the Malabar and Konkan coasts through self-help groups and entrepreneurs.

The Institute has pioneered the concept of open sea farming through cage culture technology. Finfish cages have been successfully launched along the east coast, ushering a new milestone in mariculture technology. Three more are being installed in Ratnagiri, Diu and Mandapam.

The Institute's dissemination of research knowledge during the last six decades has been impressive, with more than 5 000 research papers in international and national journals, 100 special publications, many information bulletins, brochures and newsletters, 53 volumes of the flagship *Indian Journal of Fisheries*, and 193 issues of the *Marine Fisheries Information Service* bulletin. The CMFRI website is regularly updated.

The Institute's HRD and outreach extension programmes have an enduring brand identity. The Agriculture Technology Information Centre helps fisherfolk with services and technologies. CMFRI training programmes in hatchery technologies and scuba diving (conducted on demand by regional research stations of the institute) are popular with fisherfolk. CMFRI assists HRD in fisheries through the post-graduate programme of the Central Institute of Fisheries Education.

(iii) Policies related to marine fisheries and mariculture

CMFRI assists the Government of India in formulating its marine fishing policy. The Institute recently examined the impact of the monsoon-fishing ban on behalf of

the Ministry of Agriculture. Multi-disciplinary researches in marine capture and culture fisheries have won it recognition as a premier institute.

Major thrust areas of CMFRI in recent years

Marine Capture Fisheries: Policy advisories for fisheries management; Short-term and long-term forecasts of fishery yields; Impact of gear on fished stocks; Trophic modelling of major marine ecosystems; Simulation of fishery yields and biomass under various scenarios; Application of remote sensing for fisheries forecasts on a GIS platform; Tag-recovery studies on straddling and migratory stocks; Impact adaptation and vulnerability of Indian marine fisheries to climate change; Impact of fisheries on biodiversity and quantification of biodiversity loss; Estimation of biomass of DSL and mesopelagics of the Indian seas; Creation of a marine biodiversity registry of the country; Rebuilding of vulnerable and overexploited stocks to the 1985 level by 2015.

Mariculture: Development/standardization of hatchery and farming technologies for potential marine shrimp species, lobsters, brachyuran crabs, king crabs and molluscs leading to commercialization; Development of technologies for seed production and farming of high-value species such as grouper, snapper, bream, and tunas; Open-sea cage farming of carnivorous marine fishes; Development of appropriate technologies for at least a dozen species of marine ornamental fishes of international commercial value and demand; Development/standardization of technologies for sea ranching of commercially important crustaceans, molluscs and sea cucumbers to augment natural stocks; Development of farming technologies for marine organisms of pharmaceutical importance; Consolidation and transfer of mariculture technologies of pearl oyster, edible oyster, clam, mussel,



Facilities at the CMFRI headquarters - electron microscope (left) and marine aquarium (right).

chank, sea cucumber, seaweed, shrimp and finfishes and their integration with artisanal capture fisheries; Development of blacklip pearl oyster farming technology and production of black pearls; Organic farming protocols for marine organisms.

Marine Biotechnology: Genetic improvement of marine cultivated species through selective breeding and hybridization; Endocrinology and reproductive physiology of cultivable marine organisms; Bioinformatics and gene library of existing and emerging marine pathogens; Bioconversion of raw material to enrich feed ingredients and reduce anti-nutrients; Bioprospecting for secondary metabolites from marine invertebrates, algae and microbes for use in disease management; Molecular taxonomy of marine organisms to develop PCR based identification tools

Major strengths of the CMFRI

- **Human resources – core competency:** 111 scientists qualified in various disciplines relating to marine fisheries and mariculture.
- **Research network:** Three regional, seven research and 15 field centres enable the Institute to address location-specific problems in marine fisheries and mariculture. Links with reputed R&D organizations

within and outside the country strengthen the network.

- **Infrastructure:** State-of-the-art laboratories and hatcheries carry out research in fishery biology, marine ecology, hydrography, biodiversity, statistics, marine biotechnology, economics, extension, and mariculture.
- **Resource monitoring and technology transfer:** The Institute’s network of research/ regional and field centres constitutes a strong resource monitoring system. The Institute’s economic analysis of marine fisheries — including evaluation of marine fish landings, economics of craft-gear combinations, price spread and market dynamics – has been valuable. Information is taken to the field through industry-farmer meets, village level meetings, training programmes, symposia and exhibitions. The Institute’s Agricultural Technology Information Centre serves as a single window delivery system for end-users.

Cooperation with other fisheries institutions in India and abroad

CMFRI has been collaborating with various national and international research and developmental institutes. These include the FAO, World Fish Center, IFS, SEAFDEC, Wageningen International, BOBP-IGO and the Marine Stewardship

Council The Institute has provided technical advice to countries like Iran, Mauritius and Bangladesh.

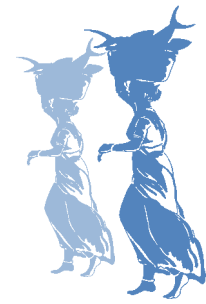
Vision of CMFRI

The Institute hopes to develop an information-based management system for changing over from open access to a regulated regime in marine fisheries, for augmenting coastal fish production through mariculture and sea ranching and for restoring critical marine habitats. In this context, CMFRI has identified the following thrust areas:

Fishery yield forecasting through modeling; Trophic modeling of marine ecosystems; Straddling and migratory fish stocks; GIS-based fishing and mariculture sites; Impact of climate change on marine fisheries; Hatchery technology for marine food fishes and their farming; Genetic improvement of farmed fishes; Bioinformatics and gene library of marine pathogens; Molecular taxonomy; Black lip pearl oyster farming and tissue culture technology; Open sea cage farming; Demand-supply, cost-benefit analysis; Policy research, WTO, CBD, IPR, TRIPS Impact; Conservation research; Impact analysis.

The CMFRI has a great future as a centre of excellence in mariculture and marine biotechnology and as a nodal organization for fisheries sustainability and management in the Indian Ocean.

Review of Marine Fisheries in Orissa



Small-scale fisheries in Orissa (often symbolized by images of svelte women hurrying on the beach in Puri with headloads of fish) is a story of untapped resources and unrealised potential.

The BOBP-IGO recently carried out a study for UNDP on marine fisheries in Orissa. It related to the marine fishery infrastructure, the socio-economics of marine fishers, and the institutional structure governing their activities.

Primary data for a sample study was collected between December 2006 and March 2007 in six coastal districts of Orissa – Ganjam, Puri, Jagatsinghpur, Kendrapara, Bhadrak and Balasore. Data was obtained on the income, education and assets of fishers. Group discussions were held with fishers and their associations. Discussions were also held with Department of Fisheries (Dof) officers about problems faced in marine fisheries and possible solutions. The BOBP-IGO team visited major landing centres in the six coastal districts and talked to user associations about the marine infrastructure.

Some of the study's many objectives: Review marine fish production in Orissa for the period 1950-51 to 2004-05 and correlate it with harvestable potential. Assess the marine fishing fleet, the extent of motorization and mechanization and the use of sea safety measures. Evaluate shore-based infrastructure. Assess resource enhancement through fish aggregating devices, artificial reefs, mariculture and seaweed farming. Study the Orissa Marine Fishing Regulation Act (OMFRA), 1982. Review policy measures like closed seasons, closed areas and their impact on fisheries. Review the institutional support available for marine fisheries development, credit linkages, role of gender and human resource development.

Some of the study's findings and impressions are presented here in Q & A form.

Is marine fisheries production in Orissa falling? What are the basic facts regarding production and the condition of fishers?

Most fishing activity is in coastal waters; deeper waters remain untouched. Marine fish production

has recorded a fall over the past seven years – from 0.16 million tonnes in 1997-98 to 0.12 million tonnes in 2004-05. About 3 000 sq. km of water area falls under reserve forests and is not available to fishers.

But actual fish production from Orissa waters is higher than the figures show. Reason: Trawlers from Andhra Pradesh and West Bengal fish in Orissa but land their catches in their respective states. Many Orissa trawlers also land their catches in Digha, West Bengal.

During the last two decades, the fleet size has gone up substantially in relation to fisher population. The trend is continuing. Mechanized boats have gone up in number by 250 percent in 25 years (from 692 in 1981 to 1 796 in 2004-05).

Motorized boats numbered 2 467 in 2005, up from 820 (1990), an increase of 422 percent in 165 years. Non-motorized boats (catamarans, bar boats, navas, dingis, potial./botali and choat) have actually fallen in numbers – from 6 000 in 1975-76 to 4 220 in 2005.



The existing infrastructure of three fishing harbours and seven fishing jetties can accommodate only about one-fourth of the state's mechanized boats.

The maximum sustainable yield of commercially important marine species up to 200m depth is estimated at 0.161 million tonne. About 76 percent of the potential MSY is being exploited annually at present.

The average per capita income of marine fishers is low - Rs 1 000 per month. Health, education and housing are unsatisfactory. Nearly half of the fishers have health problems. Balasore is the poorest district in terms of health – 62 percent of the respondents have reported health problems.

Almost 85 percent of Orissa's fisher population belongs to the age groups 6 to 17 and 18 to 59. The fishing industry already shows signs of overcapacity; this may worsen with new entrants to the work force. Young fishers are not optimistic about the future of fisheries in the state and are migrating to fishing and other industries in Mumbai, Goa, Gujarat and Kolkata. Those who remain in Orissa find few livelihood alternatives.

More than one-third of the fishers feel that in coming years, the fisheries situation in Orissa will worsen – due to factors such as rising prices, debt burden, declining fish stocks, restrictive government policies. Artisanal fishers say fishing by mechanized boats in their fishing zone is harming their livelihoods.

For fisheries production to go up and the condition of fishers to improve, various productivity and management constraints must be tackled.

What is Orissa's present infrastructure for marine fisheries?

Sixty four landing centres along the coast of Orissa cater to the needs of fishers belonging to 647 fishing villages. Mechanized fishing boats operate from 19 fish landing centres



An IT kiosk set up in a fishing village to provide information on potential fishing zone and weather conditions.

(FLCs), a minor fishing harbour (MFH) in Dhamra and a major fishing harbour (FH) at Paradeep.

All harbours except Paradeep (which is 100 % Centrally-sponsored) and the fish landing centers have been constructed with 50 percent assistance from the Central Government. There are 18 boatyards in private and public sectors, most of them in and around Paradeep, and six-net making units.

Processing: Of the 367 freezing plants in the country, 21 units are located in Orissa with a capacity of about 342 metric tonnes per day. The total capacities of these units are as follows: ice plants 1 519 tonnes, cold storages 5 102 tonnes, chill rooms 220 tonnes, peeling sheds 125.4 tonnes and processing plants 388 tonnes.

Marketing : Marine fish marketing in the State has both domestic and export components. About

71 percent of the marine fish is consumed as fresh, 22 percent goes for drying, 7 percent is frozen. About 49 percent is quality fish, 51 percent comprises small and miscellaneous varieties. About 40 percent of Orissa's marine catch is used for local consumption – of which nearly 90 percent is in the coastal districts.

Headload on foot, and bicycles, are the most common mode of transport for cheaper fish varieties in villages and small towns. Better-quality fish is collected by middlemen from landing centres and transported to wholesale markets in Cuttack, Berhampur, Bhubaneswar and Rourkela by road and rail for marketing through retailers. Kolkata is the biggest market outside the State for marine fish. Marine fish marketing in Orissa is carried out by a large number of intermediaries forming a long chain of market channels.

Fisheries infrastructure, active fishers and fish production in Orissa during 2005-06

District	Landing Centres	Infra-structure	Number	Active fishers	Production (Tonnes)
Balasore	13	FLC	6	52 190	33 788.50
Bhadrak	10	MFH+FLC	3	15 853	10 856.20
Kendrapara	8	FLC	4	10 222	7 970.89
Jagatsinghpur	5	FH+FLC	2	19 645	31 007.63
Puri	12	FLC	1	12 627	28 557.00
Ganjam	16	MFH+FLC	1	10 745	10 033.65
Total	64		17	1 21 282	1 22 213.87

Significant quantities of low value fish are dried and marketed within and outside the State. As the drying of fish is carried out in a primitive and unhygienic manner, the product commands low value.

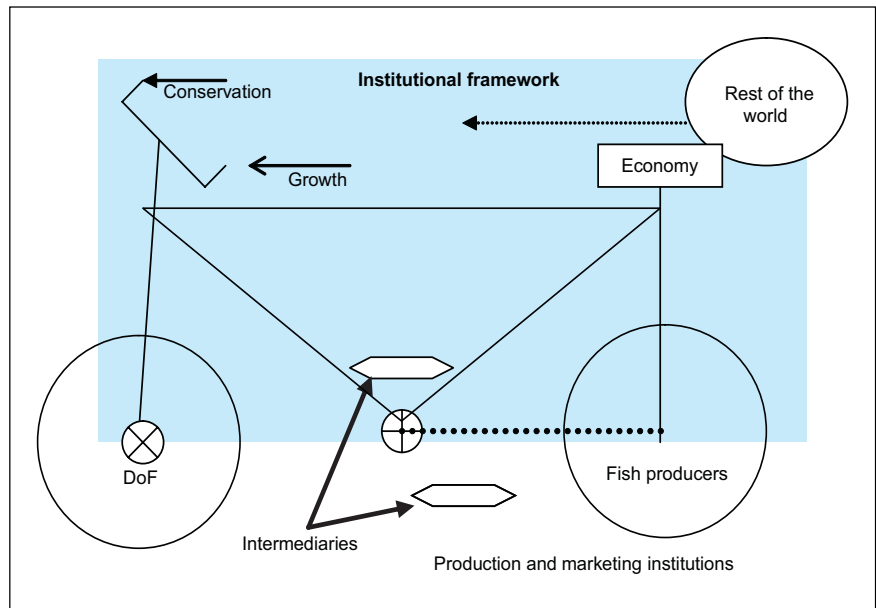
What are the productivity and management constraints to marine fisheries cited earlier?

Production and productivity constraints relate to the pre-harvest and post-harvest fisheries infrastructure; dredging and repair of harbours and fish landing centers; repair facilities for boats and engines; facilities for credit and subsidy; training for fishers and officials; R & D initiatives concerning alternative occupations for fishers; developing a deep-sea fishing fleet.

Management constraints: Total fishing effort should not exceed maximum sustainable yield. Excess fishing effort should be siphoned off. Alternative livelihood options must be developed. Sufficient revenue should be derived from marine capture fisheries through market linkages. To succeed, a marine fisheries management programme should strive to strengthen monitoring, educate fishers, improve the interaction between the DoF and fishers, manage the infrastructure, and design subsidies to build capacity.

Please describe the growth model proposed for Orissa by the study team.

Sustainable growth is like riding a bicycle. If the bicycle does not move, the rider can't keep his balance. If the rider pays no heed to the centre of gravity, the cycle will topple. Success lies in moving – and moving in synch with the centre of gravity. The ease with which the bicycle moves depends on the condition of the tyres, the free movement of the chain and the motivation of the cyclist. On the other hand, synchronization with the centre of gravity is a function of how well the frame co-ordinates with the wheels.



Bicycle model for marine fisheries management in Orissa

In terms of Orissa's marine fisheries, the front wheel represents the Government (mainly the DoF). The rear-wheel represents the fishers – they are bound by government laws. The pedals are marketing channels, conduits from the fishers to society.

The bicycle frame represents the institutional structure in fisheries. This includes rules and regulations, international treaties, financial institutions and other stakeholders (except the DoF). It also covers the traditional relationships among the fishers, boat owners and intermediaries.



This simple model does not capture the intricate interactions among all stakeholders, but highlights the roles and strengths of the DoF and the fishers. The cycle's movement depends on the ease with which market forces operate among fishers and society. This may be described as a **productivity constraint**.

Managing the movement (enforcing the institutional structure) depends on the strength of the frame and its co-ordination with the wheels. This may be described as a **management constraint**.

Ensuring sustainable development

The four broad goals of sustainable development of marine fisheries in Orissa are: Optimisation of the fishing fleet, including exploitation of deep sea resources; development of pre-harvest and post-harvest infrastructure and markets; enhancement of skills and capacities of stakeholders; institutional and policy support for sustainable fisheries and livelihoods.

Future development of marine fisheries in Orissa will depend on the attainment of these goals. The study team has discussed these four factors and developed a road map.

Optimisation of fishing fleet

Two steps are essential. A part of the existing mechanized fleet must be developed for deep sea fishing.

New mechanized boats should be allowed only for deep-sea fishing.

The fishing fleet is aging. Most present boats are unsuitable for deep sea fishing. Paradeep is the only harbour which can handle deep-sea fishing boats.

A new fleet with an OAL range of 15-20 meters can be considered for deep-sea fishing in the long run (five years and beyond.) Fishing harbours must be developed in Puri and Ganjam for the southern coast. Institutional finance must be arranged for mechanized boat owners to encourage them to develop deep sea vessels.

Development of pre-harvest and post-harvest infrastructure

In the short term, existing infrastructure should be repaired and managed. The long-term objective would be to develop new infrastructure facilities, such as FLCs, to cater to the needs of fishing fleet. After infrastructure is developed, the DoF should explore new markets for fishery products – such as the northeastern states for dry fish.

The north-south divide in Orissa marine fisheries should be addressed. At present, mechanization in north Orissa approaches saturation point while south Orissa is much less mechanized. Better north-south balance is essential.

Traditional landing centers at Pentakotha, Nuagarh, Chandrabhaga, Sana Arjipalli and New Golabondho should be developed into modern fish landing centers. Atharbanki in Jagatsinghpur could be considered for development into a fishing harbour.

For managing pre-harvest and post-harvest infrastructure projects, the government could consider mechanisms like build-operate-transfer, public-private partnership and Government-community partnership.

Value addition activities in post-harvest fisheries management – such

as fish drying and packing, and preparation of fish pickles – can employ women in large numbers. Such activities can be linked and funded by other development projects for marginalized women.

Enhancement of skills and capacities of the stakeholders

Fishers have identified the following areas for skill training – value addition; sea-safety measures; deep sea fishing and use of gear; alternative livelihoods like mariculture. The DoF on the other hand, considers the following as important: implementation of the Code of Conduct for Responsible Fisheries; Monitoring, Control and Surveillance programmes, including data collection procedures. If the government promotes a co-management model, it has to build leadership among fishers. Awareness should be created among fishers about government schemes meant for them, and whose benefits they are entitled to.

As for training of officials, field staff and junior officers need to be introduced to fisheries management; middle-level officers need training in advanced fisheries management (including stock assessment, environmental impact assessment, data interpretation, integrated sea use planning, etc) Senior staff need training in fisheries development and policy formulation (including integrated coastal area management, international laws and regulations, socio-economic analysis, etc).

Monitoring, Control and Surveillance

An efficient and effective MCS programme is the key to sustainable fisheries, also to success in implementing any planning strategy. Without MCS, a fisheries management scheme would be incomplete and ineffective.

MCS tools – such as a participatory management plan, data collection systems, communication systems – need to be developed.

MCS measures are as a rule costly to implement. But these costs can be

significantly reduced by encouraging community participation.

Subsidies have perhaps enabled the survival of marine fisheries in Orissa. But they should be phased out in five to 10 years. Money should be spent on more productive activities like R & D, market research, etc. As for the credit needs of small-scale fishers, localized micro-credit institutions should be encouraged to meet small-scale credit needs such as net and engine repair.

Co-management

The study makes a case for co-management – with the responsibility for resource management being shared between the government and various user groups. This limits government cost to surveillance – and community effort can be tapped for this as well.

Some fishers have pointed out that the fisher representatives in monitoring committees set up by the government seem powerless to raise fishers' concerns and protect their interest in issues relating to reserved forest areas. They say that unless *de jure* power is delegated to them, participation in co-management programmes will not protect their interests.

Going by the bicycle model, the frame should be supported by the two wheels; Government and the fishers should work together for dynamic movement. To make co-management effective, the government should engage the fishers in preparing and modifying rules and regulations. The community can then internalise the law into their day-to-day activities, rather than viewing the law as something thrust upon them.

What type of co-management best suits Orissa has to be worked out. A system where problems are identified at the local level, and solutions worked out jointly, is worth serious effort.

Recent BOBP publications



Abstracts: The Third International Conference on Fishing Industry Safety and Health

This concise 76-page publication contains the abstracts of some 45 papers presented at the Third International Conference on Fishing Industry Safety and Health, held in Mahabalipuram from February 1 through 7, 2006. It was organized by the BOBP-IGO jointly with the FAO and the Alaska field station of the National Institute for Occupational Safety and Health, USA.

Together, these abstracts open the window to a world of knowledge relating to safety, health, injuries, fishing vessel construction, labour standards, mechanization, training, work processes, fuel use, emergency responses, rescue at sea, monitoring, tsunami rehabilitation etc. Write to BOBP for a copy of the publication.

Socio-economic status of workers in the salt industry in India: a report

This 184-page book was prepared by the BOBP-IGO for the Salt Commissioner, Ministry of Commerce and Industry. It is based on a 15-month field study conducted from September 2004 to December 2005 by an IGO team that met more than a thousand salt workers from seven states – Gujarat, Tamil Nadu, Rajasthan, Andhra Pradesh, Maharashtra, Orissa and West Bengal.

These seven states account for about



99 percent of India's salt production and employ about 100 000 workers a day. The team also met field officers of the Salt Commissioner's office. The IGO team, assisted by local investigators, used a combination of methods – structured and pre-tested questionnaires, interviews, focus group discussions – to obtain reliable data on this un-organized sector.

The study team reported a dichotomy. Salt production has gone up more than eight-fold since independence, from 1.9 million tonnes in 1947 to 1.49 million tonnes in 2003. But an estimated half a million salt workers in India suffer from an array of problems – exploitation, lack of social security, gender bias, poverty, backwardness.

Some of the team's recommendations concerning the salt workers: Create a data base and undertake a full census. Register all salt workers. Guarantee employment. Fix minimum wages. Improve workplace amenities, such as access to potable drinking water and mobile clinics. Recruit health workers from the salt workers' community. Set up a group insurance scheme. Improve and widen credit access. Set up child crèches and schools. Modernise the industry without marginalizing small-scale salt units. Standardise production techniques. Improve power supply. Strengthen infrastructure for storage and transport of salt, with jetties and efficient rail rakes.

The book has been authored by Dr Y S Yadava, Rajdeep Mukherjee and Ram Mundhe.

Report of the Third Governing Council Meeting

The Governing Council, the top advisory and policy-making body of the BOBP-IGO, meets every year to review the IGOs progress and discuss future plans. This

publication reports on what happened at the Council's meeting in Malé, Maldives, on May 2 and 3, 2007.



It includes the IGO's report of its work after the previous meeting (the period January 2006-March 2007); a report on the second Technical Advisory Meeting of the IGO held on 5 and 6 February, 2007; and proposed programmes for 2007.

The programmes for 2007 include translation of the technical guidelines on marine fisheries which follow from the Code of Conduct for Responsible Fisheries; training programmes for junior and middle-level fisheries staff on implementation of the Code; setting up of a regional information network; organization of a fisherfolk week; information preparation and dissemination; a regional workshop on resource monitoring, control and surveillance; preparation of a regional management plan for the hilsa and shark fisheries.

Bangladesh will host the next meeting of the Governing Council early in 2008 (subject to approval by the government).

Training Project for Promotion of Community-based Fishery Resource Management by Coastal Small-Scale Fishers in the Philippines Reports of Phase 1 (10-17 July 2006), Phase 2 (10-19 September, 2006) and Phase 3 (11-16 February, 2007).

By universal consent, CBFM (community-based fisheries management) is the surest and the most effective type of fisheries management, since it is undertaken by fishing communities themselves, who perceive it to be in their best interest. Japan is therefore funding CBFM in Asia through a series of country-centred training projects carried out by small-scale fishers and their organizations (fisheries co-

operatives, in most cases). Philippines was selected as the first country for this project, covered in Japanese FY 2006 (April 2006-March 2007).

The project is being implemented by the International Cooperative Fisheries Organization (ICFO) of the International Cooperative Alliance (ICA). The project's stated aims: to promote CBFM by small-scale coastal fishers and their organizations; strengthen their activities; and thereby help sustainable production, job opportunities and poverty alleviation. BOBP-IGO is advising ICFO in implementation of the project.

The project has three phases for every country. Under Phase 1, Japanese and other experts visit the selected country to study CBFM and make recommendations; Phase 2 – a team of select fishers visit Japan to study fisheries resource management activities there. Under Phase 3, a concluding project workshop is held in the selected country.

The report of Phase 1 discusses the visit to the Philippines from 10 to 17 July 2006 by four experts: Dr Y S Yadava of the BOBP-IGO; Dr Masahiro Yamao, professor in the graduate school of biosphere science, Hiroshima University, Japan; and Mr Masaki Sato, secretary of the International Cooperative Fisheries Organization, Tokyo, Japan.

The report describes the legal, policy and institutional framework of fisheries management in the Philippines; the expert team's observations on fishery resources.

The report of Phase 2 discusses in detail the 10-day visit by a 12-member Philippines study team to Japan for exposure to its fisheries management System. Participants visited the Tokyo Metropolitan Central Wholesale Market, the fisheries division of the Okinawa Prefectural Government for presentations by the staff there, the Okinawa Local Wholesale Fish



Market, the Nago Fisheries Cooperative Association, and the Yanbaru Bussan Centre.

The report discusses the participants' observations on how far Japan's fishery management system is applicable to the Philippines. They were impressed by the rules and regulations adopted by fishers themselves about restricting fishing periods, about not catching juveniles, about conserving spawning and breeding areas. A long tradition of CBFM and the 'fishery rights' provided to FCAs contributed to the success of fishery resource management. The information readily available on commercially important fish stocks also enabled formulation of management options. The Resources Recovery Plan to address resource decline, and the strong political will in Japan, were important factors in Japan's success story with management.

Could a similar system be introduced in the Philippines? There were problems of leadership, governance, values and attitudes, the participants felt. Knowledge of fishery resources had to be strengthened. A practical system to confer fishing rights to fishermen's associations had to be developed. Policies for an open and closed season had to be formulated.

Mangrove plantations had to be promoted, marine protected areas set up, fish aggregating devices promoted, law enforcement by the community encouraged. Some other suggestions: A study covering socio-economics, the concerns of fishers, resource management practices, existing laws, etc; seminars and workshops for training; livelihood projects; auction markets; development of educational materials.

The report of phase 3 discusses the proceedings of a seminar held in the Philippines (in Puerto Princesa city, Palawan) on "Promotion of community-based fishery resource management by coastal small-scale fishers in the Philippines". Forty nine persons from the fisheries co-operative sector and from the government took part. The aim of the seminar was capacity-building of fisheries cooperative leaders.

The Palawan Declaration adopted at the seminar made several recommendations. It urged nationwide adoption by local government units (LGUs) of ordinances now being implemented by the provincial government of Palawan on coastal resource management. It urged upgrading of the Bureau of Fisheries and Aquatic Resources to a Department; technical assistance from the National Mapping Resource Information Authority in demarcating municipal waters that were off-limits to certain commercial fishing boats; technical assistance to fishery cooperatives from the Cooperative Development Authority; special attention on rescue of fishermen lost at sea by the Navy and the Coast Guard of the Philippines.

Recent issues of "Bay of Bengal News"

March 2006: A special package on improving the safety and health of fishers, based on the deliberations of IFISH-3 (the Third International Conference on Fishing Industry Safety and Health) at Mahabalipuram near Chennai from February 1 to 4, 2006, and on a post-tsunami workshop at the same venue from February 6 to 7, 2006.

June 2006: A special issue on "25 years of *Bay of Bengal News*, a success story in development journalism," with articles and reader responses recalling the best in content, photography and visuals from 80 issues of BBN.

September 2006: A miscellany of articles, papers and reviews. Editorial on fishery resource

challenges.

An interview with Mr Ichiro Nomura, Assistant Director-General for

Fisheries at FAO, Rome. Papers on safety at sea from the IFISH-3 conference and the tsunami workshop. An article on NARA, Sri Lanka. Glimpses into Japan's fish markets. A review of the Marine Fisheries Census for India, 2005.

December 2006-March 2007:

Another diverse issue. The March 2007 meeting of COFI (Committee on Fisheries), Rome. Papers from IFISH-3.

A catchy center-spread about the posters on the Code of Conduct for Responsible Fisheries. Articles on the Fishery Survey of India, Mumbai, and the Bangladesh Fisheries Research Institute, Mymensingh, Bangladesh. A summary of FAO's annual publication SOFIA (the State of World Fisheries and Aquaculture) for 2006.

Posters on the Code of Conduct for Responsible Fisheries:

A thousand copies each have been printed of a dozen eye-catching posters that focus on the Code of Conduct for Responsible Fisheries. The posters carry pithy concise text and imaginative sketches. (See *Bay of Bengal News*, December 2006-March 2007).

The Code of Conduct – in regional languages



Materials on the CCRF have to be produced in the vernacular so that fishers read and absorb them – and put what they read into practice.

The BOBP-IGO organized translations in Tamil of the “Technical Guidelines” relating to the Code of Conduct – which contain advice and explanations about the code dealing with fishing craft, fishing gear, aquaculture, etc. A set of 10 “Technical Guidelines and Plans of Action on Marine Fisheries” in Tamil have been produced. Many of them were handed over to fishers and to the Department of Fisheries, Tamil Nadu, at a one-day workshop on the Code held recently in Chennai.

Likewise, a simple 16-page version of the Code has been organized and printed in Bengali and Marathi. Copies were sent for dissemination to the Director of Fisheries, West Bengal, and the Director of Fisheries, Maharashtra.



Video films on the tsunami and on India's salt workers

Two recent video films prepared by the BOBP-IGO deal with the conditions of salt workers in India, and tsunami rehabilitation (the latter film focuses mainly on India and Sri Lanka).

The half-hour film on salt workers, titled “75 years after Dandi: India's salt workers look for their place in

the sun,” takes a historical look at the salt industry, and discusses the activities and conditions of salt workers. It contains interviews with salt workers and managers and recommendations for the industry.

The film on the tsunami briefly describes its havoc and discusses the problems and challenges of rehabilitation. Officials from the region, FAO experts and fishers are interviewed about action needed.

Calendars – 2006 and 2007

How do children with an artistic bent react to the tsunami? The BOBP-IGO held art contests for school children in four centers of Tamil Nadu, also in Sri Lanka and Maldives. These were described in *Bay of Bengal News* (September and December 2005). A selection of these beautiful paintings adorned the unique 2006 calendar. Several organisations/ agencies sponsored the production of this calendar.

The Code of Conduct for Responsible Fisheries is the theme of the 2007 calendar. It contains brief text and sketches in colour. The calendar was sponsored jointly by the Central Institute of Fisheries Education, Mumbai; the National Fisheries Development Board, Hyderabad; and the BOBP.



Bay of Bengal News is a quarterly publication of the Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO). The BOBP-IGO is a regional fisheries body, which presently covers four countries around the Bay of Bengal – Bangladesh, India, Maldives and Sri Lanka. The BOBP-IGO plays a catalytic and consultative role in developing coastal fisheries management in the Bay of Bengal to help improve the conditions of small-scale fisherfolk in the member-countries.

