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MCS in Small-scale Fisheries

Regulating the unregulated

The seas, once - abundant with fish, are drying up. Once - ambitious fisheries planners are agonising over regulation and management. Once - carefree fishers are brooding over falling catches and incomes - and their own future. This issue of BBN focuses on what will best help the seas, the fishers and the planners - MCS (monitoring, control and surveillance), the key to success in fisheries management.

MCS in Small-scale Fisheries

Regulating the unregulated

MCS (Monitoring, Control and Surveillance) is perhaps the most important three-letter term in fisheries today. Without MCS, management – an urgent priority in fisheries everywhere – would be ineffective. This editorial discusses some of the issues relating to an effective MCS system for fisheries in countries around the Bay of Bengal.

Dwindling resources, falling fish catches and incomes, concerns about sustainability, calls for a "paradigm shift" in mindset from production to management – the story is universal.

Management is the gospel that fisheries departments and institutions preach but fishers small and big ignore. Management policies are inadequate; compliance levels are low; enforcement is poor.

For all three to improve, Monitoring, Control and Surveillance (MCS) has to get better. It's a potent tool of governance in fisheries, but like governance itself, it is easier to profess than to implement. "Monitoring" entails systematic collection, measurement and analysis of data on fishing activities. "Control" refers to the conditions laid down under which resources can be harvested. "Surveillance" ensures that fishers and other players comply with laws and regulations.

MCS systems have mainly been designed for the industrial fisheries of developed countries. Special MCS systems are needed for small-scale fisheries of developing countries because of its special character – open access, multi-species, multi-gear, with thousands of small low-cost fishing units operating from beaches and landing fish at numerous small and remote landing centres. The process of setting up an effective MCS system is slow, costly, and full of hurdles.

To help the process, the BOBP-IGO held a three-day workshop on MCS in fisheries in Chittagong, Bangladesh, in January 2008. Leading fisheries officials from BOBP-IGO member-countries (Bangladesh, India, Maldives, Sri Lanka) took part, besides experts and observers. The workshop's "Chittagong Resolution" urged that MCS should be integrated into every member- country's fisheries policy, its regulatory and managerial frameworks. Education, training and awareness programmes and media mobilization should be a part of the process.

Here are some insights and learnings from the workshop.

– An MCS system may be perceived as costly, but the cost of not managing the resource is far higher. This said, the MCS system should be designed to be cost-effective. It should encourage compliance, rather than demand enforcement. Further, the cost of conservation should not exceed the economic benefits from marine resources. The fisheries department or the management authority should examine all practical options for sharing the cost of management with industry. Likewise, information-sharing among all stakeholders is another practice that should be institutionalized.

– MCS in small-scale fisheries has to confront unique constraints:
  - Lack of accurate statistics in the small-scale/ artisanal sector.
  - Lack of a scientific information system.
  - Inadequate trained manpower at both management and operational levels.
  - Lack of awareness at the community-level of the need for MCS.
  - A large number of inaccessible landing places along the coast.
  - Lack of supporting legislation to implement MCS.
  - Inadequate funding for MCS.

– A sound MCS system can be based on either a preventive approach or an enforcement approach. The preventive approach entails measures to control access, such as licensing. The enforcement approach entails penalties on law-breakers so that law-abiding is seen as not merely wise or correct but as advantageous. But strong political will and government support are needed for firmness in enforcing penalties.

– All fishing vessels must be registered. Procedures for registration and licencing must be streamlined. In some countries, registration and licencing are seen as cumbersome multi-window processes. This discourages compliance. Further, registration systems should be uniform throughout a country.

– A Vessel Monitoring system (VMS) is an essential MCS tool. VMS enables accurate and timely information about vessel location and activity through transponders on the vessels and associated paraphernalia.

However, VMS is practical only for a large industrial fishing fleet. For small-scale fisheries, colour coding of fishing fleets on the basis of their place of origin and area of operation, and display of flags with registration numbers, are necessary measures. Random sampling of catch is essential – the enforcing authority ought to use modern communications technology to make the process effective. Better two-way communication systems in all fishing vessels is essential.

– Limits should be imposed on fishing effort through access regulations (licensing of fishing vessels, for example), closed seasons, closed areas and gear restrictions.

– A comprehensive stock assessment is essential to ensure sustainable exploitation of resources, and also work out optimum fleet size by area and species. This may help reduce conflicts as well.

– The MCS authority should probe and address the reasons for non-compliance with regulations – apart from that of inadequate enforcement. It could be lack of awareness, inconsistencies in regulations issued by different ministries, a culture where community solidarity is a

International MCS Network

The International Monitoring, Control, and Surveillance Network for Fisheries-Related Activities (www.imcsnet.org) helps in the global battle against IUU (illegal, unreported and unregulated) fishing. Created in 2001, the network facilitates collaboration between MCS professionals.

Members of the network are national organizations which have been authorized to co-operate with organizations elsewhere to prevent, deter and eliminate IUU fishing. The network, which now has some 50 members, provides training, serves as a forum for professionals to meet and discuss MCS, and maintains a database of contacts and information for member-countries.

Why is such a network needed? Comprising over 70% of the earth's surface, the oceans feed the world. IUU fishing takes place in all oceans; while fisheries-related corruption and crime occur on land. Identifying and pursuing criminals over large areas requires resources and effort beyond the reach of any single nation. Developing nations are particularly vulnerable to incursions in their waters.

The Network's objectives:

- Efficient information exchange.
- Preparing analyses and studies related to IUU fishing.
- Recognizing the dangers of IUU fishing and seeking common solutions.
- Facilitating communication with members and between them.
- Develop capabilities among member nations to work regionally and globally to prevent, deter and eliminate IUU fishing.
- Training of MCS officials in member nations to improve their effectiveness, skills and capacity to address IUU fishing.

The Network conducted the first Global Fisheries Enforcement Training Workshop in Kuala Lumpur in 2005 and the second in Trondheim, Norway, in August 2008.

stronger force than government edict.

– Legislation on MCS in the region is either poor or inadequate. It should be revised. It is widely believed that fisheries laws are often complex, difficult to understand and implement. Those concerned should consult a wide range of stakeholders in formulating laws that are simple and clear and relatively easy to enforce.
– Co-operation and support from advanced countries for an MCS system should be regarded as a priority – on technology, on search-and-rescue systems, on strengthening the Coast Guard, on curbing illegal fishing, on a vessel monitoring or vessel tracking system. The Code of Conduct for Responsible Fisheries suggests such co-operation.
– MCS systems must be local-specific, and take account of prevailing cultural, financial and human factors. The focus should be on improving data collection, strengthening local awareness of the need for conservation and management, and encouraging fishers as whistle-blowers who will report infringements.
– MCS has to be a co-operative effort with industry and the entire fisher community. It can't succeed if it's just government-driven. Decentralizing management, and moving towards co-management and community management, is the way to the future.
– CBFM (community-based fisheries management) structures at the community, district, regional and national levels should be tapped for MCS activities. In fact, fishers should be able to help enforce MCS, with NGOs serving as facilitators, if an appropriate legal, management and financial framework is devised.
– The MCS authority could conduct a micro-level exercise to determine the norms for scientific and environment-friendly MCS, depending on the type of craft, fish species, time of the year and gear type. This should be carried out and published. Accordingly, an area-specific management plan could be set out.
– Illegal fishing should be combated through port state measures such as inspection of gear and catch onboard arriving vessels, and inspection of documents.
– "Sustainability" may have neither meaning nor relevance for artisanal fishers who live from day to day. It would be relevant, however, if fishers are provided with useful information – on fish abundance by area, weather forecasts, market prices, safety at sea, etc. In Maldives, for example, fishing forecast information is provided free of charge exclusively to registered vessels.
– Regional cooperation can strengthen understanding and knowledge on all MCS-related issues and lower costs as well. The 'Chittagong Resolution' on MCS is a good beginning and must be taken further.
– Ultimately, MCS confers manifold benefits that go far beyond resources. For small-scale fisheries, it could mean more accurate resource mapping; a better insurance deal; greater safety; more stable incomes; greater employment opportunities and a win-win situation for all.

At the national level, a strong MCS in fisheries could even enable more effective operations against terrorism, drug-peddling, arms smuggling and other social evils.

– Y S Yadava

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

CICEF - India's Nodal Agency for Development of Fishery Harbours

When was CICEF set up and why? What is the mandate and vision of CICEF?

On January 10, 1968, the Pre-investment Survey of Fishing Harbours (PISFH, the precursor to Central Institute of Coastal Engineering for Fishery or in short CICEF) was set up in Bangalore by the Ministry of Agriculture in collaboration with the FAO for a period of five years. It conducted studies and site surveys for development of minor fishing harbours, advised on site construction, and helped develop the fisheries potential of major commercial ports.

After FAO assistance ceased, the organization received technical assistance (equipment and consultancy services) from January 1974 for two-and-a-half years from the Swedish International Development Authority (SIDA).

In August 1983, PISFH was renamed the Central Institute of Coastal Engineering for Fishery in view of changing trends in maritime fisheries. The Institute was asked to help develop brackishwater fish farms in cooperation with state governments under a UNDP project, in addition to existing activities.

The Institute's work in coastal aquaculture received a further thrust through UNDP/FAO assistance for five years from 1986 to 1991 – mainly in the form of equipment and consultants for development of shrimp farms and hatcheries. The Institute also implemented the World Bank-assisted Shrimp and Fish Culture Project in West Bengal, Orissa and Andhra Pradesh for eight years (1992 to 2000).

Presently, under the Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, CICEF carries out the entire gamut of activities relating to fishery harbours – reconnaissance surveys, investigations, drawings and construction, advice on engineering and economics, monitoring construction.

Vision

The socio-economic context of CICEF's operations is challenging. Nearly 3.57 million fisherfolk operate from India's 3 272 coastal fishing villages and 1 343 fish landing centres. The fishing fleet is varied – more than one lakh traditional craft, more than 76 000 motorised traditional craft, nearly 60 000 mechanised fishing vessels.

The fishing industry is undergoing a notable transformation – in the size of mechanised fishing vessels – to make them suitable for offshore/ deep-sea fishing. Statistics show that mechanised fishing vessels have been increasing annually at the rate of 10 percent.

The landing and berthing facilities created so far in the country can accommodate only 25 percent of the active fishing fleet. Result: overcrowding and congestion. Some of the harbours lack maintenance, many of the facilities are in utter disrepair because of overcrowding. With fish importing countries

Mr K Omprakash, 59, has been Director of CICEF from August 1995. A graduate in civil engineering (University of Madras), he has a post-graduate diploma in hydraulic engineering (Delft University of Technology, Netherlands). His experience in marine fisheries spans 35 years. He has specialized in fishery harbours and has served as fishery harbour consultant to Iran under an FAO-sponsored TCDC (Technical Co-operation among Developing Countries) programme.

Mr Omprakash has received training in brackishwater aquaculture at the National Brackishwater Aquaculture Technology Research Centre at Pagbilao, Quezon, Philippines (Sept-Oct 1991). He also did a short course on shrimp farm management at the Asian Institute of Technology, Bangkok (May 1994). He visited Japan in April 1998 and January 1999 in connection with the procurement of a dredger as part of Japanese grant-in-aid.

Joining CICEF as Assistant Director in 1972, he rose to the position of Director in 1995. He also did two short stints elsewhere in government during this period – as Deputy Commissioner (Fishery Harbour) in the Ministry of Agriculture (1992-94) and as Chief Engineer in Inland Waterways Authority of India, Ministry of Surface Transport (1994-95).

imposing stringent international standards on hygiene, HACCP and ISO 9000, better harbours and more harbours are imperative.

Natural catastrophes such as depressions, storms and cyclones are regular occurrences on both the east and west coasts. Cyclones are particularly frequent, leading to heavy loss of life and damage to fishing vessels. This underlines the need for more sheltered harbours for fishing boats.

Existing fishery harbours – 41 commissioned, 20 under construction – are grossly insufficient for the ever-increasing fishing fleet. The number of harbours should be at least tripled during the next 10 to 15 years. It is also necessary to rehabilitate harbours and fish landing centres (FLCs) that have become defunct or have outlived their useful life span.

CICEF is presently identifying potential sites for locating fishery harbours and FLCs in the various maritime States and Union Territories (UTs).

Given reasonable facilities, the FLCs and minor fishery harbours could contribute significantly to the overall national economy and to their respective regions and could enable the socio-economic uplift of fisher populations.

What is the staff strength of CICEF? What are its facilities?

The Institute is headed by the Director. The sanctioned staff strength is 47 (30 technical, 11 non-technical, 6 administrative personnel). They belong to three divisions – technical, economic, administrative.

The Institute's inter-disciplinary team comprises engineers and economists with specialised knowledge and experience relating to pre-investment studies, engineering and economic investigations, techno-economic feasibility reports for development of fishery harbours, FLCs and brackishwater shrimp farms.

CICEF in action.

The Institute has had its own building in Bangalore since August 2003, situated on 0.755 acre of land, with a built-up area of 1 472 sq. m. The Institute is well-equipped in terms of equipment and other paraphernalia to conduct surveys and technical investigations.

What have been the foremost achievements of CICEF in recent years, including support for post-tsunami reconstruction?

Fishery Harbours

- Till the end of March 2008, the Institute had carried out engineering and economic investigations for the development of fishery harbours/ FLCs at 76 sites and prepared project reports for 75 sites.
- On the basis of project reports prepared by the Institute, the Ministry of Agriculture has sanctioned 61 fishery harbours. Of these 41 have been commissioned and 20 are under various stages of construction.
- The Institute has monitored the construction of fishery harbours and FLCs sanctioned by the Ministry of Agriculture under a Centrally Sponsored Scheme. It has provided technical guidance to the maritime States/UTs in speedy project implementation.

Fish Landing Centres

The Institute has identified sites for the development of FLCs. Reports have been prepared for 10 sites in Tamil Nadu, four in Andhra Pradesh, three in Kerala, 20 in Andaman and Nicobar islands. The governments concerned are taking action on the basis of these reports.

Master Plan

Detailed master plans for fishery harbours and FLCs have been prepared for all maritime States and UTs and submitted as vision documents to them and to the Ministry of Agriculture.

Brackishwater Shrimp Farms

- The Institute has so far reconnoitered 66 200 ha of brackishwater shrimp farm area. Investigations were carried out in 15 584 ha of water spread area in the maritime States of Gujarat, Maharashtra, Goa, Kerala, Tamil Nadu, Andhra Pradesh, Orissa and West Bengal.
- During the period 1986 -1991, four pilot brackishwater shrimp farms and a shrimp seed hatchery were developed under UNDP assistance.
- Under the World Bank-assisted Shrimp and Fish Culture Project, the Institute served as a Nodal Agency for the development of

CICEF in the field.

brackishwater shrimp farms. It was associated with four projects in West Bengal (Canning, Dighirpar, Digha and Dadanpatra Bar), one project in Orissa (Jagatjore/Banapada) and one project in Andhra Pradesh (Bhairavapalem).

Tsunami Rehabilitation

The tsunami struck in December 2004. The Institute inspected affected fishery harbours and FLCs during January 2005 in Tamil Nadu, Kerala and Puducherry and a report was submitted to the Ministry of Agriculture.

Please tell us about the foreign collaborations of CICEF.

The Institute has received technical assistance and expert consultancy services for the development of fishery harbours and for brackishwater shrimp farms and hatcheries from i) the FAO/UN, ii) SIDA, iii) UNDP and iv) World Bank.

How has CICEF been able to contribute to food and nutritional security, human resource development, and policy development in marine fisheries?

Following the creation of fishery harbours and FLCs through CICEF, motorised and mechanised fishing vessels have been landing their fish more systematically and hygienically. International standards such as HACCP and ISO 9000 are being applied strictly. In consequence, the quality of fish has improved and spoilage has been reduced. This has contributed significantly to the national economy in the areas of food and nutrition. Employment opportunities have gone up manifold. Engineers have been trained to conduct investigations and prepare project proposals.

As regards policy development on marine fisheries, the Ministry of Agriculture is implementing a centrally sponsored scheme on "Development of Marine Fisheries, Infrastructure and Post- Harvest Operations". Establishment of fishery harbours and FLCs is part of this scheme. The objectives of the scheme are:

- Providing infrastructure facilities for safe landing, berthing and unloading of fish catches of mechanised fishing vessels, traditional fishing craft and deep sea fishing vessels.
- Construction of new major fishing harbours in association with maritime State Governments, Port Trusts and UTs.

On the basis of techno-economic feasibility reports (TEFRs) prepared by CICEF, the Ministry has accorded administrative sanction and provided central assistance as follows:

(i) 50% of the project cost to maritime State Governments and 100% to UTs for the construction of minor fishery harbours and FLCs;

(ii) 100% assistance to maritime States, UTs, Port Trusts and Fishermen Associations for construction of major fishery harbours;

(iii) 50% assistance for the construction of minor fishery harbours and FLCs on a Build-Operate-Transfer (BOT) basis;

(iv) 50% assistance to maritime States and Port Trusts for repair and renovation/modernization of existing fishery harbours and FLCs, and 100% assistance to UTs.

What are some of the major constraints CICEF faces?

Technical staff trained earlier in India and abroad have either retired or are likely to retire shortly. Technical skills now available with the Institute are limited; there is a shortage of technical manpower. At present, the Institute undertakes only engineering and economic investigations. There is no expertise available for environmental and mathematical model studies to enable complete project reports. Such studies are being carried out by maritime States/ UTs through consultants and research institutes. Consultants are also being used for the development of fishery harbours and FLCs. Some maritime States have acquired expertise in the formulation of project proposals.

What future do you envisage for CICEF?

CICEF has a bright future. We are equipped to face the challenges we are entrusted with in the development of fishery harbours and landing centres in the country.

Bangladesh National Workshop Adopts Action Plan on Monitoring, Control and Surveillance

Fifty-one persons from 21 national, regional and international fisheries organizations took part in the National Workshop on Monitoring, Control and Surveillance (MCS) in Marine Fisheries in Bangladesh, held on June 7-8, 2008 in Cox's Bazar.

It was organized by the Danida-funded project "Strengthening Institutional Capacity of the DoF (SICD)" in coordination with the Ministry of Fisheries and Livestock (MoFL), and the BOBP-IGO.

Mr Nasiruddin Md Humayun, Project Director, SICD Project, welcomed participants. Describing the current crisis in global fisheries, Mr Humayun said that fish stocks had got depleted in many parts of the world because of over-exploitation, habitat destruction, industrial pollution and waste-dumping into marine waters.

In response, fisheries authorities have been regulating the fishing fleet; introducing gear restrictions, closed areas and closed seasons; and registering and licensing small-scale fishing operations, said Mr Humayun.

The National Fisheries Strategy formulated by Bangladesh in 2006 could be effective only if MCS was reviewed and strengthened, Mr Humayun said.

Mr Humayun thanked the chief guest, Mr Parikshit Datta Choudhury (Joint Secretary, MoFL) and the chairperson – Mr Md Rafiqul Islam, Director General, Department of Fisheries (DoF) – for their support to the workshop. He thanked Dr Yugraj Singh Yadava, Director, BOBP-IGO for technical and financial assistance to the workshop; the Royal Danish Embassy, Bangladesh, for financial support and cooperation; and Mr Bundit Chokesanguan, Director (Training), SEAFDEC.

Mr Sajjadul Hassan, Deputy Commissioner, Cox's Bazaar District, Bangladesh, said that the potential of marine fisheries in Bangladesh was huge. Effective management was essential to tap the resources in a sustainable manner. "While doing so, the occupational hazards faced by the fishers need to be minimized", said Mr Hasan.

Declaring the workshop open, Mr Parikshit Datta Choudhury (Joint Secretary Fisheries), said that MCS in fisheries had been neglected in Bangladesh. An effective MCS programme was needed to strike a balance between conservation and sustainable exploitation.

The proposed action plan should be based on the Chittagong Resolution adopted by the BOBP-IGO member-countries in January 2008.

Mr Md Rafiqul Islam, Director General, DoF, said that capture fisheries in Bangladesh were stagnating because of lack of a reliable database, over-exploitation of some stocks and under-exploitation of others, inadequate MCS, plus the impact of global warming and climate change.

He suggested demarcation of the EEZ of Bangladesh. An effective information network; a central data base for information on the weather and on fauna and flora; a strong MCS system; management plans for shared stocks; marine parks; joint stock survey programmes; protection of nursery grounds; and a ban on capture of juveniles of fin and shellfish species – these were some other suggestions.

Dr Yugraj Singh Yadava made the keynote presentation on

Participants at the National Workshop on MCS.

"Monitoring, control and surveillance in small-scale fisheries - guiding principles and practices". Stressing the uniqueness of fisheries to the national economy of Bangladesh, Dr Yadava said that some 1.77 million fishers were active in the primary sector and 67 300 in the secondary sector. Fisheries contributed significantly to the national GDP and to export earnings.

He said that the coastal marine fishery portrays a picture of unregulated access, overcapacity, low catch per unit effort and fishing rights conflicts. Most fishing communities rely almost entirely on fishing for their livelihood, and lack alternatives. A large proportion of fish stocks -- both marine and inland – are fully exploited, over-exploited or depleted. While the commercial trawl fishery is regulated to a certain extent, the small-scale/ artisanal fishery is almost unregulated.

The DoF awards fishing licenses only to registered boats. But it's the MMD that registers the boats and only about 10 percent of the mechanized boats get registered. This means that a large number of boats are unlicenced and not monitored. The DoF has no magisterial power; fisheries personnel depend on the executive and the Police Department to enforce the Fisheries Act.

The MMD is ill-equipped to enforce existing legislation, as it has only two offices all along the coast. The Bangladesh Coast Guard, set up in 1994, is mandated to protect national interests in the maritime zones of Bangladesh and prevent illegal fishing. But the Coast Guard is ill equipped as well, it needs more manpower, more patrol boats, more equipment.

Small-scale fishing communities are illiterate, and provisions of the Fisheries Acts and Regulations are unknown to many of them. An effective and implementable legal framework is a pre-requisite to management and conservation of fisheries resources.

The main constraints to MCS in Bangladesh are lack of accurate fisheries statistics and a scientific information system; inadequate trained manpower at both management and operational levels; lack of awareness at the community-level of the need for MCS; a large number of inaccessible landing places; lack of supporting legislation to implement MCS; a multiplicity of agencies and lack of well-defined roles and jurisdictions; and inadequate funding for MCS.

Community motivation is the most important step for effective implementation of an MCS policy, Dr Yadava said. Joint effort by all stakeholders and coordination among them is essential; MCS can't be practiced in isolation by the Government.

Dr Yadava said that the Chittagong Resolution of January 2008 on MCS had recommended action plans for implementing MCS and for strengthening national agencies. The current workshop is aimed at formulating such an action plan to guide MCS in Bangladesh.

Dr Yadava called for a paradigm shift – from a regime of open access in marine fisheries to limited and controlled access, and allocation of rights to user groups. Small-scale fisheries can benefit immediately from successful MCS measures through (i) effective demarcation of fishing areas, (ii) data strengthening, (iii) target fishing through resource mapping, (iv) sea-safety, (v) reflection of their interests in fishing policy, (vi) stabilization of catch per boat and hence income, and (vii) effective land and sea-based monitoring systems.

Mr Md Kabir Ahmed, District Fisheries Officer, Cox's Bazaar, proposed a vote of thanks at the end of the inaugural session.

Technical Presentations

Mr Bundit Chokesanguan, Director (Training) at SEAFDEC, Thailand, provided an overview of MCS in fisheries in Southeast Asia. He said that small-scale fisheries were dominant in the region, barring Thailand, where industrial fisheries had grown faster.

Every coastal state in Southeast Asia faces theft of resources from Illegal, Unreported and Unregulated (IUU) fishing made possible by lack of MCS, the speaker said. IUU fishing undermines efforts to conserve and manage fish stocks. If this practice is not curbed, vulnerable stocks can't be rebuilt, said Mr Bundit.

He said a Regional Plan of Action to Promote Responsible Fishing Practices – including combating IUU fishing – had already been drafted by Southeast Asian countries. A workshop held in Bali, Indonesia from 4 to 6 March 2008 had made recommendations as follows:

- Formalize a MCS sub-regional network;
- Identify and assess key MCS gaps within the sub-region;
- Develop licensing and authorization processes for fishing and support vessels;
- Develop cooperative surveillance exercises;
- Develop sub-regional hot pursuit guidelines;
- Coordinate and integrate all relevant national agencies in MCS activities;
- Focus on mechanisms to improve the collection and analysis of information on fishing vessels, catches, trans-boundary market destinations of catches; and
- Strengthen institutional and human capacity building across the region.

Mr Bundit said that depletion of fish stocks, overfishing, conflicts between resource users, ignorance and violations of laws and regulations by fishermen were some of the main problems of coastal and marine fisheries in the region. In efforts to improve fisheries management by establishing MCS systems, some countries had succeeded, others had failed.

The failures might have been due to the 'common property' characteristic of fishery resources, lack of strict implementation of

MCS policies, shortage of manpower and equipment to enforce laws, and lack of coordination between government agencies concerned, said Mr Bundit.

Dr Md Giasuddin Khan, Senior Fisheries Specialist, WorldFish Center, Dhaka, discussed the "Status of Coastal and Marine Fishing Fleet in Bangladesh and Preparedness for a Monitoring, Control and Surveillance Regime". He said that a short study undertaken by The WorldFish Center at the request of the government confirmed that fish stocks are continuously declining.

Dr Khan said that over the last 20 years a big shift had occurred in the composition of catches of finfish trawlers. In 1984-1986, major commercial species caught were white grunters, croakers, catfish, breams, snappers and hair tails. Since 2005-2006 these have mostly been replaced by low valued species like acetes shrimp, crab juveniles and Bombay duck.

Surveys during 1984-1986 showed that 20 species had contributed to the main landings. In 2005-2006, this number had declined to 12. More valuable and longer-lived species were being replaced by smaller, short-lived pelagic fish species, said Dr Khan. Destructive fishing practices must be phased out and precautionary management approaches should be implemented wherever necessary.

On marine catch monitoring, Dr Khan called for development of local reporting systems, especially for artisanal fisheries. Mechanisms should be instituted to ensure proper selectivity in fishing gear and fishing operations, minimization of wastes and discards, reduction in catch of non-target species. Registration of all mechanized boats should be completed urgently. Given the limited capacity to mount sea-borne inspection, efforts should focus on land-based inspection.

Dr Khan said that the marine fisheries policy should be revised to reflect both the precautionary approach and the ecosystem approach (which recognizes that fisheries will impact the biological diversity of the wider ecosystem). Inter-sectoral conflicts should be minimized. Co-management and community-based fisheries management should be encouraged.

Commander Afazur Rahman Chowdhury of the Bangladesh Coast Guard (BCG) made a presentation on "Present status of legal support to implement MCS in the marine fisheries sector in Bangladesh".

He provided an overview of international laws such as the 1982 United Nations Convention on the Law of the Sea, the FAO Compliance Agreement and the 1995 UN Fish Stocks Agreement. He also discussed the 1995 FAO Code of Conduct for Responsible Fisheries (CCRF), which served as an instrument of reference to help States establish or improve the legal and institutional framework for responsible fisheries.

Mr Chowdhury said that many legislative instruments were already in force in Bangladesh to support MCS, directly or indirectly. These were ordinances, acts and rules administered by various ministries. The Marine Fisheries Ordinance, 1983, was the base law and regulatory instrument for marine fisheries in Bangladesh. It authorized the government to specify the types, classes and numbers of fishing vessels that could be deployed in Bangladesh waters.

Mr Chowdhury said that marine fisheries legislation had been generally implemented for industrial fishing trawlers. Implementation for the artisanal sector had been a challenge. The socio-economic conditions of fishers were a primary cause, but lack of responsibility, interference of pressure groups and lack of trained manpower in marine fisheries were other factors.

During Session II, the workshop divided itself into four groups to discuss four subjects.

Action Plan for Implementations of MCS in Bangladesh

A. Fish Stock Assessment

- Monitoring of catch and stock assessment should be carried out regularly. The provisions under the Bangladesh Marine Fisheries Capacity Building (BMFCB) Project should be utilized for the purpose. After completion of the BMFCB Project, the Department of Fisheries (DoF) should carry out this function with the involvement of the Local Stakeholder Committees (LSCs).
- Resource survey(s) should be organized, for which the Government may consider additional funding. Such survey(s) may take into account both maximum sustainable yield and maximum economic yield.
- Marine fish landings should be estimated on the basis of a statistically designed programme. To achieve satisfactory results, it needs to be ensured that fish catches are landed at designated fish landing points (Fishing Harbours or Fish Landing Centres).

B. Optimization of Fishing Fleet

- A thorough review of the mechanized and non-mechanized fishing fleet should be undertaken. Based on the present marine fish landings, available data on catch per unit effort and other biological parameters, the fishing fleet (both mechanized and non-mechanized and trawlers) should be adjusted and excess capacity phased out in a time-bound manner.
- The 31 numbers of 'under trial' fishing vessels operating at present must be banned. The 50 numbers of modern fishing

trawlers already licensed should commence fishing in the deep sea.

C. Registration and Licensing of Fishing boats

- All unregistered and unlicensed fishing boats should be registered/ licensed in a time-bound manner.
- The dual system of registration of fishing boats by the Mercantile Marine Department (MMD) and licensing by the DoF should be discontinued. There should be one-stop service point (single window) for registration and licensing under the control of DoF.
- The registration/ license fee structure should be reviewed.

D. Zonation of Fishing Grounds

- No fishing should be permitted in the coastal waters up to 5 meter depth/ 3 nautical mile (NM) distance. Non-mechanized fishing vessels may be allowed to fish beyond 5 meter depth and up to 40 meters. The zonation should take into consideration aspects such as the size of the fishing vessel, gear to be deployed and the engine horsepower.

E. Review of Fisheries Legislation

- A thorough review of the existing fisheries and supporting legislation should be undertaken and necessary amendments should be proposed keeping in view the requirements of Monitoring, Control and Surveillance (MCS).
- The review may also consider harmonization of the fisheries and supporting legislation with the global fisheries instruments and other documents aimed at sustainable development of the fisheries resources.
- To make the implementation effective, harmonization of the legislation may be considered.

F. Policy and Management Frameworks

- The exiting policies on fisheries development may be reviewed and, if necessary revised to meet the local requirements and also to confirm to the global instruments on sustainable fisheries development.
- The good practices adopted in the neighbouring countries may also be considered while reviewing the fisheries policies.
- A comprehensive marine fisheries management framework should be formulated for all commercially important fin and shellfish species. Implementation of the management framework already developed for species such as hilsa (*Tenualosa ilisha*) should be strictly enforced.

G. Institutional Strengthening and Human Resources Development

- Capacity building of officials of the DoF, MMD and other concerned organizations in both government and non-government sectors should be initiated in a planned manner. A GAP Analysis may be undertaken to arrive at the actual needs of capacity building and institutional strengthening.
- Strengthening of the fisheries institutions and other agencies concerned with the implementation of MCS (*e.g.* Coast Guard, Navy) should be taken up in a time-bound manner. This should also include strengthening of the organizational set up of the DoF at the coastal District and Upazila levels.
- The use of information technology should be stepped up in implementation of MCS. The Geographical Information System established in the DoF should be further strengthened.
- Skills and capacities of fisher groups and community-based organizations should be built through short-term and highly focused vocational trainings and hands-on workshops.
- Fisher communities in all the coastal districts should be mobilized to participate and assist in the MCS activities. The print and electronic media should be made use of to the fullest extent in creating awareness on MCS and its objectives.
- Cost-effective approaches such as 'co-management' of resources should be promoted to achieve the objectives. Stakeholder consultations should be initiated to decide on the modalities of co-management approach for MCS and related activities.
- Implementation of MCS should ensure that the livelihoods of small-scale fishers are safeguarded.
- The use of MCS should not be restricted to enforcement alone, but for providing multiple benefits to the fisher community such as promoting safety-at-sea, reducing post-harvest losses and promoting hygiene and sanitation in boat and at landing and berthing sites.

H. Coordination and Networking

- An inter-disciplinary high powered inter-ministerial committee should be constituted to coordinate the activities and also monitor the progress through performance indicators. Such a committee should be coordinated by the Ministry of Fisheries and Livestock.
- Formal and effective linkages should be established between the key players - DoF/ Navy/ Coast Guard/ MMD for implementation of the MCS programme.

Group I: *Registration and Licensing of Fishing Boats, Demarcation of Zones, Colour Coding, Communication and Surveillance Infrastructure:* This Group recommended that a one-stop service point be fixed for registration and licensing of fishing vessels; fishing zones for different categories of vessels should be demarcated; a no-fishing zone should be declared up to 5 meter/ 3 nautical mile; non-mechanized vessels should be allowed to fish in the 5 - 40 meter depth zone; the number of shore stations should be increased; the MMD should mount a vessel registration drive.

Group II: *Estimation of Fishing Capacity, Maximum Sustainable Yield and Optimization of Fishing Fleet:* This Group suggested that all categories of fishing vessels be reduced in number; the dual system for licensing/ registration of fishing boats should be stopped; the 'Zaman Committee Report' on trawlers should be implemented.

Group III: *Governance, Policy and Legislative Support to MCS:* This Group suggested that the Fisheries Policy document of Bangladesh should be revised in conformity with the CCRF; good practices from the experiences of neighboring countries should be incorporated in the policy; a high powered ministerial committee should be formed with DOF as lead agency to strengthen implementation of MCS and plug loopholes.

Group IV: *Institutions, Human Resource Development and Role of Non- Governmental and Community-Based Organizations:* This Group suggested better coordination between marine fisheries agencies; institutional strengthening; vocational and short-term training for fishers throughout the coastal belt; utilization of print and electronic media to create management and MCS awareness.

The Group presentations generated much discussion. There was unanimity on several of the points listed below:

- A cadre of enforcement officers should be created from the existing manpower.
- Strong coordination is needed among agencies such as MoFL, DoF, Navy and Coast Guard in implementing MCS.
- Registration of fishing vessels should be accorded top priority and modalities worked out by the DoF/ MoFL and the MMD. The registration procedure should be transparent.
- The fishing fleet must be restricted to optimum size and zones should be set up for different categories of fishing boats to help reduce conflicts and promote sustainability.
- A manual on MCS should be prepared. It will set out procedures for implementing agencies and their work, funds needed, time-frame, etc.
- Should trawlers fish only in depths beyond 40m? Should zoning decisions be made on the basis of depth of the waters or distance from the shore? The questions should be discussed.
- The Bangladesh Navy and Coast Guard must be strengthened both to implement MCS and assist fishers at sea.
- Log books should be mandatory for fishing boats.
- Pollution from land-based sources is increasing and should be checked.
- Landing centres should be maintained and managed better, and all fishing vessels must land at these centres. New landing centres should be established.
- A one-stop service should be provided for registration of fishing vessels; MMD should be given this responsibility.
- Mesh size regulations should allow fish at least one opportunity to breed and propagate.
- No fishing should be permitted in breeding grounds such as mangroves.
- Catch-based surveys should be initiated prior to stock assessment.
- The services of the Bangladesh Space Research and Remote Sensing Organization should be used to identify potential fishing zones.
- Colour coding should be carried out for different categories of fishing vessels.
- New surveillance check posts should be set up along the coastline (at places such as Borguna, Satkhira, Patherghata, Bagerhat, etc.)
- Fisher community participation in MCS should be encouraged to foster the feeling of community ownership of resources, also to make MCS cost-effective.

On the basis of the recommendations made by the workshop, a draft Action Plan on Implementation of MCS in Bangladesh was presented by Dr Yadava. It was discussed and a final Action Plan adopted by the workshop (see page 10-11). Dr Yadava described the Action Plan as comprehensive. Its implementation would help sustainable development of marine fisheries resources in Bangladesh.

In the workshop's concluding session, Mr Rafiqul Islam, chairperson, said that the Action Plan would have to be implemented in a phased manner. A group would be constituted to prioritize actions and identify the modalities for implementation.

Mr Nasiruddin Md Humayun proposed a vote of thanks. He said the Royal Embassy of Denmark would be willing to support development of sound policies on MCS through the SICD Project.

Workshop in Chittagong Makes Recommendations for Sea Safety of Fishers in Bangladesh

Forty-nine persons took part in a workshop on "Safety at Sea for Small-scale Fisheries," held in Chittagong, Bangladesh, on 21 and 22 January, 2008. It was organized by the BOBP-IGO in co-operation with the Food and Agriculture Organization (FAO) of the United Nations and the Ministry of Fisheries and Livestock (MoFL), Bangladesh.

The participants represented the MoFL; the Department of Fisheries (DoF); the Bangladesh University of Engineering and Technology; the Navy and Coast Guard; the Bangladesh Fisheries Research Institute; the Mercantile Marine Department; the Bangladesh Maritime Training Institute; the Bangladesh Fisheries Development Corporation; the Fisher Association and Cooperative Societies; the Boatbuilders Association; representatives of boatyards; experts; the FAO and the BOBP-IGO.

Mr Syed Ataur Rahman, Secretary, MoFL, presided over the inaugural session. Mr Parikshit Datta Choudhury, Joint Secretary (Fisheries), MoFL, chaired the remainder of the workshop.

Welcoming participants, Dr Y S Yadava, Director, BOBP-IGO, pointed out that while safety at sea is a problem with small-scale fishers everywhere, it is even more serious in Bangladesh because it is a frequent victim of natural calamities. He said the global programme on Safety at Sea and its South Asian component would catalyse efforts to improve the safety and well-being of small-scale fishers in the region.

Mr Md Mokammel Hossain, Director-General, DoF, said that after the devastation caused by cyclone SIDR, discussions have taken place on extending programmes on safety at sea to small-scale fishers. At present, little knowledge exists about fish stocks in the Exclusive Economic Zone (EEZ) of Bangladesh. This aspect needed strengthening, besides development of Monitoring, Control and Surveillance (MCS) in marine fisheries.

Mr Parikshit Datta Choudhury, Joint Secretary, MoFL, described the safety of small-scale fishers as an area of neglect. Cyclone SIDR had lent urgency to the subject, and the government has initiated some measures. The Safety at Sea Project is a bold step in the right direction.

Mr R Ravikumar, FAO Regional Programme Coordinator, Safety at Sea Project, gave a brief outline of the Project and its proposed activities.

In his inaugural address, Mr Syed Ataur Rahman, Secretary, MoFL, said that over time, a rapid increase has occurred in the fisher population of Bangladesh and in fishing effort. Result: fisher incomes have been falling. Fishers are trying to mechanize their boats and venture into deeper waters for higher catches, but weather conditions in the Bay of Bengal threaten their effort. Lives have been lost, boats have been damaged, fishers have suffered grave misery.

Participants at the Sea Safety Workshop.

Top to bottom: Mr Syed Ataur Rahman, Mr Parikshit Datta Choudhury, Mr Md Mokammel Hossain, Cdr Mir Ershad Ali, Mr R Ravikumar.

Mr Rahman said fishers fend for themselves, depending on traditional knowledge and experience. They have no communication equipment or life-saving appliances. Cyclone SIDR had killed more than 3 000 people, mostly fishers. "If we had informed fishers about SIDR, many lives would have been saved."

The UNDP/ FAO/ BGD Project on "Empowerment of Coastal Fishing Communities for Livelihood Security (ECFC Project)" had provided some help, Mr Rahman said. But much more is needed to be done, including welfare measures for fishers. A national focal point had to be identified for the Safety at Sea Project, and costs integrated into the revenue budget. "We should take lessons from this workshop and frame guidelines on what is to be done."

Technical Sessions

During the first Technical Session of the workshop, five presentations were made. Mr Ravikumar said the South Asian component of the SIDA- funded and FAO-executed Global Project on "Safety at Sea for Small-scale Fisheries" is being implemented in Bangladesh, India, Maldives and Sri Lanka. The Project is expected to come up with (i) guidelines and rules for design and construction of boats and good boatyard practices, (ii) stakeholder training/ awareness programmes, (3) safety at sea -fishery management integration, and (4) improved reporting and analysis of mortalities/ injuries at sea.

The second presentation was made by Mr A F M Sirajul Islam, engineer and ship surveyor, MMD, on "Overview of safety aspects of small fishing craft in the marine sector of Bangladesh". Mr Islam said that Bangladesh has some 2.5 million small-scale fishers and 35 to 40 000 fishing boats. Wood is the basic material for boat construction. Design is based on traditional knowledge.

Mr Islam said that during the monsoon, cyclonic weather caused by depression creates problems for fishers, leading to boat capsize and loss of life and property. Engine failures are also very common, and boats drift. There are no rules and regulations for the safety of small-scale fisheries or for the construction, stability and maintenance of small boats.

Mr Islam said that building community awareness programmes, and measures such as registration of fishing boats, insurance schemes for fishers and their assets, and implementation of IMO and ILO norms and guidelines, were necessary.

Commander Mir Ershad Ali of the Bangladesh Navy made the next presentation on "Overview of search and rescue operations in Bangladesh". He said that Bangladesh has acceded to some 20 IMO conventions. It has Marine Search and Rescue (SAR) Centres located in Chittagong and Khulna. Numerous accidents occur in the Bay of Bengal due to poor seamanship, the age of fishing vessels and human error.

Commander Ali said that the Marine Fisheries Ordinance, 1983, mandates the Bangladesh Navy with surveillance duties. The four main players on surveillance are the Navy, the Air Force, the Coast Guard and the Department of Shipping. Funds are short, a national-level SAR organisation doesn't exist: these are the two main constraints to SAR operations in Bangladesh.

In the next presentation, Dr Abdur Rahim, Professor, Bangladesh University of Science and Technology, highlighted "Training needs in safety at sea for the maritime fishery sector". Dr Rahim classified fishing vessels of Bangladesh into (i) Deep sea trawlers, (ii) Wooden offshore boats, and (iii) Small inshore and estuarine boats.

He said that deep sea trawlers have been imported from South east Asia. Offshore wooden boats operate in a

hazardous environment. Those made from locally available wood last 4 to 5 years, while boats of imported wood last more than 10 years. There is no dearth of skilled craftsmen in Chittagong and Cox's Bazaar, Dr Rahim said. The problems are lack of public finance as well as lack of training in boat design.

The session's final paper was presented by Mr Sk Mostafizur Rahman, Project Director, RFLDP Barisal component. He shared with the workshop the experience of the ECFC project in Cox's Bazaar district during 2000-2006.

Mr Rahman said the Project was implemented in all the eight upazilas of Cox's Bazaar District, covering 117 villages. The project targeted the poor and the disadvantaged, assisted communities in empowerment, introduced economic and community welfare activities, ran a community radio programme, facilitated conservation and management of natural resources through community-based approaches.

Mr Rahman said that the project decentralized implementation of activities. Fishers, especially women, took active part. Lack of safety equipment, inadequate access to weather information, inappropriate design and construction of small fishing boats, absence of a strong data base on accidents at sea, inadequate SAR operations – these were the major drawbacks concerning sea safety for small-scale fishers.

The workshop's second technical session consisted of group discussions. Participants were divided into three groups. They discussed knowledge gaps in fisher communities on safety awareness; knowledge gaps in national agencies on safety at sea initiatives; and knowledge gaps in the service industry on safety aspects for the fisheries sector.

Each group presented its ideas and findings to the workshop. These

were discussed, and recommendations followed.

Recommendations

The workshop agreed that existing rules and regulations (*e.g.* SOLAS 1974; Marine Fisheries Ordnance, 1983) do have adequate provisions to ensure the safety of fishers at sea, but their application at the field level must be improved. Fishing vessel inspectors and surveyors must be trained to interpret rules and regulations concerning safety. An implementable National SAR plan should be formulated, which identifies the roles, responsibilities and capacities of different players responsible for SAR.

The workshop recommended that boat owners be persuaded to provide adequate communication and navigation equipment to the crew. Awareness programmes should be undertaken on proper use of fishing gear, safety and communication equipment, the use of distress signals, etc. Communication equipment like VHF must be demonstrated and then introduced. The community should be systematic in reporting accidents at sea and in implementing safety guidelines among fishers. NGOs and CBOs can play a vital role in this effort.

The workshop agreed that skills of boatbuilders and other service providers should be augmented through training. Traditional wooden boats are inadequate for modern fishing practices. Skill variations among different boatbuilding centers must be looked at.

Participants agreed on the need to diversify boatbuilding materials: FRP is now a common boatbuilding material in South Asian countries. They also agreed on registration of boatyards to ensure quality.

The workshop emphasized the need for a proper surveillance and reporting system for accidents and incidents at sea. Fishing effort should be aligned with scientifically assessed fish stocks for proper fisheries management. A 'precautionary approach' should be adopted toward fishing effort till reliable data on stocks was available.

The workshop emphasized the need for a database on the fishing fleet and a proper boat registration mechanism. This would help check piracy, which is rampant in Bangladesh waters. It also stressed the need for insurance of life and property of fishers as a necessary condition for sea safety. At present, such insurance does not exist.

The workshop recommended a national fisheries management plan drawing on the strengths and needs of all the players. Safety at sea would be a necessary ingredient of such a plan, besides resource management, effort control and modernization.

The workshop agreed on pilot-scale implementation of activities in the Cox's Bazar area on the basis of recommendations made by the three groups. The activities included (i) awareness-building at the community level, (ii) promotion of an MCS regime through database building and simplification of registration procedures, and (iii) development of technical guidelines and information materials on sea safety including boatbuilding, life-saving appliances, distress and weather signals, etc.

Mr Parikshit Datta Choudhury expressed his satisfaction over the outcome of the workshop. He hoped its recommendations would be taken up for implementation by the BOBP-IGO and other agencies, and assured full government support for the project's implementation. Dr Y S Yadava proposed a vote of thanks.

India, Bangladesh and Myanmar Lay out Road Map for a Management Plan for Hilsa Fisheries

Delegates from Bangladesh, India and Myanmar have laid out a road map for a management plan for hilsa fisheries. This was done at a regional consultation organized by the BOBP-IGO on March 14-15, 2008, at the Central Inland Fisheries Research Institute (CIFRI), Barrackpore (Kolkata).

Welcoming delegates, Dr Y S Yadava, Director of the BOBP-IGO, recalled that management plans for two important commercial fisheries – hilsa and sharks – were first mooted at the Second Meeting of the Technical Advisory Committee of the BOBP-IGO in Chennai in February 2007. It was suggested that the management plan for hilsa fisheries should be prepared by Bangladesh, India and Myanmar and the management plan for shark fisheries by India, Maldives and Sri Lanka. Although Myanmar is not a member of the BOBP-IGO, its inclusion was considered essential since hilsa forms an important commercial species in the Irrawady River System.

At the Barrackpore consultation, the opening session was followed by a technical session (with papers from the three countries on the status of hilsa). On the basis of guidelines put up by the BOBP-IGO secretariat, the delegates prepared information logframes and laid out a road map as follows for a management plan:

- A comprehensive status paper would be prepared on hilsa fisheries resources, including a bibliography on research work. Action: R&D institutions and universities in the region. (The status paper would discuss resources, production, MSY, stock assessment, impacts, legal and policy support, projects & programmes, etc.)
- A stakeholder consultation on hilsa management would be organized in each of the three countries. Alternative livelihoods for hilsa fishers would be an important part of the consultation.
- A data collection, collation and compilation mechanism would be set up in member-countries; a National Task Force would be established in India and Myanmar; a 'Hilsa portal or website' would be created for the Bay of Bengal region.
- Awareness materials on conservation and sustainable exploitation of hilsa fisheries would be prepared.

Participants at the Regional Consultation.

Key Institutions	Supporting Institutions
Bangladesh	
Bangladesh Fisheries Research Institute, Mymensingh	• Ministry of Fisheries & Livestock • Department of Fisheries
India	
Central Inland Fisheries Research Institute, Barrackpore	• Ministry of Agriculture (Department of Animal Husbandry, Dairying and Fisheries) • Fishery Survey of India, Mumbai • Central Marine Fisheries Research Institute, Kochi
Myanmar	
Fisheries Resource Conservation Unit, Yangon	• Ministry of Livestock & Fisheries • Department of Fisheries

- A Gantt chart (on page 18) covering the period April - September, 2008 was prepared to carry out these activities in a systematic time-frame.

During the opening session, Dr Yadava said the hilsa fishery – which is a source of food, nutrition and livelihoods in the coastal, estuarine and inland areas of the three countries – is at present subject to severe stress from natural and anthropogenic impacts. Both qualitative and quantitative changes have occurred in the landings of this species in recent years.
A management plan is therefore urgent to check further impacts on the fishery.

Dr Musharaf Ali, Assistant Commissioner (Fisheries), Government of India, expressed concern over the declining stocks of hilsa due to human intervention, and called for all-out management effort.

Dr K K Vass, Director of CIFRI and chairperson of the Consultation, congratulated the BOBP-IGO on its initiative of a Regional Consultation. He said a management plan for hilsa fisheries should look beyond commercial aspects and take into account sustainability and livelihood issues.

Technical Session

Dr Khan Kamal Uddin Ahmed, Principal Scientific Officer of the Bangladesh Fisheries Research Institute, Mymensing, Bangladesh, made a presentation on the "Status of Hilsa Fishery in Bangladesh". He described hilsa as the "national fish of Bangladesh", and said it accounts for 50-60 percent of the global hilsa catch, 12 to 13 percent of national fish production and about 1 percent of the country's GDP.

Dr Ahmed said the annual average of hilsa landings during the period 1983-84 to 2006-07, was 2 10 498 tonnes. During the last two decades, hilsa production from inland waters declined about 12 percent, while production from the marine sector increased two-fold. The number of marine fishing boats and gear has increased about four times since 1984-85, resulting in tremendous fishing pressure on hilsa fisheries in marine waters.

Explaining the results of a scientific study, Dr Ahmed said that the hilsa of Bangladesh, India and Myanmar belong to the same stock. Most hilsa born in fresh waters live and grow in the sea and migrate upstream for breeding and feeding. The adults again return to the sea after spawning.

Some 4 60 000 fishers from 1 83 000 families are active in hilsa fisheries in Bangladesh. About 88 percent of the fishers have no land or less than 0.5 acre of land. Some 1 00 000 crafts engage in hilsa capture in inland waters, while mechanized and non-mechanized boats and gear in the marine sector number around 106 000. Commercial hilsa fishing occurs in the marine and riverine areas throughout the year and peaks during September and October.

The Regional Consultation in progress.

A majority of hilsa catch (60-70%) occurs during the peak breeding season.

Dr Ahmed referred to three important management measures undertaken recently by the Bangladesh Department of Fisheries. These are the special operation to protect and conserve juvenile hilsa, the *jatka*; declaration of hilsa sanctuaries in major nursery grounds; and conservation of gravid hilsa in the major spawning grounds for uninterrupted spawning. Since hilsa is a common resource of the Bay of Bengal, with Bangladesh, India and Myanmar together harvesting 90-95 percent of the resource, a tri-country initiative for hilsa management and conservation is urgently required for sustainability.

Dr K K Vass presented a country paper on "Status of Hilsa Fishery in India". He said hilsa occurs on the east coast of India (river Ganga and its tributaries, the Chilika brackishwater lake), the rivers Brahmaputra and Barak in Assam and rivers of the west coast.

Dr Vass said that increased market demand for hilsa and the high price it commands have increased the fishing pressure on the species during the past three to four decades. The trend is continuing. Driven by the urge for higher harvests, fishers are deploying more and more effort, paying little attention to size or season. Such indiscriminate exploitation has resulted in a remarkable decline in mean length and weight of catch, especially in larger river systems.

Dr Vass suggested regulations on mesh size (for example, an increase in mesh size from the existing 8-12 cm to 9-13.5 cm) and optimum fishing effort on hilsa. Besides increasing the mean weight and overall production, this would also allow fishes to spawn at least once before being caught.

Dr Vass recommended that a better understanding be obtained of the population dynamics and MSY of

Gantt Chart for proposed activities to support preparation of a management plan for Hilsa.

Sl. No	Management aspects	2008					
		April	May	June	July	August	September
1.0	Preparation of comprehensive status paper on hilsa	←	—	→			
2.0	Stakeholder consultation		←	—	→		
3.0	Setting up the data collection mechanism	←	→				
4.0	Setting up of National Task Force	←	→				
5.0	Setting up of a 'Hilsa Portal/ Website'				←	—	→
6.0	Preparation of awareness materials				←	—	→

hilsa species through stock assessment conducted by countries sharing the resource. He also suggested a bibliography on hilsa; development of effective harvest and post-harvest technologies; and investigations on the feasibility of raising of hilsa in the lacustrine environment.

Mr U Aung Htay Oo, Senior Fisheries Officer (Research), Department of Fisheries, Government of Myanmar, said that in his country, small-scale fisheries generally comprise two categories of fishermen – the fishing boat owner and the crew. Most fishing boat owners do not go out to the sea; but in the inland sector, many of the boat owners are active in fishing.

Discussing the state of information on hilsa, Mr Oo said that no specific research activities are being carried out at present on hilsa fisheries. Technical assistance from regional organizations like the BOBP-IGO and from developed countries would be useful for a hilsa management plan. As precautionary measures, Mr Oo suggested mesh size control and protection of juvenile hilsa. Awareness-creation among fishers for conservation and sustainable exploitation of the hilsa fishery would be essential.

Preparing a road map for the management plan

After the three country status reports on hilsa, Dr Y S Yadava discussed three peculiar characteristics of hilsa. Its stocks are shared among three coastal states; it is migratory in character; it is predominantly an artisanal fishery distributed far and wide in the coastal areas. These factors render a sound monitoring and control mechanism in a given fishing area difficult, particularly when harmonized management practices are absent.

He said the BOBP-IGO had drawn up guidelines on working toward a hilsa management plan from the 1995 FAO Code of Conduct for Responsible Fisheries (CCRF). The Guidelines include a "Framework for a Management Plan on Hilsa," which has four main heads relating to information, institutional arrangements, stakeholders, and finance and funding.

On the basis of this framework, an indicative discussion map with six log-tables was prepared and given to the participants. The log tables were headed as follows:

Log 1: Status of Hilsa fishery in the Bay of Bengal.

Log 2: Natural and anthropogenic impacts.

Log 3: Socio-economic analysis – institutional arrangements.

Log 4: Socio-economic analysis – awareness creation and training.

Log 5: Socio-economic analysis – livelihood and trade.

Log 6: Economic analysis – funding requirements and provisions.

Representatives of each country together analyzed the situation of hilsa fisheries in their respective countries in terms of information sought in the log tables for a management plan. Gaps in information, and the future course of action, were identified. The resulting log tables were presented to the Consultation.

The Consultation constituted a technical committee in each country – key institution and supporting institutions – to initiate action on the management plan. It was also agreed that the next Regional Consultation on the subject will be held in Bangladesh during the last quarter of 2008, subject to the approval of the Government of Bangladesh.

BOBP-IGO holds Third Technical Advisory Committee Meeting in Sri Lanka

The Third Technical Advisory Committee of the BOBP-IGO discussed and approved the Organisation's workplan for the period April 2008-March 2009 at a meeting in Beruwala, Sri Lanka, on March 28-29, 2008. Senior fishery representatives from the four member-countries and an observer from the FAO took part. Mr Neomal Perera, Deputy Minister of Fisheries & Aquatic Resources, Sri Lanka, was the chief guest at the inaugural session.

Dr Yugraj Singh Yadava, Director of BOBP-IGO, welcomed the chief guest and the delegates. He said that the TAC plays the important role in the BOBP-IGO of identifying key issues for intervention. He urged member-countries to thoroughly review past work and set future directions.

Mr G Piyasena, Secretary, Ministry of Fisheries and Aquatic Resources (MoFAR), Sri Lanka, said that member-countries had the will and capacity to work closely with the BOBP-IGO. He hoped the meeting would yield important outputs for sustainable development and management of fisheries in the Bay of Bengal region.

In his inaugural address, Minister Neomal Perera described the BOBP-IGO as a unique regional fisheries body to help governments improve the quality of life of small-scale fishers in the region and strengthen their livelihood opportunities. He recalled with appreciation the three-day Regional Consultation in Sri Lanka on "Preparation of Management Plans for Shark Fisheries". He hoped the fruitful partnership between Sri Lanka and the BOBP-IGO would continue. Mr Indra Ranasinghe, Director General (Fisheries Development), MoFAR, proposed a vote of thanks.

Mr P Sivaraj (India), acting chairperson, said the BOBP-IGO was doing a commendable job in promoting the sustainability of marine fisheries in the region. He appreciated the Organisation's efforts in 2007-08. Sri Lanka was unanimously chosen to chair the third meeting of the TAC.

Report on BOBP-IGO activities

Dr Yadava presented the BOBP-IGO's report for April 2007-March 2008, and detailed the status of various activities undertaken as per the agreed work programme.

Safety at Sea: The South Asia Component of the Global Project on "Safety at Sea for Small-scale Fisheries (GCP/GLO/200/MUL)" implemented by the FAO (Fisheries Industries Division) through the BOBP-IGO was initiated in May 2007.

The project seeks to analyse data to identify the causes of accidents; educate and train trainers, extensionists, fishermen and inspectors; strive for better fisheries management measures and safety regulations; develop improved communication systems; and apply FAO draft guidelines for construction and repair of small FRP fishing vessels.

The Alaska Center of the National Institute of Occupational Safety and Health (NIOSH) of the Centers for Disease Control (CDC), USA, also assists the project. It funds a component on surveillance and monitoring of fishing-related accidents at sea.

During the year, National Workshops were organized in Negombo, Sri Lanka (11-12 October 2007); Chennai, India (3-4 December 2007); and Chittagong, Bangladesh (21-22 January 2008). Government officials, fishers, boatbuilders, other service providers and NGOs took part. At these workshops, gaps in information, service and policy on sea safety issues were identified. National action plans for pilot- scale implementation were designed.

The joint FAO-IMO Project on "Tsunami Reconstruction and

Participants at the Technical Advisory Committee Meeting.

Rehabilitation in Sri Lanka and India on Small Fishing Vessel Safety" was also initiated during the period. This project assesses the standards of boats built and distributed to fishers as part of tsunami relief. It introduces construction and equipment standards for small fishing vessels, on the basis of the FAO/ILO/IMO Voluntary Guidelines for the Design, Construction and Equipment of Small Fishing Vessels.

Mr Oyvind Gulbrandsen, FAO/ BOBP-IGO Consultant, did a detailed assessment in November-December 2007 of the quality of construction and design of small-scale fishing vessels in India and Sri Lanka. He would provide guidelines for the construction of FRP fishing vessels and wooden fishing vessels (below 24 meter in length), commonly used in India and Sri Lanka, and also guidelines for FRP boatyards in the region.

The FAO Fishery Officer (Mr Roger Kullberg) attached to the Safety at Sea Project made field visits to Patuakhali, Kuakata and Barisal in Bangladesh from 23 to 29 January 2008. He studied and assessed the quality of fishing boats – their construction, availability of communication and safety equipment, and safety preparedness of the crew, etc.

The Regional Workshop on "Monitoring, Control and Surveillance (RW-MCS) for marine fisheries in the Bay of Bengal" was held in Chittagong, Bangladesh, on 16-18 January 2008. Twenty-three representatives from ministries and departments of fisheries; the Coast Guard and the Navy; the Mercantile Marine Department; fisheries research institutions; boatbuilders and fish exporters of the region; experts plus the FAO took part. The Chittagong Resolution (see page 42) was a significant outcome of the workshop.

Resource Management: Two Regional Consultations were organised – to discuss management plans for hilsa fisheries, covering Bangladesh and India (and Myanmar as observer country); and a management plan for shark fisheries covering India, Maldives and Sri Lanka.

The Hilsa consultation was organised in Barrackpore (Kolkata), India, on 14-15 March, 2008. Eleven delegates took part. After reports and discussion on the current status of hilsa fisheries resources, the Consultation recommended an action plan to initiate a management plan.
A detailed report on the 'Hilsa Consultation' is available on pp 16-18.

Likewise, a regional consultation on shark fisheries (held in Beruwala, Sri Lanka, 24-26 March, 2008) agreed on an action plan. The detailed report on the 'Shark Consultation' can be seen on pp 47-50.

Miscellaneous: The BOBP-IGO's attractive 2008 desk calendar focused on sea-safety measures. A single-sheet wall calendar and a set of six laminated placards on distress signals and checklists were prepared as awareness material for fishers.

The BOBP-IGO has published a newsletter and 12 posters in English on the Code of Conduct for Responsible Fisheries (CCRF), and initiated a process to translate them into Bangla, Dhivehi, Oriya, Sinhalese, Telugu and Tamil. Archiving is being done of over 50 000 photographs relating to three decades of the programme.

Supportive activities: The BOBP-IGO collaborated with UNDP and the Government of Orissa in preparing a report on "Development of Marine Fisheries and Post-harvest Sectors in Orissa". It helped implement a training project on "Promotion of Community-based Fishery Resource Management by Coastal Small-scale Fishers in Thailand". It took part in an expert consultation on "Low Cost Fisheries Management Strategies and Cost Recovery," held in Georgetown, Guyana, 4-7 September 2007; and in a technical consultation in Rome

Mr Neomal Perera, Deputy Minister for Fisheries & Aquatic Resources, Government of Sri Lanka.

(4-8 February, 2008) to formulate international guidelines for the management of deep-sea fisheries in the high seas.

Discussion on BOBP-IGO activities

Catch statistics: Mr Simon Funge-Smith (FAO) said that while the quantity of fish catch has gone up in the region, the landings show a disturbing trend since we are fishing down the food chain. The BOBP-IGO should inform national governments and the FAO about this trend.

Mr Sk Mostafizur Rahman (Bangladesh): A management plan for protection of shark fisheries is needed in Bangladesh too, because in recent years large quantities of shark juveniles are being caught in Bangladesh waters. Bangladesh should therefore be included in the BOBP-IGO's management plans for shark. (The TAC asked the Secretariat to raise the issue at the next Governing Council meeting.)

Utilization of tuna: Dr Champa Amarasiri (Sri Lanka) said that coastal fishing effort in Sri Lanka can't be increased further. Offshore waters offer some scope; even here, reports of over-exploitation of yellowfin tuna suggest the need for caution.
Mr Sivaraj said that India's offshore waters are yet to be exploited for tuna and tuna like species.
Dr Shiham Adam (Maldives) said that Indian Ocean skipjack stocks are resilient, and are not being over-exploited.

Mr Funge-Smith said the FAO is considering a Regional Technical Cooperation Programme (TCP) on improved utilization of tuna, to be implemented through INFOFISH, Kuala Lumpur. Some BOBP-IGO member-countries might also be included in the Regional TCP. He suggested that member-countries could consult the Indian Ocean Tuna Commission (IOTC), and raise issues with the IOTC Working Party on Tropical Tunas, which would be held later this year. Dr Amarasiri said that member-countries ought to prepare their own plans before approaching the IOTC.

Delegates suggested a BOBP-IGO strategy consultation on tuna fisheries, which would include representatives of industry as well. The Director of BOBP-IGO should attend the next meeting of IOTC, it was felt.

Mr Rahman suggested joint stock assessments by member-countries. The Indian delegate said the Fisheries Survey of India (FSI) could carry out regional surveys of stocks. BOBP-IGO said it could support the participation cost of one technical person from each member-country in the fishing vessels of FSI, after agreements among member-countries. The delegate from Sri Lanka pointed out that accessing data from joint surveys was at times difficult. This negated the objectives of such surveys.

The TAC advised the Secretariat to encourage multilateral agreements among member-governments. If possible, key institutions should be identified for easy and timely dissemination of data among the stakeholders.

Proposals and priorities from member-countries

Bangladesh: Mr Rahman identified areas in marine fisheries where BOBP-IGO could play a major role in tapping the potential of his country's marine waters – such as information networking among member-countries on fish stocks and creation of a fish data base; management plans on important fish species; an effective regional MCS system; regional cooperation in weather forecasting; and networking of community-based organisations in fisheries.

He said member-countries should harmonize management practices for shared stocks – including ban on destructive fishing practices and declaration of closed seasons for fishing.

India: Mr P Sivaraj said the activities of the BOBP-IGO were in line with India's priorities. Activities such as safety at sea and MCS have been included in India's 11th Five-Year Plan. The BOBP-IGO is playing an important role in creating awareness among fishers and promoting sustainable fisheries in India. It should step up efforts to disseminate the CCRF so that it reaches a critical mass of stakeholders. Mr Sivaraj suggested that the BOBP-IGO should help transfer useful technologies from one member-country to another, especially in small and medium-sized boat construction.

Maldives: Dr Shiham Adam said that while tuna continued to be the mainstay of fisheries in the Maldives, coastal fisheries (especially reef fisheries) are an important source of income and livelihoods for communities in the outer atolls of the Maldives. The rapid expansion of tourism has increased the demand for reef fishes.

Dr Adam said that reef sharks in the Maldives are being severely depleted and gulper sharks are being over-exploited. The other fisheries that need attention include aquarium fishes, sea cucumbers and lobsters. At present, Maldivian ornamental fishes have limited direct access to foreign markets; they are mostly exported to Sri Lanka and re-exported from there to markets abroad. One of the priorities for Maldives is to develop mariculture so as to reduce the effort on wild stocks. The Government has announced 11 potential sites to be leased out on a long-term basis for aquaculture.

Sri Lanka: Dr Amarasiri said that Sri Lanka's priority is to develop the coastal tuna longline fishery. The skills and capacities of small-scale tuna longliners must be upgraded, fish handling and processing must be improved both on-board and after landing. To ensure a continuous supply of low-cost good-quality bait, Sri Lanka plans to initiate milk fish farming and to introduce bait fishery in coastal areas. The country needs a tuna fishery management plan and a fleet development plan to exploit tuna resources in a sustainable manner, Dr Amarasiri said.

Discussion on country proposals

Initiating discussions on the country proposals and priorities, Dr Adam said that development of milk fish hatcheries for bait fishing is important to the Maldives. Listing some collaboration options, Dr Yadava said that at present India imports milk fish from the Philippines. The Network of Aquaculture Centres in Asia-Pacific (NACA), Bangkok, could be approached to develop milk fish farming in the region.

Dr Funge-Smith endorsed the proposal of the Secretariat for associating NACA with milk fish farming. He said that the Philippines has good technology in milk fish farming and is now moving towards a cage-based milk fish culture. He, however, cautioned that issues related to disease transfer should be carefully considered. He also said that NACA had already developed technology for grouper fisheries.

Referring to the MCS priorities of Bangladesh, Dr Yadava said that countries may like to first develop their national MCS action plans through stakeholder consultations. He said the Secretariat is networking with FAO and other international agencies to explore the scope for external assistance and funding. Mr Funge-Smith suggested that the BOBP-IGO discuss possible

The Technical Advisory Committee in progress.

collaborations with the FISHCODE programme and the IUU Monitoring Network of DFID. He also suggested that information networking should be strengthened.

Presentation on Regional Programmes/ Activities/ Issues of topical importance

The Secretariat proposed four new activities during 2008-2009.

a) **Preparatory studies on alternative livelihoods for fishers**: A few comprehensive socio-economic studies could be taken up. Eventual aims: to encourage fishers to think beyond fishing and reduce fishing effort, and reduce the vulnerability of fishers to various shocks.

Mr Ranasinghe said that mariculture, aquaculture, construction work and dress-making had been tried out on a pilot basis as alternative livelihoods for fishers in Sri Lanka during the last four years. Of these, aquaculture (sea bass farming in the Negombo lagoon) was the most successful.
Mr Ranasinghe said that good technical guidance is a pre-requisite for any alternative livelihood activity.

The FAO Representative said that Spain is supporting FAO in implementing the Asia-Pacific Rural and Agricultural Credit Association (APRACA) programme in which Sri Lanka is proposed to be included.

b) **Study on impact of fuel price hike on marine fisheries:** This will address the problem of small-scale fishers and develop a coping strategy for them.

Dr Adam said that Maldives had proposed a subsidy scheme for fishers to offset the effect of price hike. He suggested that the study may look into fuel efficiency. The Bangladesh delegate said that a fuel subsidy for fishing boats was introduced 10 years ago in his country. Mr Ravikumar, FAO Regional Sea Safety Coordinator, said that fishers tend to increase engine power without any genuine need to do so. It is more of a rat race and needs to be curbed. The chairperson said that the Cey-Nor Foundation in Sri Lanka, which looks into marketing aspects, offers fishers guaranteed prices. The scheme has been working well for the last seven years; presently, 19 varieties of fish species are covered under this scheme. Mr Funge-Smith said that subsidies can keep the prices of fish artificially low, resulting in their over-exploitation.

c) **Study of the impact of climate change on fisheries**: This will record and monitor research efforts in member-countries in tracking the impact of climate change, particularly on coastal fisheries. Information will be disseminated.

d) S**tudy on capacity-building in food safety in marine fisheries:** The aim is to improve handling of fish on board and at fishing harbours or fish landing sites, and raise awareness among stakeholders about measures necessary to strengthen safety and improve hygiene.

The delegate from Sri Lanka said that waste disposal at the Beruwala Fishing Harbour has been very successful; this could be a model for other harbours in the region.
Mr Funge-Smith suggested that the Secretariat look at the FAO-TCP Project on 'Cleaner Fishing Harbours' implemented in India.

Secretariat: Work Plan

Presenting the BOBP-IGO's work plan for the period April 2008-March 2009, Dr Yadava said the IGO would continue with its capacity-building and resource management activities. It would carry out two scoping studies on management of small-scale tuna fisheries and management of brood stock of tiger shrimp, besides the four proposed new activities.

The TAC endorsed the work plan and asked the Secretariat to present it at the next meeting of the Governing Council.

Secretariat: Review of Role of TAC

The Secretariat requested the TAC to evaluate its own role, as recommended by the BOBP/IGO's Governing Council. The representative of FAO suggested that TAC should develop the Organisation's work plan, make policy recommendations to the Governing Council and identify emerging issues in fisheries.

Some members felt that a review of the role of TAC was premature since the BOBP-IGO is only about five years old. Such reviews can be conducted after 10 to 15 years.

The TAC adopted the report of the meeting, recorded its deep appreciation to the Government of Sri Lanka for its hospitality, and agreed to hold its next meeting early 2009 in Bangladesh, subject to the concurrence of the Government.

BOBP-IGO's Governing Council Holds Fourth Meeting in Dhaka

The Fourth Meeting of the BOBP-IGO's Governing Council was held at the Bangladesh Agriculture Research Council, Dhaka, on 6-7 May 2008. Representatives of member-countries (Bangladesh, India, Maldives and Sri Lanka) took part, besides an observer from The WorldFish Center and the Secretariat of the BOBP-IGO.

Mr Manik Lal Samaddar, Special Assistant to the Chief Advisor, Ministry of Fisheries and Livestock (MoFL), Bangladesh, was the Chief Guest and chaired the inaugural session. Mr Syed Ataur Rahman, Secretary, MoFL, Special Guest; Mr Parikshit Datta Choudhury, Joint Secretary, MoFL; and Mr Rafiqul Islam, Director-General, Department of Fisheries (DoF) took part in the inaugural session, along with senior officials from the Bangladesh Agricultural Research Council; DoF; the Bangladesh Coast Guard; and representatives from industry and the media.

Welcoming delegates, Dr Y S Yadava, Director, BOBP-IGO, said the Organisation had completed five years of existence as an IGO and was well-recognized internationally. It had fruitful relationships with the FAO, the National Institute of Occupational Safety and Health, USA, the Swedish International Development Agency and several other international organizations. He thanked member-countries for their support.

Dr Yadava said that global marine fisheries is passing through a crisis for several reasons, ranging from anthropogenic impacts to climate change to excess fishing capacity. He urged member-countries to harness all available expertise and management capacity, and foster regional cooperation to address the complex problems of marine fisheries.

Delegates at the Fourth Meeting of Governing Council in Dhaka, Bangladesh.

Mr Rafiqul Islam said that though fisheries contributes about 5.3 percent to the GDP of Bangladesh and is the second-biggest foreign exchange earner after garments, most marine fishers are poor and lack significant fishing assets. Most of the 40 000 mechanised fishing boats in Bangladesh are unregistered. He referred to the 'knowledge gap' among fishers about sea safety, weather conditions and the right fishing gear – which affects their well-being.

Mr Islam recalled with appreciation the development work of the erstwhile BOBP in marine fisheries and its role in fostering regional cooperation.

Mr Abdulla Naseer, Permanent Secretary, Ministry of Fisheries, Agriculture and Marine Resources, Maldives, and Chairman of the Governing Council, also complimented the BOBP-IGO and called for continued co-operation among member-countries through the IGO to address emerging issues.

Mr Syed Ataur Rahman expressed deep concern and sympathy for the victims of cyclone Nargis that hit coastal Myanmar on 04 May 2008, and for victims of cyclone SIDR that devastated lives and livelihoods in southern coastal districts of Bangladesh, especially in Barisal.

Mr Rahman said Bangladesh is yet to realize optimum yield from its aquatic wealth in the Bay of Bengal (BoB). He called for collective action by BOBP-IGO to tap the resources of the Bay in a sustainable manner. He recalled the IGO's work on initiating preparation of a management plan for hilsa fisheries, and the national workshop on sea safety for small-scale fishers (January 2008, Chittagong). He hoped that its outcomes would be implemented. He said Myanmar should be brought into the fold of the BOBP-IGO to help better fishery resource management of the Bay.

In his inaugural address, Mr Manik Lal Samaddar welcomed delegates and expressed condolences to victims of cyclone Nargis in Myanmar.

Mr Samaddar described the BoB as a valuable resource in terms of food, trade, employment and biodiversity. Fisheries and aquaculture therefore enjoy huge potential. But while marine fish production is stagnating because of unsustainable fishing practices, aquaculture has limitations due to limited water area.

Mr Samaddar said the BOBP-IGO is helping popularize the Code of Conduct for Responsible Fisheries (CCRF) and initiating action on monitoring, control and surveillance (MCS). The GCM should further enhance regional cooperation in fisheries and enable sustainable management and development of coastal fisheries in the region.

Mr Parikshit Datta Choudhury, Joint Secretary, MoFL proposed a vote of thanks.

Bangladesh was unanimously elected to chair the Fourth GCM. Dr Naseer (Maldives) thanked the Governing Council and the BOBP-IGO Secretariat for support during his tenure as chairperson of the Governing Council.

Report of the BOBP-IGO (March 2007-April 2008)

Dr Yadava presented the report of the BOBP-IGO for the period April 2007-March 2008. He described the BoB as a tropical ecosystem in a monsoon belt. Growth of capture fisheries over the past decade has been slowing, except in the Maldives. Millions of fishers in the Bay suffer the prospect of loss of livelihoods because of rising population, unsustainable fishing practices, habitat degradation and post-harvest losses. Further decline could be disastrous.

Dr Yadava described the activities carried out by BOBP-IGO under various heads. The safety at sea project implemented by the FAO through the BOBP-IGO (which is

the South Asia component of the global project); the regional workshop on 'Monitoring, Control and Surveillance for Marine Fisheries in the Bay of Bengal; two regional consultations on preparation of management plans for hilsa and shark fisheries; translation of the Technical Guidelines on Marine Fisheries of the CCRF into Bangla and Telugu; publication of theme-based annual calendars, laminated placards on safety at sea; the quarterly newsletter ***Bay of Bengal News;*** and digitization of the organisation's visual archives.

Other supporting activities implemented during the year: Assistance to the International Cooperative Alliance in implementing a training project on "Promotion of Community-based Fishery Resource Management by Coastal Small-scale Fishers in Thailand"; collaboration with the UNDP and the Government of Orissa, in preparing a report on development of marine fisheries in Orissa; an expert consultation on "Low Cost Fisheries Management Strategies and Cost Recovery" held at Georgetown, Guyana, 4-7 September 2007; and a technical consultation on "International Guidelines for the Management of Deep Sea Fisheries in the High Seas", held in Rome, Italy, 4-8 February 2008.

Mr G Piyasena, Secretary, Ministry of Fisheries and Aquatic Resources, Sri Lanka, said that his country is engaging the BOBP-IGO in various ways to take forward implementation of safety at sea programmes. He thanked the BOBP-IGO Secretariat, the FAO and member-countries who have supported safety at sea activities in the region.

Dr Abdulla Naseer said that safety-at-sea requirements of Maldives are unique in the sense that no serious accidents or mortalities occur. Fishing boats in the Maldives are well-equipped, different from those of other member-countries, and Maldivians are first-rate fishers. But the fleet is being modernized fast, and working knowledge on various communication and navigation devices needs to be improved. The Safety at Sea Project should include such training in its activities in Maldives. This would enable fishers to make multi-day fishing trips, as opposed to the single-day fishing in vogue now.

Dr Naseer said the incidence of illegal, unreported and unregulated (IUU) fishing in Maldivian waters was increasing. Fishers often report the presence of IUU fishing vessels, but the EEZ is large and it's difficult for their Coast Guard to patrol the entire area. He urged the Governing Council to consider the issue of illegal fishing and member-countries to work closely in the matter.

Mr M K R Nair (India), complimented the BOBP-IGO for its excellent accomplishments during the year. He asked whether BOBP-IGO activities are sufficiently gender-centric.
Dr V S Somvanshi (India), said that statutory measures are needed to support the Safety at Sea Project. The standards aimed at under the Project cannot be sustained in a statutory void, he said.

Mr Rafiqul Islam (Bangladesh), suggested that CCRF should be adapted to the needs of member-countries. He expressed concern over IUU fishing, and emphasized the need for effective MCS in marine waters.

While acknowledging the good work done so far, he suggested that the Secretariat consider taking up more activities for which additional funds could be mobilized. A mission

and vision statement for the BOBP-IGO should be prepared for the next five years and placed for approval at the next meeting of the Governing Council. This should include a strategic action plan (SAP) for implementation.

Dr Giasuddin Khan (Observer, The WorldFish Center) complimented the BOBP-IGO for its work despite time and human resource constraints. He said that Bangladeshi fishers are more vulnerable to risks at sea than others; the minimum safety requirements on board fishing vessels should be promoted at the earliest. He urged a country-specific approach for proper implementation of the Code of Conduct.

He said the important work of the erstwhile BOBP over three phases should be reviewed to find out whether some useful follow-up could be done and recommendations still valid could be adopted. He said basic studies on the health of fish stocks are very important. Historical trends in fish production should be analysed to plan for the future growth of marine fisheries in the region.

Mr Piyasena, said that Sri Lanka was finalizing legislation for boat construction norms for presentation to Parliament. The Government proposed to convene a stakeholder consultation in this connection, and BOBP-IGO's assistance would be required to facilitate the process. He also said that a management plan was urgently needed for many important fishery resources that had got depleted. The Canadian International Development Agency was helping out with management plans for a few important fin and shell fish species, but more species needed to be included in the ambit of management plans. The BOBP-IGO could provide technical inputs for such plans.

Mr Piyasena said Sri Lanka fully endorsed the idea of a mission and vision statement for BOBP-IGO and formulation of a SAP.

Dr Naseer said the Dhivehi version of the CCRF, translated by the BOBP-IGO, was used extensively during the stakeholder consultations to finalise the new fisheries legislation of the country. Each and every participant at the Consultation was given with a copy of the Code.

He concurred with the idea of a mission and vision statement and a SAP for the BOBP-IGO. He said member-countries should guide the Secretariat in preparing the proposed road map, which was to be submitted to the Governing Council at its next meeting. The archives of the former BOBP and the documentation created by the BOBP-IGO should be put to maximum use, said Dr Naseer.

Dr Somvanshi was pleased with the programmes concerning safety of fishers, fishing boat construction and fish stocks. He said the outcomes of such programmes should be integrated into policy documents and legislation.

Responding to the various suggestions made, the Director of the BOBP-IGO said the objective of assimilating the principles of CCRF would be addressed in two stages. During the first, the document would be popularized among stakeholders by circulating translated versions of the main Code and its Technical Guidelines. Adapting the Code to meet local requirements should be attempted in the second stage.

About gender-focus activities, he said that the Secretariat proposed to conduct detailed studies on the role of women in fisheries. He asked member-countries to identify women consultants for the proposed study. About possible interventions in the cyclone-affected areas of Myanmar, he proposed that BOBP-IGO ask the concerned agency in Myanmar whether it would need technical inputs from BOBP-IGO.

The Chair remarked that BOBP-IGO had undertaken voluminous and important activities for development of marine fisheries during the year. The report of the Secretariat for April 2007-March 2008 was adopted.

Report on the Third Technical Advisory Committee (TAC) Meeting

The Secretariat presented the report of the Third Meeting of the TAC held at Beruwala, Sri Lanka, on 28-29 March, 2008.

Dr Giasuddin Khan enquired about the BOBP-IGO partnering organisations like SEAFDEC (South East Asian Fisheries Development Center) and BOBLME (Bay of Bengal Large Marine Ecosystem) that are active in marine fisheries. The Director, BOBP-IGO, said in reply that discussions have been going on with SEAFDEC on various activities. But the BOBLME is not fully functional yet. The Secretariat welcomed the suggestion of cooperation with these organisations.

The Bangladesh delegate said that a stock assessment exercise being carried out with support from the Islamic Development Bank and the Government of Malaysia would be completed within two years. India said the Fishery Survey of India could help out with stock assessment programme through bilateral or multilateral arrangements. The BOBP-IGO could facilitate such a process. The observer from The WorldFish Center suggested that capacity-building in stock assessment was vital and that this suggestion should be taken up on a priority basis.

Role of Technical Advisory Committee

The Director, BOBP-IGO said that the Third GCM had recommended that the Secretariat make a thorough assessment of the mandate and functions of the TAC and present a report to the Governing Council. The issue was raised at the Third Meeting of TAC. This meeting suggested that the TAC could *inter alia* play the following roles:

(i) develop the work plan for the Organisation,

(ii) suggest policy recommendations to the Governing Council, and

(iii) identify emerging issues in fisheries.

In general, the TAC members were satisfied with the functions of the TAC and appreciative of the tasks accomplished by the TAC. Members also felt the BOBP-IGO is just about five years old; it might be premature to examine the role of TAC at this juncture. Such reviews could be conducted after 10 to 15 years.

The Bangladesh delegate suggested that the DoF would be more appropriate than the Bangladesh Fisheries Research Institute (BFRI) to represent his country in the TAC.

The Governing Council suggested that a review of the role of TAC be taken up after five years *i.e.* in 2013. It also said that BFRI should continue to represent Bangladesh as a technical and research organisation.

The Governing Council accepted the Report of the Third Meeting of the TAC presented by the Secretariat.

IGO programme and activities for April 2008-March 2009

The Director, BOBP-IGO, presented the proposed programme and activities for April 2008-March, 2009.

The work plan proposed that BOBP-IGO continue with its capacity-building and resource management activities. The Secretariat would carry out two scoping studies on management of small-scale tuna fisheries and management of tiger shrimp fisheries and four new studies on alternative livelihoods, impact of fuel price hike on marine fisheries, impact of climate change on marine fisheries and capacity-building for improving food safety in marine fisheries. In addition, a vision and mission document and a SAP would be presented in the next meeting of the GCM.

In response, the GCM agreed to the following changes in the activities:

(i) For 'Fisherfolk Week' celebrations, the Secretariat will prepare documentaries on developmental issues relevant to the needs of each member-country.

(ii) On the engagement of local consultants, the process shall be initiated in consultation with the focal point in each member-country.

(iii) In the proposed study on "Impact of Fuel Price Hike on Marine Fisheries", a component on the impact on consumers and remedial measures may be included in the study.

(iv) The Secretariat may develop a base paper on "Preparation of National Plans of Action on IUU Fishing".

Administrative Matters

The Governing Council approved the appointment of M/s Varadarajan & Co, Chartered Accountants, Chennai, as auditors for the BOBP-IGO for 2007 and 2008. It agreed to the terms of reference proposed for the post of Senior Programme Advisor. The Secretariat was asked to circulate the vacancy announcement widely and write to member-countries as well for further circulation within ministries and departments.

The Governing Council also agreed to the Secretariat's proposal to recruit a Policy Analyst. The GCM approved the terms of reference for the post and suggested that this post also be publicized widely.

The idea of secondment of technical personnel from member-countries to the BOBP-IGO Secretariat for a period ranging from 12 to 18 months was agreed to in principle. The GCM asked the Secretariat to submit a detailed proposal to member-countries.

Other Matters

The Governing Council suggested that in future the BOBP-IGO may also play the role of a management advisory body in the region for sustainable development of fish stocks in the Bay of Bengal. The Secretariat was asked to prepare a note on the proposal for the next meeting of the Governing Council.

The Governing Council unanimously agreed that Myanmar should be requested to joint the BOBP-IGO. The Government of India was asked to take the lead in the matter.

The Governing Council thanked Bangladesh for hosting the fourth GCM and accepted India's offer to host the next meeting early in 2009**.** The Report of the Governing Council was adopted on 07 May 2008.

Developing World Working Group of the Marine Stewardship Council Meets in Brussels, Belgium

The Marine Stewardship Council (MSC) has set up a Developing World Working Group (DWWG) to advise the Council. The DWWG is an important specialist group of the MSC and meets annually. The second meeting of the DWWG was held in Brussels, Belgium on 26 April 2008. Dr Y S Yadava, Director of BOBP-IGO and a member of the DWWG, took part. Ms Meredith Lopuch of the Worldwide Fund for Nature chaired the meeting.

Ms Yemi Oloruntuyi of the Council provided a brief update on recent developments.

She said that MSC is doing pilot assessments of six small-scale fisheries. It is also researching exports (by origin and species) of small-scale fisheries to markets of the developed world.

The Council updated members on the status of projects suggested at the 2007 meeting of the DWWG. These included a trust fund for capacity-building; incentives for participation in the Marine Stewardship Council; guidance for NGOs of developing nations; and keystone projects.

The DWWG agreed that seafood trade among developing nations should be increased. It also discussed ways by which members of DWWG could discuss issues throughout the year rather than just once a year. It discussed three proposals in the meeting's agenda:

- Developing a template to certify action plans;
- MSC fishery associates; and
- Fishery certification training package.

Members evinced keen interest in the first and third proposals. They agreed that any training kit or tool for certification must include not only the economic and market benefits of certification, but also the environmental and political benefits. The tools should build on work already done in developing countries relating to ecological sustainability and management. A range of projects was discussed, including the GTZ development of tools to help fishers honour the Code of Conduct for Responsible Fisheries; the COBI and WWF pre-analysis tool; and the Parfish tool developed by MRAG, which is used in India.

Members pointed out that since MSC's core mission is environmental sustainability, it should focus on improving the fisheries environmental performance of members.

DWWG Members at the Meeting in Brussels.

The Working Group said it was necessary to raise awareness about the MSC and its programmes and their potential benefits in developing nations – including government and private managers and potential donors. Funding was needed to strengthen and improve fisheries and make it certifiable.

Marine Stewardship Council

The Marine Stewardship Council (http://www.msc.org) or the MSC is an international non-profit organization set up to promote solutions to the problem of overfishing. The MSC runs the only certification and eco-labelling programme for wild-capture fisheries consistent with the ISEAL Code of Good Practice for setting Social and Environmental Standards and the Guidelines of the Food and Agriculture Organization of the United Nations on fisheries certification.

Presently, over 160 fisheries are engaged in MSC programme with 43 certified, 102 under assessment and another 20-30 in confidential pre-assessment. Worldwide, more than 2 500 sea food products resulting from the certified fisheries seal the blue MSC eco-label. The estimated retail value of seafood products bearing the MSC logo is estimated around 1.4 billion US $ annually. MSC labeled products are currently available in 42 countries.

The MSC offices are located in London, Seattle, Tokyo, Sydney, The Hague, Edinburgh, Berlin, and Cape Town.

Chittagong Fishing Harbour

Photographs by S Jayaraj

Text by S R Madhu

Chittagong fishing harbour best reflects the hurly burly of marine fisheries in Bangladesh – teeming with boats, fishermen and fish, with fish traders, vendors and labourers. Boats are setting out to sea or landing, buyers and sellers are haggling over the latest bonanza from the seas. Decibel levels are high as fish is unloaded, bargains are demanded and struck, and the fish moves out to markets in lorries, hand carts or cycle rickshaws.

The Chittagong fishing harbor, one of the biggest fish landing and berthing facilities in Bangladesh, includes the Patharghata Fishery Ghat and Monoharkhali BFDC (Bangladesh Fisheries Development Corporation) Ghat. Patharghata Fishery Ghat, a traditional landing site, handles more than 90 percent of the total fish landed in Chittagong. This Ghat has four fish landing points. While one point is operated by the Chittagong City Corporation, the other three are leased by the Chittagong Port Authority to private parties. The boats berth according to their convenience and pay Taka 200 per arrival and 2 percent of their total sale to the Point Authority. The Ghat Authority provides water, electricity and ensures security.

The adjacent Monoharkhali BFDC Ghat was established in the early nineties and has one landing point. Few boats land their catch at this ghat due to siltation problem. BFDC handles the catch at this site and the revenue earned from the commission accrues to the Government.

Some 46 percent of the 900 000 marine fishers of Bangladesh make their living from Chittagong and Cox's Bazar. The country's industrial fishery operates entirely out of Chittagong – you see industrial trawlers, gill netters, set bag netters, long lines and trammel nets – an

estimated 44 000 in 2006. Besides, small-scale fishermen make their living from the sea using dinghies, chandis and balams. The major fishing gear used in coastal areas and estuaries are gill net, set bagnet, trammel net, longline and beach seine.

Fisheries is one of the mainstays of the Bangladesh economy. It accounts for 4.86 percent of the GDP and 5.9 percent of exports, and supplies about 80 percent of the animal protein intake of its population.

The country's marine fish catch in 2005-06 was nearly half a million tonnes. (Inland fisheries accounts for the bulk of fish production of about 2 million tonnes.) More than 90% of the marine fish is landed by artisanal fishers, and some half a million people make a living from marine artisanal fisheries.

Important species caught include hilsa, catfishes, Indian salmon, sea perch, Bombay duck, snapper, pomfret, Indian mackerel, shark, rays and prawns. The industrial fleet focuses mainly on shrimps.

Over the years, the marine fishing fleet, of industrial as well as traditional craft, has expanded. But some stocks are being over-exploited, some others under-exploited, says Mr Md Rafiqul Islam, Director General, Department of Fisheries. Other problems with marine fisheries are lack of a reliable database, inadequate MCS (monitoring, control and surveillance), plus the impact of global warming and climate change.

Some of the solutions advocated are: management action to control fishing effort, to be supported by all stakeholders; access rights only to registered fishers; a marine resource database and an effective monitoring system.

The Chittagong harbour is life in the raw – the photographs on these pages provide glimpses. Harvesting the sea, for all its hazards, is perhaps easier for fishers than battling forces on land. Rarely is daily bread so hard earned.


MIAMI

Impact of Climate Change on Indian Marine Fisheries*

Is climate change the next apocalypse? Even optimists agree that it is one of the most critical global challenges of today. Research shows that climate change may impact agriculture and fisheries; endanger food security; trigger sea-level rise; lead to sea ice melting and glacier retreat; aggravate natural disasters such as floods, cyclones and droughts; accelerate the erosion of coastal zones; quicken species extinction and the spread of vector-borne diseases; cause coral bleaching and decline in biodiversity.

How has climate change affected India? Can governments and communities adapt to it? Both research and action on the subject are at a nascent stage. But recent studies throw some light on the subject.

We summarize here the observations and findings of two papers, by scientists from World Wildlife Fund-India (WWF) and the Central Marine Fisheries Research Institute (CMFRI) respectively. The authors are Dr Prakash Rao and Dr E Vivekanandan, who discuss how India's marine fisheries should adapt to climate change.

* *Based on articles contributed by Dr Prakash Rao and Dr E Vivekanandan. Dr Prakash Rao is Senior Coordinator, Climate Change and Energy Programme, WWF-India, New Delhi (Email: Rao@wwfindia.net). Dr Vivekanandan is Principal Scientist and Head, Demersal Fisheries Division, Central Marine Fisheries Research Institute, Cochin, Kerala, India (Email: evivekanandan@hotmail.com).*

Impact of climate change on climatic parameters

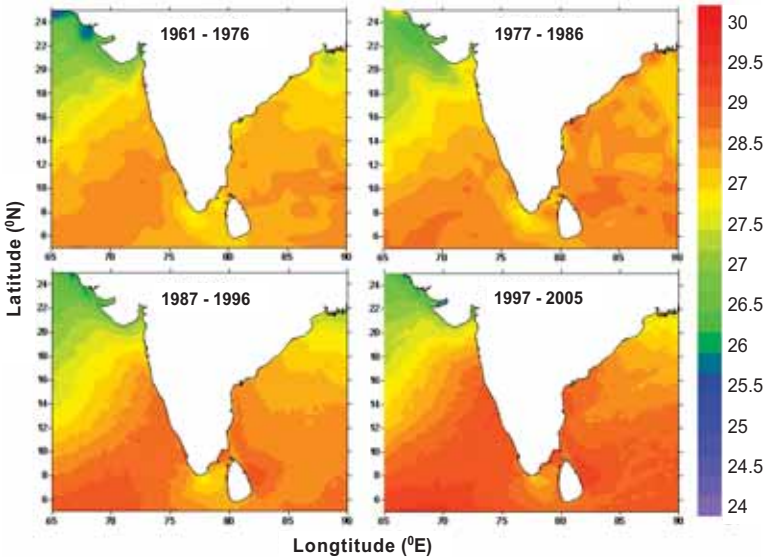
Evidence of the impact of global climate change on marine environments is ample. But it is regional rather than global climate models that are appropriate for observation and study of climate change impacts (Clark, 2006).

Analyzing data on sea surface temperature (SST) and other parameters from a variety of global sources, Vivekanandan et al. (2009a) found warming of the sea surface along the entire Indian coast. The SST increased by 0.2°C along the northwest, southwest and northeast coasts and by 0.3°C along the southeast coast during the 45-year period from 1960 to 2005. The team has predicted that the annual average SST in the Indian seas would increase by 2.0°C to 3.5°C by 2099.

Sea level rise in the Indian seas: The Inter-governmental Panel on Climate Change (IPCC) has projected that the global annual seawater temperature would rise by 0.8 to 2.5°C by 2050. The sea level would rise by 8 to 25 cm. The sea level rise for Cochin (southwest coast) during the past century is estimated at 2 cm (Emery and Aubrey, 1989; Das and Radhakrishna, 1993). But the rate of increase is accelerating. It may rise at the rate of 5 mm per year in decades to come. This will accelerate erosion and increase the risk of flooding (Nicholls et al., 1999).

Impact on marine fisheries

Production from marine capture fisheries has been stagnant during the past 10 years because of overfishing, unregulated fishing, habitat destruction and pollution; climate change may exacerbate this



Plot of SST showing warming of sea surface along the Indian coast during 1961-2005. (Source: ICOADS and AVHRR data from NOAA/NASA; the values near the vertical bar indicate SST (⁰C)

situation. Warming of water may impact fish diversity, distribution, abundance and phenology. Acidification of water will affect calciferous animals. Storms, floods and drought will severely impair fisheries. Sea level rise will lower fish production and damage the livelihoods of communities.

Some tropical fish stocks may face regional extinction. Some others may move towards higher latitudes. Coastal habitats and resources are likely to be impacted through sea level rise, warming sea temperatures, extremes of nutrient enrichment (eutrophication) and invasive species. Most fish species have a narrow range of optimum temperatures related to their basic metabolism and availability of food organisms. Even a difference of 1°C in seawater may affect their distribution and life processes.

At shorter time scales of a few years, increasing temperature may result in changes in distribution, recruitment and abundance. Species with short-life span and rapid turnover such as plankton and small pelagic fishes are most likely to experience such changes.
At intermediate time scales of a few years to a decade, changes in distribution, recruitment and abundance of many species may be acute. Changes in abundance will alter the species composition.
At longer time scales of multi-decades, changes in net primary production and transfer to higher trophic levels are possible.

Investigations carried out by the Indian Council of Agricultural Research show that different Indian marine species will respond to climate change as follows:
(i) Changes in species composition of phytoplankton may occur at higher temperature; (ii) Small pelagics may extend their boundaries; (iii) Some species may be found in deeper waters as well; and (iv) Phenological changes may occur.

Changes in species composition of phytoplankton: Laboratory experiments on seven species of phytoplankton showed that some species may multiply faster at higher temperature (29°C) than at lower temperature (24°C). But they decay earlier at the higher temperature.

Small pelagics extend their boundaries: The oil sardine *Sardinella longiceps* and the Indian mackerel *Rastrelliger kanagurta* accounted for 21 percent of the marine fish catch in 2006. These small pelagics, especially the oil sardine, have been known for restricted distribution – between latitude 8°N and 14°N and longitude 75°E and 77°E (Malabar upwelling zone along the southwest coast of India) where the annual average SST ranges from 27 to 29°C.

Until 1985, almost the entire catch was from the Malabar upwelling zone, there was little or no catch from latitudes north of 14°N. During the last two decades, however, catches from latitude 14°N - 20°N are increasing. In 2006, catches in this area accounted for about 15 percent of the all-India oil sardine catch.

The higher the SST, the better the oil sardine catch (Vivekanandan et al., 2009a). The surface waters of the Indian seas are warming by 0.04°C per decade. Since the waters in latitudes north of 14°N are warming, the oil sardine and Indian mackerel are moving to northern latitudes. It is seen that catches from the Malabar upwelling zone have not gone down. Inference: The sardines are extending northward, not shifting northward. The Indian mackerel is also found to be extending northward in a similar way.

According to CMFRI, the catch of oil sardines along the coast of Tamil Nadu has gone up dramatically, with a record landing of 185 877 tonnes in 2006. The presence of the species in new areas is a bonus for coastal fishing communities. Assessing their socio-economic needs will greatly help in developing coping strategies for adaptation to climate impacts. WWF is currently documenting community perceptions and experiences in relation to the oil sardine fishery of the eastern coasts.

Indian mackerel is getting deeper: Besides exploring northern waters, the Indian mackerel *R. kanagurta* has been descending deeper as well during the last two decades (CMFRI, 2008).

The fish normally occupies surface and subsurface waters. During 1985-89, only 2 percent of the mackerel catch was from bottom trawlers, the remainder was caught by pelagic gear such as drift gillnet. During 2003-2007, however, an estimated 15 percent of the mackerel has been caught by bottom trawlers along the Indian coast.
It appears that with the warming of sub-surface waters, the mackerel has been extending deeper and downward as well.

Spawning: threadfin breams like it cool: Fish have strong temperature preferences so far as spawning goes. The timing of spawning, an annually occurring event, is an important indicator of climate change. Shifts in the spawning season of fish are now evident in the Indian seas.

The threadfin breams *Nemipterus japonicus* and *N. mesoprion* are distributed along the entire Indian coast at depths ranging from 10 to 100 m. They are short-lived (longevity: about 3 years), fast growing, highly fecund and medium-sized fishes (maximum length: 35 cm). Data on the number of female spawners collected every month off Chennai from 1981 to 2004 indicated wide monthly fluctuations.

However, a shift in the spawning season from warmer to relatively cooler months (from April-September to October-March) was discernible (Vivekanandan and Rajagopalan, 2009). Whereas 35.3 percent of the spawners of *N. japonicus* occurred in warm months during 1981-1985, only 5.0 percent of the spawners occurred in the same season during 2000-2004.

What about the cool months? During 1981-1985, 64.7 percent of the spawners occurred during October-March, whereas as high as 95.0 percent of the spawners occurred during the same season in 2000-2004.

A similar trend was observed in *N. mesoprion* too. The occurrence of spawners of the two species decreased with increasing temperature during April-September, but increased with increasing temperature during October-March over the time-scale. It appears that SST between 28 and 29°C may be the optimum. When the SST exceeds 29°C, the fish shifts the spawning activity to seasons when the temperature is around the preferred optima.

These changes may have an impact on the nature and value of fisheries

(Perry et al., 2005). If small-sized, low value fish species with rapid turnover of generations are able to cope up with changing climate, they may replace large-sized high value species, which are already declining due to fishing and other non-climatic factors (Vivekanandan et al., 2005).

Such distributional changes might lead to novel mixes of organisms in a region, leaving species to adjust to new prey, predators, parasites, diseases and competitors (Kennedy et al., 2002), and result in considerable changes in ecosystem structure and function.

False Trevally populations decline in the Gulf of Mannar: As part of a WWF India-commissioned project, the Suganthi Devadason Marine Research Institute (SDMRI), Tuticorin, undertook a study in 2004 in the Gulf of Mannar region to analyze the effect of climate change on the fishery of False Trevally (***Lactarius lactarius***) and the reduction in the income of small - scale fishermen. The project helped identify the migratory patterns of the fish species.

False Trevally is an economically and culturally important fish in India and found near the Rameshwaram coast of south east India. The species is generally seen at depths ranging from 15 to 90 metres. But over the past few years, there has been a steady decline in the catch of this fish – both because of human disturbance and changes in ocean temperatures. Destructive fishing practices have also led to decline of the species. Result: the species has moved to other regions along the coast including the east coast of Sri Lanka.

Currently, it is difficult to find out how much of catch fluctuation is due to changes in fish distribution. A time-series analysis on stock biomass of different species along the Indian coasts does not exist. Moreover, catches are influenced by economic factors such as the relative price paid for different types of fish, and changes in fishing methods or fishing effort. For instance, introduction of mechanized craft in the 1960s, motorized craft in the 1980s, and large trawlers for multiday fishing in the 1990s substantially increased the fish catch along the Indian coast. These non-climatic factors often obscure climate related trends in fish abundance. Perhaps a de-trending analysis for removing the impact of non-climatic factors may help arrive at conclusions on the impact of climate change on marine fisheries.

The effects of changed fish migration and distribution caused by climate change are most difficult to deal with for highly migratory species, such as tuna. It is not clear whether the spurt in yellowfin tuna fishery in the Bay of Bengal and eastern Arabian Sea in the last five years is due to climate driven changes in the migration route of the fish.

Coral reefs may become remnants: Coral reefs are the most diverse marine habitat, which support an estimated one million species globally. They are highly sensitive to climatic influences and are among the most sensitive of all ecosystems to temperature changes, exhibiting the phenomenon known as coral bleaching when stressed by higher than normal sea temperatures. Corals usually recover from bleaching, but die in extreme cases.

In the Indian seas, coral reefs are found in the Gulf of Mannar, Gulf of Kachchh, Palk Bay, Andaman Sea and Lakshadweep Sea. Indian coral reefs have experienced 29 widespread bleaching events since 1989 and intense bleaching occurred in 1998 and 2002 when the

SST was higher than the usual summer maxima.

By using the relationship between past temperatures and bleaching events and the predicted SST for another 100 years, Vivekanandan et al. (2009b) projected the vulnerability of corals in the Indian Seas. They believe that the coral cover of reefs may soon start declining. The number of decadal low bleaching events will remain between 0 and 3 during 2000-2089, but the number of decadal catastrophic events will increase from 0 during 2000-2009 to 8 during 2080-2089.

Given the implication that reefs will not be able to sustain catastrophic events more than three times a decade, reef building corals are likely to disappear as dominant organisms on coral reefs between 2020 and 2040. Reefs are likely to become remnant between 2030 and 2040 in the Lakshadweep sea and between 2050 and 2060 in other regions in the Indian seas.

These projections take into consideration only the warming of seawater. Other factors such as increasing acidity of seawater are not considered. If acidification continues in future as it does now, all coral reefs would be dead within 50 years. Given their central importance in the marine ecosystem, the loss of coral reefs is likely to have several ramifications.

Impacts of climate change on coastal systems

Coastal India (with over 8 000 km of coastline) is a productive and ecologically diverse landscape. Climate change may aggravate the impact of injurious large-scale development and reduce the productivity of marine ecosystems.

The Fourth Assessment Report of the IPCC (2007b) has suggested that climate change is likely to significantly impact coastal India. Some possible impacts:

- *More hot days. More heat waves. More death from heat strokes in recent years;*
- *Intrusion of saline water into groundwater in coastal aquifer; and*
- *Decline in precipitation, droughts in most delta regions of India and drying of wetlands.*

Worldwide, WWF studies have brought out some important underlying impacts of climate change on marine ecosystems – such as a rise in SST, decreasing marine pH, shifting ocean currents, release of methane hydrates and rising sea level.

India is vulnerable to major climate changes because of a long coastline on the east and west and the Himalayan mountain range in the north. WWF- India has been working in some of India's most critical ecosystems and landscape. Its studies seek to probe climate impacts in the Sundarbans, the coastal regions of south India and in the Himalayas, and focus mainly on impacts and adaptation; mitigation; and policy interventions.

Sundarbans: The Sundarbans is part of the world's largest delta (80 000 sq. km) formed from sediments deposited by three great rivers, the Ganges, Brahmaputra and Meghna. It consists of 102 low-lying islands in the Bay of Bengal and forms one of the world's richest mangrove ecosystems (34 mangrove species). Faunal diversity is significant too, with a strong tiger population. The combination of terrestrial, freshwater and marine flora and fauna makes this one of the most diverse and productive ecosystems in the country.

The Sundarbans is now under severe stress due to sea level rise and associated problems. A population of four million in the Indian Sundarbans is severely stressed. Mangroves are under threat, so are endangered species like tigers and turtles. An effective coping mechanism to reduce the vulnerability of the region is essential.

WWF- India is documenting local community knowledge and climate perceptions through an initiative known as 'Climate Witness'. It was launched because of the strong indicators of climate change from various scientific studies. WWF-India hopes that this initiative will make the authorities integrate climate change concerns into development planning through a bottom-up approach.

Characteristics of the initiative:

- *Stakeholders at different levels will help develop a model intervention;*
- *A homogeneous geographical area will be identified to validate the model; and*
- *Local concerns on climate change will be integrated into development planning.*

Islands selected for the 'Climate Witness' initiative studies are mostly in the southwestern corner of Sundarbans (except Chhoto Mollakhali and Bali islands situated in the northeastern part of the delta).

Local communities in these sites were more concerned by weather phenomena (such as monsoon delays in recent years), than by rising temperatures. Local residents reported very high frequency of thunder and lightning during storms in last 10-15 years. In their opinion depression and cyclonic storms occurred more frequently than earlier. Delayed monsoons and untimely rain impaired agricultural productivity leading to loss of crops and increased pest attacks.

Community interactions and adaptation responses

The WWF- India has been studying the coping capacities of communities – particularly in those islands where landmass has been lost over the past few decades. Community knowledge is being classified on environmental impacts like soil erosion, loss of landmass, damage of coastal embankments, siltation, unsustainable livelihood practices, population pressure, storms and cyclones, effect of tidal waves, etc.

Farmers and fishermen (both depend on the ecosystem) form a major part of the work force of these islands. Since industry isn't developed, livelihood options are limited. Nearly 61.85 percent of the respondents surveyed were farmers or fishermen. Nearly 10 percent were full-time fishers. A majority of the inhabitants were vulnerable to climate-related adversities.

In response to climate change, village communities have been taking short-term actions such as:

- *Shifting the farming time because of shifting of monsoon season;*
- *Diversifying into different weather-resistant crops;*
- *Constructing and renovating ponds and canals for rain water harvesting and use in winter cultivation;*
- *Constructing mud-barrages around the islands to protect them from saline water intrusion; and*
- *Reforesting of mangroves on the mud barrage.*

WWF- India says that in communities dependent on ecosystems, different stakeholders must come together to address climate change and environment security. They could develop site-specific measures at the local level, evolve a consensus for national strategies, and support inter-governmental processes.

The stakeholders would include the very poor; farmers and fishers; local, state and national bodies; urban consumers; business and industry; groups concerned with coastal zone regulation; scientists and academics.

When stakeholders at different levels are brought together on a common platform, climate change concerns can be better integrated into development planning. Resource centers and local knowledge networks can raise awareness and strengthen action. Some other institutional processes can also be established.

How can fisheries adapt?

Options for adaptation are limited, but do exist. The impact of climate change depends on the magnitude of change, and on the sensitivity of particular species or ecosystems (Brander, 2008).

Develop knowledge base for climate change and marine fisheries: Considerable effort should be made to collect historical climatic and oceanographic data – in addition to monitoring these key parameters. Long-term environmental and ecological monitoring programmes are important as such data cannot be collected retrospectively. In India, spatial marine fish catch and effort data are available for the last four decades. However, a synergy between the climatic and oceanographic data and fisheries data is needed. Projections on climate change impact on fish populations have not been performed so far. Such projections need to be developed as the first step for future analytical and empirical models, and for planning better management adaptations.

Adapt the Code of Conduct for Responsible Fisheries (CCRF): Fish populations are facing the familiar problems of overfishing, pollution and habitat degradation. Reducing fishing mortality in the majority of fisheries, which are currently fully exploited or overexploited, is the principal means of reducing the impacts of climate change (Brander, 2007). Reduction of fishing effort (i) maximizes sustainable yields, (ii) helps adaptation of fish stocks and marine ecosystems to climate impacts, and (iii) reduces greenhouse gas emission by fishing boats (Brander, 2008).

Some of the most effective actions which we can take to tackle climate impacts are to deal with the old familiar problems such as overfishing (Brander, 2008), and adapt the CCRF and Integrated Ecosystem-based Fisheries Management (FAO, 2007).

Increase awareness on the impacts of climate change: Being a signatory to the United Nations Framework Convention on Climate Change (UNFCCC), India has submitted the first National Communication to the UNFCCC in 2004. The second National Communication is under preparation for submission in 2011.

National climate change response strategies are under preparation. A specific policy document on the implications of climate change for fisheries needs to be developed for India. This document should take into account all relevant social, economic and environmental policies and actions including education, training and public awareness related to climate change. Effort is also required to raise awareness of the impact, vulnerability, adaptation and mitigation related to climate change among all stakeholders.

Strategies for evolving adaptive mechanisms: In the context of climate change, the primary challenge to the fisheries and aquaculture sectors will be to ensure food supply, enhance nutritional security, improve livelihoods and economic output and ensure ecosystem safety. These objectives call for identifying and addressing the concerns arising out of climate change and evolving adaptive mechanisms and implementing action across all stakeholders at national, regional and international levels (Allision et al., 2004; Handisyde et al., 2005; WorldFish Center, 2007; FAO, 2008).

Strategies to promote sustainability and improve supplies should be in place before the threat of climate change assumes greater proportion. While the fisheries sector may strive to mitigate climate change by reducing CO_2 emissions, especially by fishing boats, it could reduce impact by following effective adaptation measures. There should be fiscal incentives for reducing the sector's carbon footprint, and for following other mitigation and adaptation options.

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Regional Workshop on Monitoring Control and Surveillance Adopts the Chittagong Resolution

The first regional workshop on Monitoring, Control and Surveillance (MCS) for marine fisheries in the Bay of Bengal was held in Chittagong, Bangladesh, on 16-18 January 2008. Fisheries officials and representatives from the coast guard and the navy of member-countries (Bangladesh, India, Maldives, and Sri Lanka) took part, besides consultants, representatives of the FAO and the BOBP-IGO.

The inaugural session was chaired by Mr Parikshit Datta Choudhury, Joint Secretary, Ministry of Fisheries and Livestock (MoFL), Bangladesh.

Welcoming participants, Mr Datta Choudhury emphasized on the danger to marine resources posed by increasing fishing effort. He hoped the workshop would pave the way for effective policy formulation on MCS in member-countries.

The workshop was divided into technical presentations and discussions; a field trip; and group discussions to analyze issues and recommend action.

The Regional Workshop on MCS in progress.

Summary of the technical session

Dr Yugraj Singh Yadava, director of BOBP-IGO, initiated the technical session with an overview of MCS measures in member-countries. He said the rapid increase in the fisher population in an open-access regime has led to low catches and fishing rights conflicts. Member-countries are not ready yet for a paradigm shift in policy emphasis from production to management. The legal framework is insufficient, policies for fisheries management are inadequate and compliance levels are low. Citing FAO data, he said that in the Bay of Bengal region, of 46 commonly exploited species, 11 species are fully exploited and four are fully or over-exploited.

He said that MCS ought to go beyond its traditional definition of policing. It should be seen as a path to sustainable fisheries. An array of tools was available for MCS – legislation, data collection, improved communication and overall support from political, social and business interests. He highlighted the importance of a vessel monitoring system (VMS) for MCS.

Dr Yadava suggested that member-countries seek cooperation from advanced countries on MCS – in data and technology, for example – as proposed by the Code of Conduct for Responsible Fisheries (CCRF).

Mr Arne Andreasson, an independent consultant, made a presentation on "Application of MCS in small-scale fisheries". He said that MCS systems have mainly been designed for the industrial fisheries of developed countries. Special MCS systems are needed for

small-scale fisheries – which are scattered, with many small units operating close to the shore, employing a wide range of gear, and landing fish at numerous small and remote landing centres.

These special systems would include monitoring through random sampling and the use of modern communications technology by the enforcing authority. Limits on effort through access regulations (licensing of fishing vessels, for example), closed seasons, closed areas and gear restrictions, are enforceable measures.

He said that all MCS systems are costly – but not in relation to the cost of not managing the resource at all. Efforts to decentralize management decisions and move towards co-management and community management would lead to cost-effective MCS systems, with elements of self-control.

Discussing MCS in Bangladesh, Commander A R Chowdhury from the Bangladesh Coast Guard said that small-scale fisheries accounts for about 93 percent of the Bangladesh fish production of 2.1 million tonnes.

The marine fishing fleet (industrial trawlers, gill netters, set bag netters, long lines and trammel nets) increased from 17 385 to 44 082 between 1997 and 2006.

He said Bangladesh had already implemented various control measures, such as limits to fishing days, control of mesh sizes, restricting trawling to within the 40 m depth zone, guidelines for fish capture, declaration of a sanctuary for hilsa. The government is registering boats and encouraging alternative livelihoods for fishers. Despite these measures, MCS on small-scale fisheries is very inadequate, Mr Chowdhury said. Only 15 to 20 percent of the country's fishing vessels are registered. Registration and licensing are multi-window processes that discourage fishers. The licensing fee is perceived as high, it has to be renewed annually.

The Bangladesh Coast Guard and the Navy, responsible for enforcement as well as search and rescue operations, are constrained by manpower shortage and lack of air support. Illegal fishing is widespread, foreign vessels engage in poaching.

Mr Chowdhury suggested that Bangladesh learn from the experience of countries like Malaysia in designing a cost-effective MCS regime. The country's surveillance system needed to be upgraded. VMS, over-the- horizon radar and a strong Coast Guard were essential, as also . well-coordinated research to advance the MCS regime.

Discussing the status of MCS in India, Dr V S Somvanshi, Director General, Fishery Survey of India, said that India is endowed with 8 118 km of coastline, 0.53 million sq. km of continental shelf and 2.02 million sq. km of EEZ. Fisheries contributes 1.07 percent to the total GDP. India's fish biodiversity represents nearly 10 percent of the world's fish biodiversity. Fisheries in India is complex because of its multi-species, multi-gear, multi-craft and multi-stakeholder character.

The Ministry of Agriculture (2001) has estimated the potential yield from marine sources as 3.92 million tonnes. The present exploitation level is about 76 percent of the potential. The country has some 3.57 million marine fishers and a fishing fleet of 0.3 million. An open-access system leads to uncontrolled exploitation. Illegal, Unreported and Unregulated (IUU) fishing further aggravates the problem.

Registration of fishing vessels in India follows stipulations under different Acts for vessels < 20m and

Speakers at the Regional Workshop (from top to bottom): Mr Arne Andreasson, Mr Nimalsiri Abeywickrama, Cdr A R Chowdhury, Dr V S Somvanshi, Capt. Ahmed Jihad and Mr Mohamed Shameem.

vessels > 20m. But there is no uniformity either within a state or between states. A standard system throughout the country would be a priority. Regional co-operation would help curb IUU fishing.

The paper proposed standardization of craft and gear; zonation of sea fishing areas; a colour code for fishing boats; a uniform system of registration; installation of VMS; strengthening of the fisheries database; information networking for fisheries; awareness-raising among fishermen on resource management.

Mr Mohamed Shameem, Ministry of Fisheries, Agriculture & Marine Resources (MoFAMR), Maldives, and Capt. Ahmed Jihad of the Maldives Coast Guard, discussed the status of MCS in their country. They said the island nation of Maldives has more water than land, and marine fisheries is the strongest traditional sector. The country has a total population of just over 300 000 scattered over 200-odd small coral islands.

The major fisheries are pole and line fishing for skipjack tuna; hand lining and long lining for yellowfin and bigeye tuna; reef fisheries targeting different species; and a small yet profitable aquarium fishery targeted at export markets.

The major governing regulation is the Fisheries Act of 1987. It is presently being revised to take into account changes in management needs and international obligations. MoFAMR is the lead agency tasked with fisheries management and development in the country. It is supported in the execution of its mandate by the Fisheries Advisory Board (FAB).

Compliance is a major problem, the two authors said. Some reasons for non-compliance: lack of awareness, inconsistencies in regulations issued by different ministries, inadequate enforcement capacities, the socio-cultural environment of small island communities that rely on community cohesion and solidarity.

Maldives has implemented a Vessel Tracking System (VTS) for all vessels licensed to operate in the outer EEZ. Established in 1995, the VTS is monitored by the Maldivian Coast Guard. This is done by installing vessel-tracking transponder equipment on board the vessel. Frequent power failure and absence of written rules in operating transponders impair the efficacy of the system.

Maldives plans motivating fishers to regulate themselves. MoFAMR will provide fishing forecast information free of charge exclusively to registered fishing vessels. Fishers will then be encouraged to install VMS systems: better catches for them, systematic vessel information and catch reports for MoFAMR. This will encourage boat registration and enhance sea safety as well.

Mr Nimalsiri Abeywickrama, Director (Planning), Ministry of Fisheries & Aquatic Resources (MoFAR), Sri Lanka, presented a paper on the status of MCS in his country. He said Sri Lanka's marine fishing fleet of some 43 000 includes more than 39 000 in coastal fisheries. Some 600 000 people depend on the coastal fishery. Small-scale crafts, about 90 percent of the fishing fleet, contribute about two-thirds of the domestic fish production.

The December 2004 tsunami triggered uncoordinated and un-monitored restoration effort and a big rise in the number of fishing boats; consequently, lower catch per unit effort and income from coastal fisheries. Harmful, IUU fishing has also gone up.

The Department of Fisheries and Aquatic Resources (DFAR) is the agency that enforces various Acts. Other key agencies for fisheries management in Sri Lanka are the MoFAR, the National Aquatic Resources Research & Development Agency and the National Aquaculture Development Authority.

The paper said that coastal fisheries in Sri Lanka have either reached the maximum sustainable yield or are close to it. A management programme has been launched for coastal fisheries. Seven hundred areas have been set apart for management through community participation. Alternative income opportunities for fishers are to be created to reduce fishing pressure.

Strengthening of MCS and introducing a vessel monitoring system will be other priority areas. Assistance and co-operation will be necessary from regional and global management organizations.

Summary of group discussions

Three groups were constituted to discuss different aspects of MCS — physical environment requirements (Group I); governance and policy environment requirements (Group II) and the role of CBOs/ NGOs in setting up MCS regime (Group III).

According to Group I, comprehensive stock assessment is necessary to determine the fleet's optimum size for sustainable exploitation. The right fleet size and gear can be then worked out, and category-wise operational area of fleets defined. This will also help reduce inter-category conflict. Registration of vessels should be mandatory. Awareness should be built to foster a culture of registration.

The group said that VMS should be mandatory for large vessels. For small vessels, measures like colour-coding and display of flags and registration numbers, could be considered as part of the VMS.

Encouraging community participation in MCS and SAR operations is urgently necessary, the group said. NGOs can be effective in this context. For harbour-based vessels, governments can introduce a smart card and a harbour pass. Two-way communication (VHF and cell phone) could be promoted to enable both MCS and distress communication. Local communities

equipped with internet access could be tapped to provide needed information.

Group II said that existing MCS legislation in member-countries should be revised. An information base is lacking, and mechanisms for collecting, collating and disseminating national statistics are inadequate. All stakeholders should take part in making data collection effective. The group lauded the MCS regime in Maldives and urged stakeholder consultations for developing any MCS regime.

Steady budget support is essential for MCS, the group said. It can be used commercially, as in the Maldives, to make it popular. Given the shared stock of member-countries, regional cooperation is must for a successful MCS. There is also scope for sharing information to curb IUU fishing.

Group III suggested that community-based organisations (CBOs) could help enforce MCS. In fact, fishers should be able to help enforce MCS through CBOs, with NGOs serving as facilitators. The government should incorporate fisher concerns into the management regime.

The group found that co-management will not work without legal empowerment of CBOs. On the other hand, there is a risk of power misuse by CBOs. The practical solution at present is for CBOs to work with the government.

The group recommended a micro-level exercise by government to determine the norms for scientific and environment-friendly MCS, depending on the type of craft, fish species, time of the year and gear type. This should be carried out and published. Accordingly, an area-specific management plan could be set out.

The group concluded that a CBO network could help ensure a sound MCS in fisheries, if properly conceived and designed, with an accompanying legal, management and financial framework.

On the final day of the regional workshop, participants passed the Chittagong Resolution on the basis of the group recommendations. The text of the resolution is given on page 42.

Participants engaged in Group Discussions.

The Chittagong Resolution

Conscious that the marine fisheries sector is highly important for the economies of member-countries of the Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO);

Recognizing that the marine fisheries sector is a major contributor to the livelihoods, food and nutritional security and foreign exchange earnings of member-countries;

Realizing that a high percentage of the world's artisanal fisheries and small-scale fisheries are concentrated in South Asia, where many of the coastal stocks are almost fully exploited;

Recognizing that the marine fisheries sector largely operates in an open-access regime, and that the present condition of fisheries is largely attributable to weaknesses in the institutional and regulatory environment, a declining resource base and poor socio-economic conditions;

Realizing that monitoring, control and surveillance (MCS) regimes are weak in the marine fisheries sector of member-countries;

Concerned about the social and political constraints to regulating access to marine fisheries and to optimizing the fishing fleet;

Concerned that the current fisheries management regime for coastal fisheries in the region may lead to further unsustainable levels of exploitation of fisheries resources, and thereby impact the livelihoods of small-scale fishermen;

Concerned that the supporting regulations and policy framework relevant to the needs of MCS for small-scale fisheries, remain inadequately addressed by fisheries and maritime administrations in the sector;

Recognizing the limitations in institutional capacity of fisheries and maritime administrations in the region to undertake all responsibilities associated with the mandate;

Recognizing that the 1995 Code of Conduct for Responsible Fisheries (CCRF) of the FAO does not adequately address the need and requirements of MCS in small-scale marine fisheries;

Emphasizing the urgent need to address the multi-dimensional issue of MCS for small-scale fishermen in a holistic manner; and

Recognizing that the problem is not insurmountable;

We, the representatives of Fisheries and Maritime Administrations, Coast Guard and Fishermen's Associations, nominated by the Governments of Bangladesh, India, the Maldives and Sri Lanka, having participated in the BOBP -IGO Regional Workshop on MCS for Small-scale Fisheries held in Chittagong, People's Republic of Bangladesh, from 16 -18 January 2008, now therefore:

Resolve to address, as a matter of urgency, the issue of MCS for small-scale fisheries;

Recommend that MCS requirements be comprehensively integrated into every member-country's fisheries policy and regulatory and managerial frameworks. This would include associated commitments under the CCRF and other regional, inter-regional or global instruments and initiatives;

Emphasize the need to rationalize institutional mandates and inter-sectoral cooperation at the national level, in order to enhance implementation of MCS in small-scale fisheries;

Recommend that fisheries and maritime administrations enhance their knowledge and database on the health of the fish stocks and on commensurate efforts required to harvest resources in a sustainable manner;

Recommend the development and implementation of education, training and awareness programmes which satisfy and promote MCS requirements;

Recommend that mandatory requirements for improving implementation of MCS be supplemented by other strategies which involve the participation of fisher communities, families, the media and other stakeholders in order to promote the adoption of a wide range of MCS measures;

Recommend that member-countries, while implementing MCS, also undertake measures to enhance the economic viability of small-scale fishing enterprises, as an essential element of the marine fisheries sector;

Recommend that member-countries make full use of the available technologies, including Vessel Monitoring System wherever feasible, in support of MCS;

Recommend that member-countries employ innovative measures such as co-management. This will be an effective cost-sharing measure for MCS and enhance the participation of fishers and other stakeholders in the management of marine fisheries resources;

Recommend that member-countries undertake measures to formulate time-bound action plans for successful implementation of MCS and for strengthening the national agencies responsible for MCS;

Recommend that member-countries undertake measures directed towards regional cooperation in ensuring successful implementation of MCS; and

Strongly recommend the formation and implementation of a regional MCS programme, employing a consultative and participatory approach, building upon institutionally derived data and the operational experiences of small-scale fishermen.

Adopted on Friday, 18th January 2008 in Chittagong, Bangladesh.

Participants Laud Regional Training Course on Code of Conduct for Responsible Fisheries

The rapid depletion of fish stocks is a major challenge for fisheries managers worldwide. Confronting this challenge, the FAO spearheaded a global agreement on the Code of Conduct for Responsible Fisheries (CCRF), which was adopted by member-nations in October 1995.

The Code was hailed as a landmark global initiative in fisheries. But even 13 years after its adoption, the Code has not been properly understood by many stakeholders, especially in developing countries. One reason is the complex phrasing and legalistic language of the Code.

To create awareness among junior and middle-level fisheries officers of member-countries of the BOBP-IGO (Bangladesh, India, Maldives and Sri Lanka), a two-week Regional Training Course on CCRF was organised by the BOBP-IGO from 16 to 27 June 2008 in Chennai and Mumbai, India.

In Mumbai, the Central Institute of Fisheries Education (CIFE), a deemed university, helped conduct the training. Four participants from each country took part.

The course was inaugurated in Chennai on 16 June 2008. Dr Dilip Kumar, Director and Vice-Chancellor, CIFE; Dr V Sampath, Ex-Advisor, Ministry of Earth Sciences; and Dr H Kasim, Principal Scientist and In-charge, Central Marine Fisheries Research Institute (Chennai base) took part as guest speakers.

Welcoming participants, Dr Y S Yadava, Director, BOBP-IGO, said the course was in pursuance of the IGO mandate of capacity-building in member-countries.

The Participants at the Regional Training Course on CCRF.

Dr Yadava described the Code as a comprehensive document meant to address fisheries issues in a practical manner. The BOBP-IGO had earlier organised national workshops on the CCRF for senior policy makers of member-countries. The present training course would help build a cadre of middle-level officers conversant with the Code and its Technical Guidelines. He hoped the course would bridge the prevailing knowledge gap on the Code in member-countries.

Dr V Sampath said that though the Code is a voluntary document, it has many references to international laws and conventions and is therefore binding on countries. The Code would facilitate interaction among participants who could learn from one another. He congratulated the BOBP-IGO for organizing the course.

Dr Kasim said the Code provides clear guidelines for fishers on what is expected from them, and for administrators on how fishers can be made a part of the process of fisheries governance. Citing examples from the field, he said the Code's principles are hardly implemented. Whenever a fisher is asked to curb effort, he agrees, but looks over the shoulder at his neighbour who isn't doing so!

Just as panchayats are now being empowered politically, village-level bodies should be empowered to enforce CCRF, Dr Kasim said. Fishers will then have a greater voice in decision-making. Dr Kasim hoped that in future, such courses would include more participants from member-countries and from other neighboring countries as well.

Dr Dilip Kumar, chief guest of the inaugural session, said that the course could help take the Code to the grassroots through middle-level and junior fisheries officials of member-countries. He said the Code is comprehensive, and every country can adapt the Code to its own needs.

The CIFE was happy to partner the BOBP-IGO in conducting the course. He hoped the partnership and the experience would lead to even better courses in future.

The pedagogical session of the course began with a lecture by Dr Yadava on the BOBP-IGO, its mandate, role, objectives and programmes. He discussed the transformation of the BOBP to an Inter-Governmental Organisation and its role in promoting sustainable fisheries in member-countries.

Dr Sampath then provided a 'historical overview' of various fisheries management approaches in the Bay of Bengal region. He discussed the evolution of fisheries management in the Bay and the transformation of focus from economic growth to sustainability.

Day 2 began with a lecture by Dr Yadava on the CCRF, its nature and scope. Describing the Code and its 12 Articles, Dr Yadava said the Code takes into account all aspects of fisheries. He cited examples of various activities in member-countries that in effect exemplify the Code. But it should be adapted better to the requirements of member-countries and involve all stakeholders.

Dr Sampath discussed the "International Plan of Action (IPOA) for reducing incidental catch of seabirds in longline fisheries and conservation of shark". He said that on the basis of IPOA, states were required to start implementing 'national plans' no later than 2001. He urged BOBP-IGO member-countries to start preparing national plans at the earliest.

Dr Yadava presented the "International Plan of Action on management of fishing capacity and to prevent, deter and eliminate Illegal, Unreported and Unregulated (IUU) Fishing". He said the first part of the IPOA called on countries and regional fisheries organizations to achieve efficient, equitable, and transparent management of fishing capacity worldwide by 2005. The second part – on IUU fishing – is a practical and action-oriented 'toolbox' of measures which states can use to act either directly or through regional fisheries organizations.

Mr Rajdeep Mukherjee (BOBP-IGO) discussed the Code's Technical Guidelines. He said 10 guidelines and supplements had been published so far by the FAO. They are meant to help formulation of an action plan to implement the Code. Mr Mukherjee said that in fisheries management, differentiating the actual cause of the problem from the apparent causes is a key.

Mr Rathin Roy (former BOBP staff) spoke on "Coming together to manage fisheries". He explained the importance of co-operative action by all stakeholders in implementing the Code, and urged that action should focus not merely on fisheries management but also on fisheries governance.

Ms Chandrika Sharma (International Collective in Support of Fishworkers) discussed the 'gender perspective' in taking the Code to the grassroots. She said that the earnings of fisherwomen go directly into family well-being, into food and education. Hence the inclusion of women in fisheries objectives is a must. She highlighted the poor working conditions at landing centres – particularly their sanitation and the facilities for crèches – and called for a determined effort to improve them.

Field visits

Field trips were organized on Day 3 of the course, beginning with a stakeholder meeting in Chinna Neelankarai, a small fishing village on the outskirts of Chennai, in Kancheepuram district.

The Assistant Director of Fisheries (Marine), of the district, coordinated the visit. Course participants visited the berthing places of FRP boats on the beach and talked to fishers about fishing areas, the condition of their craft and gear, the catch composition, etc. They then met 21 traditional fishermen from five neighboring villages at the village community hall.

Course participants asked fishers whether they knew about the Code and its provisions on fishing operations, safety at sea, the role of women in fisheries. How could the Code be implemented better?

Fisher representatives said some of them had read the Tamil translation of the Code and talked about it with others. Most of them accepted the Code's principles and complied with rules and regulations on matters like registration and licensing of boats. However, they were concerned about decline in resources, increase in the number of boats and use of small mesh sizes by other groups of fishers. Other points: Trawling is hurting their livelihoods. Vessel-shore communication facilities, essential for safety at sea, are poor. Women are active in fish marketing and dry fish making.

Responding to queries from course trainees, the fishers said that village panchayats help mitigate conflicts among mechanized and non-mechanized fishers. But the fishers expect the government to implement regulations better and to improve infrastructure such as fish landing centres. Fishers on their part have constructed artificial reefs to improve fish habitats; they expect the government to supplement their efforts. Course trainees thanked the fishers for their time and insights.

On the fourth day, trainees visited the fishing harbour at Puducherry, where the Deputy Director of Fisheries explained basic facilities set up there (such as berthing for 110 mechanized boats and 110 motorized boats). The trainees then visited another fishing village, Solai Thandavan Kuppam, where they were welcomed with shawls by the fisher community.

The fisher community expressed serious concern about purse-seining and trawling in their village, major causes for resource depletion. They

Participants interacting with the fisher community in Chinna Neelankarai, Chennai.

said purse-seining should be banned in Puduchery, as had been done in Tamil Nadu.

The fishers were aware of the CCRF and its guidelines. They followed rules and regulations on boat registration and display of the registration number. They said they adhered to safety requirements on boat maintenance, ascertaining weather conditions before fishing trips, carrying enough drinking water, food, extra fuel, tools, rope, anchor, torch light, sails, etc.

The fishers said the president of their village committee was authorized to deal with conflicts. They felt that rules and regulations ought to be adapted to local conditions. They wanted better communication facilities and life saving equipment. They also wanted short-term training courses on engine maintenance and sea safety.

Course moves to CIFE, Mumbai

The CIFE part of the course began on 20 June in Mumbai. Dr Latha Shenoy, senior scientist and course co-coordinator, welcomed the participants and introduced faculty and participants to one another.

Director Dilip Kumar said that while fisheries is a state subject in India, the central government has set up a strong R & D infrastructure, through eight institutions covering marine and inland fisheries and aquaculture. They function under the aegis of the Indian Council of Agriculture Research. CIFE is the only institute that encompasses all three areas.

Dr Kumar said that better links were needed between R & D and the field. The fruits of research ought to reach fishers more effectively, and fisher problems addressed better by research interventions. He hoped that the course trainees would interact with CIFE faculty on all fisheries matters.

Dr Yadava said that promoting the CCRF was a major capacity-building activity of the BOBP-IGO. About the training course, he said its three modules related to a historical overview of fisheries management; lectures on various aspects of the Code plus field visits and interaction with fishers; and group discussion and course evaluation.

Dr Dilip Kumar began the pedagogy session of the course with a presentation on the CIFE. He described the institution's achievements and its vision of becoming a global player for specialized HRD in fisheries. Discussing "Co-management of marine fisheries resources" Dr P S Ananthan described the different co-management regimes, with examples from BOBP-IGO member-countries as well as Japan.

Dr R S Biradar explained "Cost effective approaches for collection, compilation and dissemination of fisheries information". He said that while techno-economic and biological data on fisheries is essential, the nature of fisheries resources makes data collection through a census difficult. He discussed the scope and methodology of sampling processes to collect data, and stressed the importance of training in reliable fishery statistics.

In his lecture on "Integration of fisheries into coastal area management", Dr C S Purshothaman said that coastal zone management includes conflict management among stakeholders. Stakeholder consultations are therefore essential. He referred to the Indian Supreme Court's intervention on coastal aquaculture and the success of integrated coastal zone management practices in Kung Krabaen Bay, eastern Thailand.

Dr Latha Shenoy discussed adaptation of the CCRF to the grassroots**.** She said that since the Code is voluntary, it requires participation by all stakeholders. Since it is global, it has to be modified for adaptation to local conditions. She discussed the relative merits of different ways to disseminate the Code.

On 21 June 2008, course trainees met 30 members of the Versova Fisheries Co-operative Society at Versova fishing village, which is located close to CIFE on a creek. More than 380 mechanized vessels (ranging from 5m to 15.5 m) operate from the village, which has four fisheries cooperative societies.

Members of the Cooperative complained about discharge of untreated city sewage into the sea and destruction of mangroves for development. They said they follow government regulations on matters like vessel registration, mesh size and fishing bans; but such regulations are often inappropriate and should be modified.

About controlling fishing effort, the members said the government should follow the rule 'one fisher one boat'; often it grants licenses to rich boat owners who already have a

boat. The members described lack of alternative livelihoods as a major problem. Better education and training would give them more options and reduce pressure on resources.

Group discussion

Group discussion followed the field visit, with the course trainees divided into four groups. Each group included a member from each country. Topics identified for group discussions:

- Taking CCRF to the grassroots;
- Role of stakeholders and modalities/ mechanisms of their participation in implementation of the Code;
- Alignment of policies and programmes to meet the requirements of implementation of CCRF;
- Adaptation of the CCRF to meet the local requirement.

The groups presented their findings during an interactive session on the morning of 23 June in which CIFE faculty participated. They also discussed policy issues.

At the concluding session, Dr Dilip Kumar hoped the course would benefit participants and their countries in implementing the Code at the grassroots level. He urged participants to put their learning to good use and promote sustainable fisheries. Dr Latha Shenoy thanked the BOBP-IGO for choosing CIFE as partner and said the course was an enriching experience. The trainees returned to Chennai on 23 June 2008.

Final session of the course in Chennai, 24 June 2008

The session began with the course trainees sharing their experiences of the field visits and course work at Chinna Neelankarai, Puducherry and Mumbai. They said the field visits gave them a better understanding of ground realities and of the views and roles of stakeholders in resource management.

A second group discussion ensued, with the groups this time arranged by country. They assessed

Participants visiting a fish landing site in Tamil Nadu, India.

implementation of the Code in their respective countries and how it could be adapted to meet local requirements. The four focus areas were the same as in the earlier group discussion.

On the basis of discussions carried out for almost two full days, a representative from each country made a presentation on 27 June.

Major observations are summarized below:

- A wide knowledge gap exists among stakeholders about responsible fishing practices and the Code;
- Participation of other stakeholders in fisheries management is limited but gradually increasing;
- There is a communication gap between the government including R & D institutes and other stakeholders;
- The Code is more acceptable and easier to understand when translated into local languages or presented through posters; and
- Fishers are concerned about resource depletion and are eager to play a responsible role.

Some important suggestions that emerged from the group discussions:

- For effective dissemination of the Code, education and training are important tools.
- Mass media like TV and radio can be significant channels of dissemination. Since many fishers are familiar with mobile phones, Short Message Service (SMS) could be used as a delivery tool. Messages could also be disseminated through prayer services in places of worship.
- Alternative income-generation activities and vocational skills should be popularized among fishers.

Concluding ceremony

The concluding ceremony of the training course was held in the library hall of the BOBP-IGO Secretariat on 27 June 2008. Certificates were presented to participants.

Dr Yadava said the regional training course had been an enriching experience for the BOBP-IGO. The group discussions, presentations, and course evaluation by the participants would help the BOBP-IGO fine-tune future courses. They would also help the IGO's strategies for member-countries to adapt and implement the Code.

Dr Yadava asked the trainees to cultivate relationships formed during the course. They should continue to communicate with each other and with the BOBP-IGO, so that a fisheries network was established in the region. The trainees thanked the BOBP-IGO and CIFE, Mumbai, for the excellent conduct of the course and the warm hospitality. They assured the IGO that they would use the knowledge acquired during the course to promote and strengthen the CCRF in their respective countries.

Regional Consultation on Management Plan for Shark Fisheries

The Regional Consultation on Preparation of a Management Plan for Shark Fisheries, held in Beruwala, Sri Lanka, on 24-26 March 2008, was an outcome of a suggestion made at the second meeting of the BOBP-IGO's Technical Advisory Committee (Chennai, February 2007) and endorsed at the third meeting of the Governing Council (Malé, Maldives, May 2007).

Fifteen delegates from India, Maldives and Sri Lanka took part in the consultation. Mr G Piyasena, Secretary, Ministry of Fisheries and Aquatic Resources (MoFAR), Sri Lanka, chaired the consultation.

Welcoming the delegates, Dr Yugraj Singh Yadava, Director of the BOBP-IGO, discussed the critical state of the global fishery. The FAO's report for 2006 showed that global capture fish production had reached a plateau, with most fish stocks being highly exploited. The Bay of Bengal (BoB) apparently is still the least exploited, but this phenomenon may reflect insufficient reporting rather than untapped potential. It is disturbing that small-sized fishes are being exploited more and more. Result: lower catch per unit effort and low fisher incomes.

Dr Yadava said that sharks have been an age-old fishery in India, Maldives as well as Sri Lanka, and shark landings are a source of livelihoods for many. Every part of shark has an economic value. However, shark stocks are now under threat; many species of sharks figure in the IUCN Red List. It is essential that negative impacts on shark populations are addressed urgently and a management plan formulated. He hoped that the present consultation would debate the subject and enable a road map for management plan on shark fisheries.

Mr Indra Ranasinghe, Director General (Development), MoFAR, Sri Lanka, said that reliable information was needed for a management plan, which in turn was needed to create awareness and education among stakeholders. He urged co-operation among member-countries in management, also periodic review and revision of management effort.

Mr Piyasena said that for centuries, artisanal fishers of Sri Lanka had harvested sharks as a non-targeted fishery. In recent decades, modern technology and access to distant markets had increased shark fishing effort and landings. The current view was that directed shark catches and certain multi-species fisheries in which shark catches constituted a significant by-catch should be better managed.

Mr Piyasena pointed out that member-countries of the BOBP-IGO, including Sri Lanka, were yet to develop a national plan of action on the basis of the International Plan of Action for Conservation and Management of Sharks (IPOA-Sharks) formulated by the FAO within the framework of the Code of Conduct for Responsible Fisheries (CCRF). He hoped the present consultation, a timely initiative, would lead eventually to national plans for shark management.

Technical Session

Dr E Vivekanandan, Principal Scientist, Central Marine Fisheries Research Institute, Kochi, India, made the first presentation on the "Status of Shark Fishery in Indian Exclusive Economic Zone (EEZ)". He said that of the 47 species of sharks that occur in the Indian seas, six species constitute a major fishery. Some 15-20 000 fishers engage exclusively in shark fishing. Average annual shark landings (1985-2006) amounted to 36 021 tonnes.

Participants at the Regional Consultation.

Gantt chart for proposed activities to support preparation of a management plan for shark fisheries.

Sl. No.	Management aspects	2008					
		May	June	July	August	September	October
1.0	Preparation of comprehensive status paper on shark fisheries	◄	———	———	►		
2.0	Stakeholder consultation		◄	———	———	►	
3.0	Setting up the data collection mechanism			◄	———	►	
4.0	Setting up of National Task Force	◄	———	►			
5.0	Setting up of a 'Shark Portal/ Website'				◄	———	——— ►
6.0	Preparation of 'awareness material'				◄	———	——— ►
7.0	Indigenous traditional knowledge – documentation of a case study		◄	———	———	———	——— ►

He said that in the last few years, the fishery was shifting oceanward from the coast. Trawls, gillnets and hooks and lines accounted for about 95 percent of the shark landings. Potential yield of sharks in the continental shelf of the Indian EEZ had been estimated at 45 064 tonnes, and that of pelagic sharks beyond the continental shelf at 26 200 tonnes.

Dr Vivekanadan said that slow growth and late maturation – typical characteristics of the shark species – made them highly vulnerable to overfishing. During 1998-2005, an annual average of 853.7 tonnes of shark products valued at US $ 5.9 million were exported. Four species of sharks, *Carcharhinus hemiodon*, *Glyphis gangeticus*, *G. glyphis* and *Rhiniodon typus* are protected by law. Measures were needed to sustain the stock of sharks without affecting the livelihoods of fishers.

Ms Mariyam Saleem, Reef Ecologist, Ministry of Fisheries, Agriculture and Marine Resources (MoFAMR), Government of Maldives, said that the shark fishery in her country grew after exports began in the late 1970s, fuelling demand for high-valued shark fins, salted shark meat and shark liver oil from gulper sharks. Three types of shark fishery are carried out in the Maldives – the reef shark fishery, oceanic shark fishery and the deep water gulper shark fishery. Stocks, particularly of reef and oceanic shark fishery, have been depleted by heavy exploitation. Recovery of the stocks is not easy for species with the biological attributes of sharks.

The Regional Consultation in progress.

Ms Saleem said that several conflicts had arisen over the years between shark fishermen on the one hand, and the tourism sector and the tuna fishing industry on the other. A 10-year moratorium had been imposed in 1998 on shark fishing inside and within 12 miles from the rim of seven atolls in the Maldives. This was meant to address the conflict between shark fishermen and the tourism sector. Additionally, to address conflicts between the shark and tuna fishermen, shark fishing had been banned from two locations in the south of Maldives, which are considered good fishing areas by tuna fishermen.

Ms Saleem said a 2003 survey showed that shark fishing was carried out in 22 islands (the figure has since fallen to 11) by 132 fishing vessels and 528 fishermen in 2003. Annual shark exports have fallen in value from MRf 15 to 20 million in the 1990s to below MRf 10 million now, said Ms Saleem.

Ms Saleem said that on the basis of diminishing stocks and FAO's call for shark protection, experts have recommended a ban on export of all products from reef and oceanic sharks in the Maldives, after a grace period of two years. She highlighted measures to mitigate the impact of such a ban on the livelihoods of shark fishermen in the Maldives.

Dr Champa Amarasiri, Director, Research and Development, National Aquatic Resources Research and Development Agency (NARA), Sri Lanka, made a presentation on shark fisheries in Sri Lanka's EEZ. She said that during the past two decades fishing activities had got extended to the edge of the 200 mile EEZ and even beyond.

Shark capture in Sri Lanka is about four or five decades old. A majority of the shark catch is a by-catch from tuna long line and gill net boats. Sharks are targeted directly by long line and deep water fisheries, but this effort is rather insignificant, Dr Amarasiri said.

Shark catches have been decreasing rapidly during the past 10 years because of restrictions in fishing areas, also because more and more fishers are moving towards tuna longline fisheries. Catches comprise mainly silky sharks and another 12 species.

Dr Amarasiri said that the estimated total catch of sharks was 2 101 tonnes in 2006 and the total number of people engaged in this fishery were around 15 000. There is no management plan for shark fisheries in Sri Lanka. However, the Fisheries Act and other environmentally related legislations of Sri Lanka have provisions to conserve and manage shark fisheries in the country.

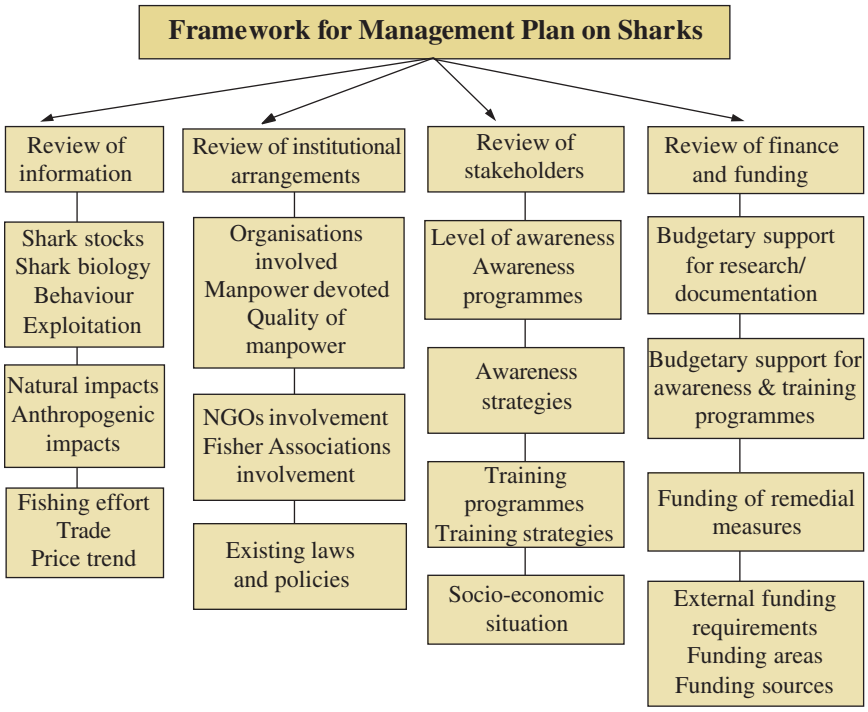
Following the country presentations, Dr Y S Yadava discussed an action plan to formulate a management plan for shark fisheries. He referred to the peculiar characteristics of sharks – they are distributed in coastal waters and the deep seas; some stocks are migratory and shared among the three coastal states; the stocks are exploited by both targeted and non-targeted fishery; knowledge on their taxonomy, biology, breeding and distribution is poor. A sound monitoring and control mechanism for shark in a given fishing area is therefore difficult.

Dr Yadava discussed the proposed 'Guidelines for Preparation of Management Plan for Shark Fisheries' that had been drawn up by the Secretariat in accordance with the CCRF and the IPOA-Sharks. The Guidelines include a "Framework for a Management Plan on Sharks," which has four main heads relating to information, institutional arrangements, stakeholders, and finance and funding.

On the basis of the framework for a management plan, an indicative discussion map with six log-tables was given to the delegates. The log tables were headed as follows:

- ***Log 1:*** Status of shark fishery in the BoB (comprising knowledge of fish stocks; of breeding behavior; of breeding grounds; of fishery and fishing effort; etc.)
- ***Log 2:*** Natural and anthropogenic impacts (relating to existing quantitative and qualitative natural and anthropogenic impacts; possible threats; suggested remedial measures and agencies that could carry out these measures; and anticipated cost of these measures).
- ***Log 3:*** Socio-economic analysis – institutional arrangements. (relating to R & D institutions and their spheres of coverage; ongoing schemes; budgetary allocation; manpower involved in R & D; NGOs active in shark fisheries management programmes; fisher associations; existing legislative and policy support.)
- ***Log 4:*** Socio-economic analysis – awareness creation and training (comprising methods used and materials developed; extent and scope of awareness drive; feedback on awareness drive; possible future approaches; budgetary allocation on awareness drive; the role of NGOs; quality of extension and field staff; training programmes organized.)
- ***Log 5:*** Socio-economic analysis – livelihoods and trade (comprising such points as the socio-economic status of shark fishers; the structure of the shark fisheries market, its volume and scope, price trends, ways to reduce fishing, alternative livelihood options, etc.)
- ***Log 6:*** Economic analysis – funding requirements and provisions (relating to possible additional funding needed to carry out activities; external funding received so far; utilization rate of external funding; areas where additional funding could be used.)

Delegates discussed issues for their country among themselves and



pooled their knowledge to analyze the shark fishery in terms of the information sought in the log tables. They identified gaps in information and the future course of action.

Dr Vivekanandan presented the log tables for India. He emphasized the need for more taxonomic work on the sharks; revalidation of the shark stocks with additional scientific inputs; data on species-wise effort; biological investigations covering a larger number of shark species, especially those inhabiting the deep seas; natural and anthropogenic impacts on shark fisheries.

He said that India has 5-6 fisher groups that carry out targeted fishing for sharks. Awareness drives could be first attempted for such focused groups with the help of dedicated NGOs working in the area. A task force on the pattern of 'Project Tiger' may be considered to manage shark fisheries. Indigenous traditional knowledge could be documented.

Presenting the log tables for Sri Lanka, Dr Amarasiri referred to the dearth of data on oceanic sharks. As for reef-associated sharks and gulper sharks, systematic knowledge on biology, breeding and related attributes is lacking. There is no significant targeted fishing for sharks in Sri Lanka, but non-targeted fishing, especially that associated with tuna long lining and gill netting, can be a problem for shark stocks. There are no on-going research programmes on shark fisheries *per se*, but they are covered in a limited manner under investigations on 'larger pelagics' carried out by NARA.

Mr Mohamed Shainee, Assistant Director-General, MoFAMR, described the shark fishery in the Maldives as unique. At present, only 11 islands in the country engage in it. Information on shark fishing is limited and species-wise data is lacking. Production figures are computed from exports – which label sharks as a single group. Maldives had prepared a status

paper on shark fisheries in 2003, which was updated in 2006. But further study is required on trade aspects of shark fisheries. Awareness is important, so is traditional management knowledge. A website on shark fisheries could be useful for information dissemination.

Constitution of Technical Committee

The Regional Consultation agreed to constitute a Technical Committee in each country to initiate action on the requirements identified at the Consultation.

Proposed Action Plan

On the basis of the deliberations, the Consultation agreed on the following set of activities for implementation. Support would be provided by the BOBP-IGO as per an agreed action plan.

(i) A comprehensive status paper on shark fisheries resources, including a research bibliography.

(ii) A stakeholder consultation on management of shark fisheries in each of the three countries. The Consultation will also discuss and identify alternative livelihoods.

(iii) Setting up of a data collection, collation and compilation mechanism on shark fisheries, especially species-wise data, which would aid in the successful implementation of the management plan.

(iv) Setting up of a 'National Task Force' on shark fisheries management.

(v) Setting up of a shark portal or website for the Bay of Bengal region.

(vi) Documentation of indigenous traditional knowledge for management of shark fisheries.

(vi) Preparation of awareness materials on conservation and sustainable exploitation of shark fisheries.

To carry out these activities in a systematic time frame, a Gantt chart covering the period May - October, 2008 was agreed to by the Regional Consultation (see page 48). It was also decided that the next meeting would be held in the Maldives during the last quarter of 2008, subject to the approval of the Government of Maldives.

In conclusion, Mr Piyasena said the Consultation had enabled a good opportunity to initiate preparation of a management plan for sharks. He thanked the BOBP-IGO Secretariat and the delegates, also Maldives for agreeing to host the next meeting.

A Regional Consultation on Safety at Sea for Small-Scale Fisheries

A Regional Consultation will be held in Chennai in July, 2008 to review the progress of work under the FAO Global Project on "Safety at Sea for Small-scale Fisheries". The Regional Consultation will report on the progress of project activities in south Asia, share information on global initiatives, discuss the status of safety at sea in BOBP-IGO member-countries and present draft technical safety guidelines for fishing vessels under 24 m in length.

A Bi-national (India and Sri Lanka) Workshop on Safety at Sea will be organized for India and Sri Lanka along with the Regional Consultation in Chennai, India. Participants will include fisheries officials, boatbuilders, representatives of national agencies concerned with fisheries training and education and with fishing vessel regulations, plus representatives from the FAO, the IMO, NIOSH (the National Institute for Occupational Safety and Health, USA) and the BOBP-IGO.

The idea of the IMO Project is to introduce sound construction guidelines for small fishing vessels in India and Sri Lanka, following the December 2004 tsunami which sparked a boom in construction of fishing vessels – many of which were of low standard and built hurriedly in makeshift boatyards by people with little experience in FRP boat construction. The workshop is being organised by the BOBP-IGO in association with FAO and IMO.

APFIC Regional Consultative Forum Meeting (6-9 August 2008)

The Asia Pacific Fishery Commission (APFIC) will organize the second Regional Consultative Forum Meeting (RCFM) from 6 to 10 August 2008 in Manado, North Sulawesi, Indonesia. The RCFM will provide a forum to synthesize, analyze and agree on actions needed to "Adapt to emerging challenges – promoting effective arrangements for managing fisheries and aquaculture in the Asia-Pacific Region". More specifically, the RCFM will review policy recommendations and action plans to address two key issues identified by APFIC: (a) certification of fisheries and aquaculture, and (b) fisheries overcapacity and IUU fishing. The RCFM will also explore two new key areas for future work – the ecosystem approach to the implementation of the Code of Conduct for Responsible Fisheries (CCRF) and market linkages, trade and finance – reducing vulnerability and strengthening livelihoods.

Thirtieth Session of the Asia-Pacific Fishery Commission (11-13 August, 2009)

The Thirtieth Session of APFIC will be held in Manado, Indonesia from 11-13 August 2008. The session is being convened under the provision of Article XIV of the FAO constitution and will discuss a range of topics such as (i) status and potential of fisheries and aquaculture in Asia-Pacific; (ii) APFIC's strategy and promotion of regional initiatives for more effective fisheries management; (iii) regional themes such as certification in fisheries and aquaculture, capacity management, combating IUU fishing, emerging issues in fisheries, and implementation of the CCRF.

National Workshop on Monitoring, Control and Surveillance

A National Workshop on MCS will be held in Chennai on 1-2 December, 2008. The workshop will be organized jointly by the Government of India and the BOBP-IGO. It is a sequel to a Regional Workshop on MCS held in Chittagong, Bangladesh, in January 2008, which recommended that member-countries formulate action plans for successful implementation of MCS and for strengthening national agencies responsible for MCS. Accordingly, the workshop will review and analyse marine fisheries management programmes in India as well as procedures for licensing and registration of fishing vessels. It will assess the capacity for MCS, identify institutional requirements and prepare a plan of action.

Expert Consultation on "Best Practices for Safety at Sea in Fisheries"

An Expert Consultation will be held at the FAO headquarters in Rome from 10 to 13 December, 2008. It is being organized by the FAO in co-operation with the BOBP-IGO. Participants will be fishers, experts on fishing vessel safety, and resource persons from member-countries of the FAO. The consultation is expected to produce a draft outline for guidelines on best practices for safety at sea in fisheries, plus recommendations on the special needs of developing countries. The guidelines have to be approved by the FAO Committee on Fisheries at its next meeting in early 2009. The draft outline will also identify the next steps after the Consultation.

Calendar on Safety at Sea

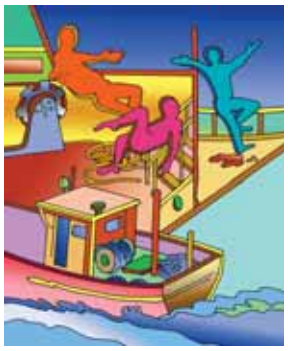
What are fishers up against when they venture out to sea? They dream of a jackpot harvest but may experience a nightmare – injury, permanent disability, physical, mental and emotional trauma, death. But they can prevent or minimize disaster by following the right precautions.

BOBP-IGO's 2008 calendar offers a slew of straight-forward messages for fishers everywhere. Plan your fishing trip. Carry your first-aid kit. Use navigation equipment and spares. Learn to signal that you are in trouble. Use protective gear. Conserve fresh water. Keep a lifebuoy. Make sure of course that the fishing boat is safe, has been built right. One useful non-fisheries tip, particularly aimed at migratory fishing communities: Use condoms!

The charm of the calendar lies in the illustrations: suggestive sketches rather than photographs, which show outlines of face and figure, and a breezy zig-zag line to indicate a wave. Says BOBP-IGO artist S Jayaraj, who received queries from even professional artists about his technique: "I did a line drawing of every situation, then used Photoshop to fill in with colour – as many as 256 colours of different tones and gradations."

"Useful calendar and very charming" was one reaction to the calendar – it is being distributed to fishers of the region at workshops and community meetings.

Research preceded the calendar, so did trial-and-error with various sketch options. Ask for the calendar if you don't have it – we have a few copies left.



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.

Edited and published by Y S Yadava for the Bay of Bengal Programme Inter-Governmental Organisation, 91 St. Mary's Road, Abhiramapuram, Chennai 600 018, India.
Tel: 91-44-24936294, 24936188; Fax: 91-44-24936102; E-mail: info@bobpigo.org Website: www.bobpigo.org
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