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Reforming fisheries Challenges for the millennium

Marine fish stocks worldwide are dwindling, catches are falling, so are the incomes of small-scale fishermen. Fisheries and aquaculture cry out for reform. This issue presents ideas, plans and recommendations for the future. Many of them are not new. What's urgently needed is action by policy-makers.



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Reforming Fisheries

Challenges for the millennium

Fish stocks are depleting and degrading because of over-exploitation, but fishers, entrepreneurs and policy-makers seem indifferent to the alarm bells on resource exhaustion. Bay of Bengal News looks at the crisis and at reforms needed in fisheries and aquaculture to resolve it – as analysed at several expert fora.

The world will run out of seafood by 2048 if marine fish stocks continue to decline at current rates, a group of 14 researchers have warned in the journal *Science*.

Overfishing, pollution and other environmental sins have made fish stocks round the world plunge. In fact, marine catches have been declining since the early 1990s. And alarmingly, smaller sizes dominate the catches of most of the species, while higher-value species have given way to low-value/ trash fish. With the market for seafood expanding, the pressure on resources is getting ever more severe. The collapse of commercial

fisheries could devastate the world economy — the fishing industry generates \$80 billion a year, more than 200 million people depend directly or indirectly on fishing, seafood is the main source of sea protein for a billion people worldwide.

The study by the 14 researchers is based on nearly three dozen controlled experiments and a critical analysis of the FAO's worldwide catch data from 1950. Ecosystem records going back a thousand years were also researched — including sediment cores and archival data. In 12 marine ecosystems surveyed, the researchers found that a decline in biodiversity of 50 percent or more

cut the number of viable fisheries by 33 percent, reduced nursery habitats by 69 percent, cut the ocean's capacity to filter and detoxify contaminants by 63 percent.

Fortunately, the findings have a positive side too. In nearly 50 areas where restrictions had been imposed on overfishing, the range of species in the water increased on an average by 23 percent within five years. This means sound management can halt the decline of fish stocks worldwide. The study concludes: "It's not too late to turn this around. It can be done, but it has to be done soon."

Let's look at the Bay of Bengal region. India's marine fish

production during the last 15 years (1990-91 to 2004-05) has been fluctuating between 2.3 and 2.99 million tonnes. The Maximum Sustainable Yield (MSY) revalidated in 2000 is 3.921 million tonnes, of which 2.280 million tonnes is available in the coastal waters and the remaining in the offshore areas of the EEZ. It is believed that coastal waters are already overexploited by about 0.3 - 0.6 million tonnes per annum. In offshore waters, there is additional catch potential of about 1.0 million tonnes (but details of species abundance are less known for offshore than for coastal areas; some definite information is available only for tunas and tuna-like species.)

Compound growth rate in the marine sector fell in the 1990s to 2.19 percent from the 3.99 percent achieved in the 1980s. Qualitative aspects of marine landings during the last one decade are even more disturbing. Some demersal varieties like shrimp have declined in stocks and fallen in average length and weight. The prized shrimping grounds of the northeast coast (Sandhead area) are almost barren today. The average sizes of ribbon fish and pomfrets are almost one-third of what they were in the last decade. If the same trend continues, the stocks might be wiped out in another decade.

What has led to this situation? Let's take India's mechanized fishing fleet of trawlers, purse-seiners, gillnetters and dol-netters. It has grown almost four times in 25 years – from 14 854 in 1980 (CMFRI census) to 58 911 in 2005 (CMFRI census). The traditional fishing fleet (including motorized boats) increased more moderately, by 1.4 times — from 134 741 in 1980 to 179 861 in 2005. During the same period, marine fish production increased only from 1.555 million tonnes (1980-81) to 2.960 million tonnes (2004-05). The 400 percent increase in the mechanized fishing fleet seems to be the main cause of overexploitation of marine resources.

In Sri Lanka, the estimated annual marine fish yield potential is said to be 250 000 metric tonnes (according to a 1978-80 survey conducted by RV Dr Fridtjof Nansen). Take actual marine fish production for the last 6-7 years. The potential yield seems to have been exceeded by about 15 to 45 thousand metric tonnes. What about the catch effort? The total fishing craft in Sri Lanka rose from 28 585 in 1981 (12 870 mechanised and motorized boats, 15 715 traditional boats) to 31 619 in 2004 (16 359 mechanized and motorized boats, 15 260 traditional boats). On the whole this increase does not seem to be alarming. But within the mechanized category, the

FRP boats doubled in number from 5 738 in 1981 to 11 559 in 2004. These are day boats with outboard motors fishing in coastal waters. They are largely responsible for the resource overexploitation.

The examples of India and Sri Lanka clearly illustrate the point that unregulated access and unbridled mechanization and motorisation of traditional craft have led to overexploitation of resources. Developments in gear technology have further accelerated the problem.

What is the solution? ***Reduce fishing capacity*** – that should be the No.1 task of countries with an excessive fishing fleet. Even where stock assessments have not been carried out or where resource information is outdated, the “precautionary principle” should rule and the fishing fleet should be cut. Simultaneously, ***develop management plans for all commercial fisheries*** so that harvests are scientifically regulated. This may be politically sensitive issue, but sooner or later the reality has to be faced. Better to do it sooner and save fishery resources from collapse.

Tackle the issue of access to fisheries. Is it okay for anyone and everyone to fish with any craft? It's no longer so. ***Co-management*** – joint management by government



and local communities – is a good way to address this issue. Governments at both national and provincial levels should give high priority to co-management plans and action. So should NGOs and fishery associations. **Ensure better monitoring, control and regulation of the fishing fleet and fishing gear, implement closed areas and closed seasons, protect nursery areas, create fish refugia** – these would be other important measures.

Post-harvest losses, especially in tropical fisheries, mean far fewer fish for human consumption. No precise quantitative figures are available. But the **quality** of fish at landing centers leaves much to be desired. Discards of fish is another serious problem. Example: the industrial finfish and shrimp trawl fisheries of Bangladesh, which throw away sizeable quantities of low value fish. **Conduct pilot-scale demonstrations on best practices and impart training to fishers** to reduce post-harvest losses and discards.

The Code of Conduct for Responsible Fisheries (or the Code) was acclaimed with hallelujas when the FAO Conference adopted it in October 1995. It was regarded as a panacea for all ills that plagued global fisheries. Subsequently, the FAO developed several guidelines and plans of action to facilitate implementation of the Code. However, 11 years later, the Code is still to reach, let alone influence, grassroots fishers.

Mr Ichiro Nomura, Assistant Director General, FAO Fisheries Department told *Bay of Bengal News* in an interview (pages 5 - 6) that communication on the Code is very poor. **Ensure that the Code is well-known, raise awareness about it, improve implementation** – this is something the FAO, national and local governments and other agencies should seriously and urgently address.

A holistic approach toward reforms in fisheries would also require sound national policies: **Remove harmful subsidies, improve hygiene and**



sanitation and safeguard consumer interests, ensure fishers a safe and healthy working environment, reduce operational expenses, bring down tariff and non-tariff barriers, particularly those that impact on the livelihoods of small-scale fishers, promote regional and sub-regional cooperation for sustainable development and management of fisheries and aquaculture.

Reforming fisheries was the theme of a regional workshop organised by the Asia-Pacific Fisheries Commission (APFIC) in August 2006 in Kuala Lumpur, Malaysia. APFIC's discussions and recommendations have been covered in some detail in this issue of *Bay of Bengal News*. (pages 25 - 32) The workshop urged upon member-countries a slew of interventions – reduce the capacity of trawlers and push-netters; improve gear selectivity; introduce more effective rights based management and co-management; protect juvenile nursery areas through refugia/ closed areas and seasonal closure; improve utilization of low-value fish through post-harvest interventions. Ensure better onboard handling, etc.

If one were to name a single challenge in fisheries today, it's about how to reverse stock depletion and check resource degradation. The two trends will become irreversible unless addressed urgently and within fixed time frames. The problem is serious but not insurmountable. Interventions must be multi-sectoral, not restricted to fisheries. Some problems have been caused by players outside fisheries. Industrial pollution is an example. Solutions must be discussed with these players.

Our ancestors passed on to us a legacy of healthy seas teeming with fish. That's how we in turn should pass it on to our descendants – lest they accuse us, quite rightly, of selfish and irresponsible dissipation.

– Y S Yadava

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

Reforming Fisheries:

An Interview with Mr Ichiro Nomura

The FAO's Assistant Director-General for Fisheries, Mr Ichiro Nomura, discussed a wide range of issues in an interview with Dr Y S Yadava of the BOBP-IGO on 17 August 2006 in Kuala Lumpur. The interview took place during a meeting of the Asia-Pacific Fisheries Commission's Regional Consultative Forum on "Reforming Fisheries".

Y S Yadava: Marine fish stocks have got depleted in most of the oceans. Over the years, marine fish production has stagnated and resources are under stress. On the other hand, demand for marine fish is expanding, leading to increased effort. How does the FAO view this development?

Ichiro Nomura: We are very concerned with developments in marine fisheries. Most of the fish stocks are overexploited and there are clear evidences of fishing down the food-chain. The reality has to be accepted. We must stem the trend. Fishery resources are not limitless. We can develop new markets of course, but the world can't keep enhancing effort to increase fish production from our oceans. Many fishery resources must recover to Maximum Sustainable Yield levels by 2015 – as resolved in 2002 by the World Summit on Sustainable Development held in Johannesburg.

Depleting stocks reflect poor fisheries management. I concede that the 2015 deadline may be unrealistic, but this should not be a pretext for inaction. It was a political decision and we must act on it. The FAO's Fisheries Department is striving for fuller implementation of the Code of Conduct for Responsible Fisheries to improve the situation in marine fisheries.

Yadava: In marine fisheries, the small-scale sector is very significant player. But this sector is under threat on many fronts. Degradation of resources. Open access which means over-exploitation. Inter-sectoral

conflicts. It is large coastal communities, often the poorest of the poor, who are active in small-scale fisheries (SSF). They need more support and larger interventions than before – from governments, from donors, from the FAO. In this context, what are your views on sustainable development of SSF and the role of the FAO?

Nomura: It is fair to say that the international fishing community and the FAO governing body did not pay enough attention to SSF in the past. The issues were not perhaps addressed quite adequately. This is also a reflection of our agenda setting practice. But from 2003 onwards, SSF has been allotted a separate agenda in the Committee on Fisheries (COFI). It has got the recognition it merits, and we will continue to recognise its importance.

The FAO has served as a catalyst. But an important issue is how SSF can be tackled effectively at the national and local levels. FAO cannot be the main actor in this exercise. The main actors

are the fishers and the national governments. COFI sessions can address the issues in the most appropriate way. I will try to see that SSF becomes a standard agenda item in all COFI sessions.

But SSF should not be addressed purely as a fisheries issue. That won't be a good strategy. Since SSF stakeholders are weak, they may lack political support. Their issues should be addressed in the larger



Mr Ichiro Nomura

Mr Ichiro Nomura, ADG (Fisheries), FAO, Rome.

Mr Nomura obtained a bachelor's degree in marine biology in 1974 from the University of Tokyo. He also has a master's in international law from the Fletcher School of Law and Diplomacy, Tufts University (1979) and a master's in public administration from the Kennedy School of Government, Harvard University (1980).

He started his career with the Fisheries Agency of Japan in 1974, and was attached to its International Affairs Division. During 1983-86, he served as the Fisheries Attaché in the Embassy of Japan based in Washington DC, dealing with matters such as bilateral fisheries issues, fish trade, import quotas, etc. For a short while, Mr Nomura moved out of fisheries and took part in the Uruguay Round of Negotiations (GATT) dealing with many agricultural commodities including rice.

Returning to the fisheries sector in 1992, he first served as Director for International Negotiations and later as the Director of the Resource Conservation Division and Director of Far Seas Fisheries in the Ministry of Agriculture, Forestry and Fisheries of the Government of Japan. In April 2000, Mr Nomura moved to Rome as ADG (Fisheries).

Mr Nomura spent his schooldays in Kobe and a larger part of his higher education and career in Tokyo.

developmental context. The COFI also believes in this.

Yadava: Do you think a sub-committee on SSF under the COFI can be useful in providing thrust or focus to the sustainable development of SSF?

Nomura: This question is often being mooted. But a standing sub-committee of COFI for SSF may not be easy to set up, institutionally and financially speaking. The two COFI Sub-committees on Fish Trade and on Aquaculture needed a lot of preparatory work and justification before they could be set up. A sub-committee on SSF would require even more justification. The FAO Governing Body should be convinced of the need. In my personal opinion it may not be a very wise strategy. If such a sub-committee comes into being, only countries with an active SSF will be interested, developed countries without an SSF may not be interested. Thus a sub-committee on SSF will unintentionally restrict their participation, this won't help the SSF.

A sub-committee may also be counterproductive to the larger strategy of helping the SSF. Issues concerning SSF should be addressed in the full COFI body in the light of the diversity and vastness of related matters, and if possible even in a much bigger forum where other developmental issues (such as health, education, etc) concerning SSF can also be discussed. I'm sure COFI will retain interest in SSF and address its issues and problems. Any worry that SSF will disappear from the COFI agenda is unfounded. The Secretariat of COFI is very supportive of SSF.

Yadava: SSF contributes substantially to fish production and exports. Can't it be argued that the trade aspect merits the involvement of those countries that do not have small-scale fisheries of their own?

Nomura: It sounds like a forced argument. Some developed countries may not care for SSF as much as you expect. They may not think it as an important business. The fisheries industry, however, may be more concerned. Seafood also faces competition from other sectors (livestock, poultry, etc). I completely

agree that the interests of SSF should be protected, and the FAO considers it a very important client. It is in fact our mission to help SSF and we are very attentive to their needs and causes.

Yadava: The Code of Conduct for Responsible Fisheries (CCRF) will be 11 years old in October 2006. The Code is voluntary in nature, but all member- states should ensure its effective implementation in the interest of sustainable fisheries and aquaculture development. It is the FAO that piloted the Code a decade ago and coordinates its implementation even today. Is the FAO satisfied with the implementation of the Code? What needs to be done to accelerate implementation at the grassroots level?

Nomura: We are not at all satisfied with the state of implementation of the CCRF. We don't mean that it is not being implemented at all, but the implementation is far from satisfactory. The Secretariat feels quite frustrated and is struggling hard on the subject of assisting the member- states. The FAO can only play a catalytic role, strengthen training components and act as a forum for awareness raising. It also provides some direct assistance, for example through the FISHCODE Project.

In the last COFI meeting, some members suggested revision of the CCRF and its Technical Guidelines. I personally feel it is not necessary at the moment to make any revisions to the Code itself. The Code is comprehensive and well-drafted. There may be some need for revising Technical Guidelines.

Yadava: Is it correct to say that the present situation is due to lack of awareness of the Code and the need to implement it, among fishers and field-level functionaries of national governments?

Nomura: Communication on the Code seems to be very poor. People in SSF may not even know what CCRF is. On the contrary, they may be implementing many provisions of the Code unknowingly – provisions they do not know about and not

highlighted by their governments. There could also be some underreporting on the implementation of the CCRF, and the whole business might be better than what it seems in the reports we receive.

The FAO should help in better communication about CCRF with the help of local and national governments. Efforts in this regard need to be galvanized. At every meeting of COFI, the progress of CCRF implementation is a standard item on the agenda. But this may not be enough. More active implementation and discussion of it may be necessary. Which part of the Code needs prioritization for implementation should be decided at the country level.

Yadava: Do you think a ministerial meeting should be convened in conjunction with the 2009 Session of the COFI to take stock of the implementation of the CCRF?

Nomura: Yes, that's a good idea. We will take note of this suggestion.

Yadava: In conclusion, how do you think regional fishery bodies and inter-governmental organizations can support the FAO in sustainable development of marine fisheries?

Nomura: There are two types of Regional Fishery Bodies (RFBs) – those which are under the FAO umbrella and those that are not. There are also two types of RFBs in terms of different mandates. The first type of RFBs has a mandate from member-states to regulate and monitor fisheries within their jurisdictions. They can directly tackle and implement issues on behalf of their member- states. In other words, they have concrete tools to regulate and monitor. The FAO provides overall guidance to such RFBs if and when requested. It can further improve their coordinating role.

The other types of RFBs, which play an advisory role, are also assisting their member- states in better management of fisheries. The FAO has been convening biennial meetings of the RFBs at the margin of COFI, which have been appreciated by all. We can make these meetings more meaningful.

Increasing safety awareness, overcoming barriers to information

Mats Rosander-Liew, *Swedish Maritime Administration, Sea Safety Council*

Sweden and the Swedish Maritime Administration warmly welcome this seminar on safety at sea for smaller vessels and boats. Some of our experiences may help other countries in their efforts to improve safety at sea.

Different countries face different conditions – cultural, geographical, geological, hydrographical and not least of all economic. These can affect what we do to develop and strengthen safety at sea.

There are no simple or uniform solutions. Safety at sea can be

This article is based on the presentation made by Mr Mats Rosander-Liew at the Third International Conference on Fishing Industry Safety and Health, Mahabalipuram, 1-4 February 2006.

achieved only by strong commitment and collaboration, by joint effort towards a common goal. Better awareness about safety at sea is a very essential first step – it leads to better ability.

We think governments hold the prime responsibility for systems to improve safety at sea. But various interest groups and related industries must be involved as well, and should be encouraged to help out and do their bit. Because safety at sea is complex and challenging and requires the co-operation of all stakeholders.

International co-operation and action are vital. Sweden therefore plays an active role in IMO. It tries to strengthen international instruments and conventions like

SOLAS (Safety of Life at Sea). Internally, it does its best to strengthen disaster prevention, through a network of coastal radio stations and warning systems that cover mariners of all kinds including operators of small crafts.

Over the years, excellent co-operation has been developed between the authorities and workers' unions on safety issues and on matters like qualifications of workers, communication, floating devices, etc. There is always scope for improving such co-operation.

Swedish authorities believe that there are principally two attitudes toward safety at sea. Reactive – responding to events that have already occurred. Proactive – characterised by preventive actions

Sweden has 750 000 leisure craft. Three-fourths of all sea-rescue effort in Sweden relate to leisure craft.



on the basis of experience and knowledge, with the development process never allowed to stagnate.

We have achieved success through proactive use of hardware (coastal radio, VHF, SAR, etc.) and software (working with people to increase safety awareness and change attitudes towards safety at sea).

Over time we have reduced the number of serious accidents, including drowning, that occur with both large and small vessels. We have done so by effectively tapping many aids, tools and resources such as:

- Mass media: press, radio, TV and Internet
- Coastal radio stations
- Weather reporting
- Search and rescue organisations
- Waterproof communication equipment
- Floating devices development
- Emergency flares
- Supporting innovations

Safety efforts directed at men – who figure most frequently in accident statistics – are of little use. To change attitudes, we must be unconventional and work with wives and children. Women are more concerned about safety at sea than men. If we involve women more actively with safety at sea

effort, there would be fewer accidents. Sweden believes that preventive safety at sea activities must begin with the family.

Methods we have used to reach people with information to increase safety:

- Getting a strong organisation behind us, the Swedish Maritime Administration and the Sea Safety Council*
- Organising campaigns in pre-schools and schools
- Preparing brochures for children and adults
- Preparing Internet materials
- Television for children and adults
- Organising special programmes for special target groups
- Organising seasonal events all over the country
- Mobilising the Sea Safety Council: the Coast Guard, the police, the Swedish Rescue Service Agency, the Swedish Sea Rescue Society, the Swedish Marine Industries Federation, the Swedish Lifesaving Organisation, insurance companies, boating organisations, diving organisations, the guest harbour organisation.

Despite all that we have done, the best of conditions and the best of intentions, a person drowns every

third day in Sweden even today. Some 35 people drown every year in leisure-craft related accidents. (More than half of them are men over 50.) Drowning is in fact the most common cause of death among children, after traffic accidents. Only six out of 10 local educational authorities in Sweden follow the curriculum in teaching children to swim. In certain Swedish schools, only two out of 10 pupils can swim 200 metres.

Safety at sea in developing countries

Let me move from safety at sea status and action in Sweden to that in developing countries. May I suggest that a few specific questions be asked.

- For whom, for which target group, is safety at sea a major issue? Who has the responsibility to address it?
- Are safety-at-sea issues for small vessels on the agenda of the relevant committees?
- What responsibilities do states, local and other authorities have for
 - infrastructure
 - legislation
 - control
 - sanctions?
- What is the current status of infrastructure, weather reporting

Left: One of the many posters and publicity materials on safety at sea. Right: Life jackets are worn even while boating in a shallow lake, as a matter of abundant precaution.



systems, wind and cyclone warnings, communication systems, and SAR (search and rescue) systems, for these smaller vessels?

- Is any disaster prevention effort being mounted on the basis of past experiences?
- Is the ability to swim mandatory in schools? Is it as important in coastal areas to be able to swim as it is to read, write and do arithmetic?
- Is there an economic driving force for increased safety at sea, from the perspective of the state, the local authority or any other authority?
- What sort of representation and what influence do these organisations have? Are the control instruments considered to be fair?
- How do these authorities look at issues such as training, equipment, regulation of catches, territorial waters, etc?
- What about the individual fisherman? How can he contribute better to his own safety? How active is his participation? Are there common, accepted, understood strategies, goals and activities? Will anybody listen?
- Is there an economic driving force for increased safety at sea, from an individual perspective?
- What are the negative factors that hinder or inhibit safety at sea?
 - Is the issue regarded as too insignificant economically?
 - Are the people in question, the fishers, regarded as too small and insignificant?
 - Are the fishers un-organised? Is it difficult to establish communication with them?
 - Are safety at sea issues regarded as too expensive to be tackled and solved?
 - Are there ego problems? Do the fishers and fisher groups believe – “We can decide the size of our catches ourselves!”
 - Do they think – “We don’t want to be controlled by others”?

Boats, accidents and sea rescue in Sweden:

- 750 000 leisure craft
- Every tenth citizen of Sweden has a boat.
- 90 percent of boats are within sea rescue areas.
- 80 percent always have life jackets for everybody onboard.
- 75 percent of all sea rescue operations (1 000 per year) relate to leisure craft.
- 35 people drown every year in leisure craft- related accidents. The cause is frequently falling overboard in conjunction with fishing alone.
- 100 people a year are seriously injured as a result of leisure craft-related accidents.

- Does competition among fishers and fisher groups inhibit co-operation and collaboration?
- Is money an issue? Training, education and equipment cost money. Cost-effective approaches and solutions must be adopted.

Help formulate course plans for schools.

- d. Work actively with the interface between the product (boat and equipment) and human behaviour.
- e. Start and assist pilot projects on safety at sea questions.
 - Fishing teams in collaboration
 - Education on “sea safety thinking”
 - Active Coastal Zone Management (CZM) surrounding these questions
 - Other material innovations

How can Sweden help?

- a. We can share our experiences on follow-up to drowning cases, and on enabling prevention through media campaigns: print, TV, etc.
- b. Share our brochures that contain general information.
- c. Support activities to explain safety at sea questions in schools.

Announcing...

TILAPIA 2007

Kuala Lumpur

International Technical and Trade Conference and Exposition on Tilapia
23 – 25 August 2007 • Kuala Lumpur, Malaysia

An international forum for industry leaders, policy makers and planners, aquaculturists and producers, export-processors and importers, investors and suppliers of inputs and services

Significant developments have taken place in the global tilapia industry since 2001 when the first comprehensive, business-oriented international technical and trade conference on the species was held. Production of farmed tilapia increased by more than 40% from 1.27 million mt in 2000 to 1.82 million mt in 2004. Meanwhile, landings from capture fisheries rose modestly from 0.68 million mt to 0.72 million mt in the same period. The total production from both capture and culture thus rose from 1.95 million mt to 2.54 million mt, an increase of 30% within a period of just five years. Total farmed production in 2004 alone was estimated to be worth US\$ 2.2 billion, up 30% from five years earlier. Major developments have taken place in the form of growing domestic and international markets, introduction of a

wide range of value added products, expansion of farming and advances in culture technology. All these, and more, will be discussed in depth at TILAPIA 2007 KUALA LUMPUR, the much awaited follow-up to the 2001 event. The conference will be accompanied by a trade exhibition featuring companies involved in growing, processing and marketing tilapia and providing various inputs and services to the industry. For more information, please see the infodish website.

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FRP boat boom in Tamil Nadu, India

Boatyards in Tamil Nadu, India, are humming with activity. The magic word in fisheries along the Coromandel coast today is FRP or fiberglass reinforced plastic. Kattumarams in FRP are fast-replacing the wooden versions which have dotted the coastline for centuries.

Kattumarams and vallams (canoes) have long been the backbone of traditional fisheries in the state. The kattumaram ("logs bound together" in Tamil) is made up of 5 to 7 logs of *Albizia* wood with tapering ends and tied together. Vallams are dugout boats often constructed with planks stitched to the sides. Both are ideal for the surf-beaten east coast of India. Centuries of evolution had led to craft considered near-perfect for their cost.

The 1980s saw a new trend – motorization of traditional craft – prompted by liberalization of imports and subsidies to promote marine fisheries. Dwindling fish catches in near-shore waters also made traditional crafts venture farther out. Result: kattumarams and canoes were fitted with outboard motors (OBM). Initially, OBMs were considered a boon for these primitive contraptions. But a mismatch between the kattumaram and the motor made fishers look for new hull material. The vibrations of the outboard motor impacted the wooden logs of the kattumaram – they often cracked and broke.

Around this time, Kerala fishermen were taking to FRP as a hull material. The sturdiness of FRP, and the lightness and speed of FRP boats, catalysed a switchover from wooden craft to FRP kattumarams and canoes in Kerala. Tamil Nadu fishermen too were finding wood problematic. Competition for wood from other industries, and deforestation – which led to

shortages and price escalation – made traditional crafts too expensive. Construction of new wooden kattumarams and vallams, and replacement of old vessels, was becoming increasingly difficult. The wood-FRP transition took place in Tamil Nadu almost a decade after that in Kerala.

By the mid-'90s, FRP fishing boats had gained ground in Tamil Nadu. Many boatyards sprung up to produce kattumarams and canoes in FRP. Some statistics indicate that by 2004 about 70-75 per cent of the wooden kattumaram fleet in Tamil Nadu had been replaced by FRP.

What is FRP?

Fiberglass is made from extremely fine glass fibers. It is used as a reinforcing agent for many plastic products, the resulting composite material known as glass-reinforced plastic or fiber-reinforced plastic (FRP). It is popularly known just as fiberglass. By changing the chemical composition of the resins and by varying the reinforcements, one may change the properties of finished FRP to suit different applications.

FAO Fisheries Technical Paper 321 provides basic information and guidelines on FRP and its limitations in boat-building. It goes into some detail on the design, construction and planning of FRP boats.

Resins used in FRP

Polyester, epoxy and to a lesser extent vinyl resins are commonly used as the bases for resin systems in FRP composites. Both are essentially thermosetting resins with several advantages:

- (a) Relatively high strength/ weight ratio and rigidity as well as good electrical and thermal properties;
- (b) Virtually unlimited moulding sizes;
- (c) Ease of fabrication using a wide range of manufacturing techniques;
- (d) Low capital outlay, particularly for hand layout;
- (e) Possibility of one-off or few-off mouldings at reasonable cost;
- (f) Design versatility that allows combination with other materials, such as foams for buoyancy;
- (g) Resistance to a number of environmental influences, including water absorption, attack by a wide

Typical scene in an FRP boatyard today.



A day in a FRP boatyard

Kanathur lies on the outskirts of Chennai, facing the Bay of Bengal. Once a fishing hamlet, it is today a satellite township of Chennai. Son India is one of the most progressive FRP boatyards of Kanathur. Started in May 1992 with about 40 workers, the boatyard has so far produced more than 2 000 boats. They have been supplied to government agencies, fishermen and NGOs. The yard's production capacity is about 25 boats/ month.

The yard has four FRP and two stainless steel moulds, all designed by the yard. Their quality has improved with experience. During the last decade, the material for the mould has changed from wood to cement to FRP and steel.

The traditional fishing boats most in demand at the yard have the following dimensions:

Model 1: Length 18 - 27 ft, breadth 6.5 ft, height 2.5 ft.

Model 2: Length 26 - 32 ft, breadth 6 ft, height 3 - 3.5 ft.

The materials used to construct FRP boats include mat (including surface mat), roving (including woven roving), resins, catalyst (methyle ethyl ketone), accelerator (for gelling), pigments, acetone (for washing hands and brushes), filler material, wax (for surface polishing), modelling clay, releasing agent (poly vinyl alcohol), brushes and polyurethane foam.

Raw material for constructing the FRP boats is procured from shops in Chennai. As a standard norm, 3.8 kg of FRP material per sq. ft. is used. The approximate cost of construction of a 27 ft boat is estimated at Rs 65 000 (approx. US \$ 1 450). The expenditure on materials and labour is as follows:

Mat-23.0%, resin-31.5%, pigment-2.5%, gelcoat-5.5%, foam-10.5%, accessories-11.5%, labour-15.5%.

The boatyard increased its production capacity to about 45 boats/ month after the 26 December 2004 tsunami. Many old hands were recalled to assist the yard in meeting orders. A number of FRP boats damaged by the tsunami also came to the yard for repair. A couple of additional moulds were prepared to meet the demand.

Mr P Gandhirajan, proprietor of Son India and a pioneer in the manufacture of FRP boats in Tamil Nadu, says that at present there are no standard designs or norms for FRP boats and no mechanism for certification of FRP boatyards. Inexperienced

Mr P Gandhirajan of Son India Boatyard in Kanathur (right). FRP moulds of the boat yard, below – exterior and interior views.



people set up boatyards. What they turn out is, boats poor in design and quality and unsafe as well, giving FRP boatyards a bad name. He urges a regular monitoring and quality control mechanism to maintain the standard of these boats.

He adds that boatyards like his need training and skill upgradation, particularly in layering, application of resin, gel coating and foam preparation. He also calls for strong R & D inputs into the FRP boat industry.

range of chemicals, weathering and UV exposure;

(h) Virtually unlimited possibilities for surface finishing, including colouring to give a maintenance-free finish;

(i) Tolerance of a wide range of additives, including fire retardants.

FRP fishing boats have the following advantages and disadvantages:

Advantages

- Do not absorb water, hence no change in buoyancy.
- Light in weight, easy to handle, excellent surf-riding capacity, less energy required for navigation.
- Waterproof, non-corrosive, do not need drying.



- Score over wooden crafts in durability, speed, loading capacity and maintenance.
- Raw material easily available, a good substitute for wood.
- Stronger than wood, more elegant and better-looking, permit complex constructions.

Disadvantages

- Higher initial cost. Fabrication needs special skills.
- Raw material, especially the resins, needs special storage.
- Low resistance to abrasion.

The tsunami of 26 December 2004 led to a huge leap in demand for

Mats for FRP boats (left). The layering process with mats (left below). Chemicals used and fabrication in process (below).



Establishment of FRP boat-building units in Tamil Nadu

Districts	Number of FRP Units	
	Before Tsunami	After Tsunami
Chennai	-	2
Kanchipuram	2	5
Villupuram	5	5
Cuddalore	2	3
Nagapattinam	1	3
Kanyakumari	2	5
Tirunelveli	0	2
Pondicherry	1	2
Total	13	37

FRP boats. In Tamil Nadu, some 51 000 kattumarams, vallams and mechanised boats were destroyed or damaged, and more than 9 000 fishing craft in neighbouring Pondicherry,

But the tsunami was at once a big boost for the boat-building industry and for FRP. Overnight, existing boatyards increased their capacity and old hands were recalled. Many new yards materialised along the coast to make new boats and repair damaged boats. Backyard FRP boat manufacturers who produced two or three boats per month began to turn out more than 50.

During the Workshop on Post-Tsunami Revival of Fisheries sector and Rehabilitation of Fishing Communities held in Mahabalipuram on 6-7 February 2006, many experts commented adversely on the construction and safety measures in these newly constructed boats. It seemed that the boats were built to a price rather than to a standard. Scantling rules were grossly ignored and skin thickness appeared to be generally inadequate. The deck construction on many boats also appeared to be very weak. It was suggested that the vacant compartments in the boats should be filled with foam, otherwise serious accidents could take place. Apart from the flaws in the construction, the workers handle strong chemicals, paint and glue, and are in peril if they don't take proper precautions.

– M Paramasivam

Experiences in boat-building in tsunami-affected countries

Ari Gudmundsson, *Fishery Industry Officer (Vessels), FAO, Rome*
Daniel Davy, *FAO Consultant, Naval Architect*

The FAO has since 2005 been assisting in the reconstruction and rehabilitation of fishing communities affected by the December 2004 tsunami. This article describes experiences and lessons from boat building activities in three affected countries – Indonesia, Sri Lanka and Maldives.

Indonesia

On account of the scale of the tsunami's havoc in Indonesia and the remoteness of the worst-affected areas, accurate figures of boats lost and damaged are difficult to obtain. But it is reckoned that in Aceh/Nias, some 7 600 boats were lost and an additional 5 000 sustained damage. Some 6 500 new boats were supposed to have been built under a rebuilding programme but the data is subject to revision. The post-tsunami boat-building programme in Indonesia has probably been the largest ever undertaken. A number of boat builders themselves perished in the tsunami, adding to the magnitude of the problem.

Fishing Vessel Regulations, Standards and Quality

There are no regulations in Indonesia (or Aceh province), applicable to the construction and safety of small fishing vessels. Most fishing vessels are lightly built wooden vessels and scantlings; they do not follow any recognised standard.

During the early part of the reconstruction effort, it became apparent that some of the boats financed through NGOs and local institutions were

sub-standard in quality, or even unsafe. The quality of boat-building during reconstruction has suffered for several reasons:

- Boats built to a price rather than to a standard.
- Boat-builders handling large orders in a short time.
- In-experienced boat-builders claiming expertise they did not possess, to capitalise on high demand for boats.
- NGOs and other institutions not adequately monitoring their own boat-building programmes.

Many of the failings in boat quality have been of the most basic type such as:

- Poorly selected timber, including sapwood and split wood.
- Thin planking, large frame spacing and small keel timbers.
- Sub-standard frame joints with unsuitable arrangement of fastenings.

- Fastenings causing numerous splits in planks.
- Inadequate through-hull fittings and pipe work.
- Use of plain steel fastenings.

Some of the effects of these basic problems are:

- New boats may have a short life. Consequently, an additional boat replacement programme might be needed in future.
- New boats require significant maintenance – in particular, to keep the hull watertight. This means time is lost at sea.
- Some completed boats are not being used by the intended beneficiaries for a number of reasons – including the perception that they are substandard or unsafe. FAO has

This article has been assembled from the experiences of FAO staff and consultants in the tsunami-affected region up to January 2006. It was presented at the Workshop on Post-Tsunami Revival of Fisheries Sector and Rehabilitation of Fishing Communities, Mahabalipuram, 6 - 7 February 2006. Since that time the situation has continued to change and develop and FAO has gained further insights and lessons from its activities in the field and has continued to provide further training and technical assistance and delivered improved fishing vessels to communities affected by the tsunami.

Examples of defective construction in post-tsunami boats from Aceh province, Indonesia.



advised that unsafe boats should not be handed over to beneficiaries and should instead be modified or broken up.

As the building of boats proceeded it became obvious that remedial activities would be needed to improve boat quality, such as:

- Training of boatbuilders and boat inspectors.
- Development of good-practice guidelines.
- Development of draft regulations for minimum construction standards.
- Work with NGOs and others to raise awareness of quality and provide technical assistance.

The FAO has developed and published “good practice” boat-building guides (for wooden boats) to enable the monitoring of programmes by NGOs and other institutions. Draft regulations on “minimum standards” of construction are now under development. In building back better, the goal is not simply to re-establish livelihoods by providing low-quality boats; a balance has to be found between responding to needs and building back better.

Boat production (especially in large numbers) is a technical exercise, which should be managed by experienced professionals. Unfortunately, some NGOs have treated boats simply as items to buy and distribute. They do not have the capability to assess the type or quality of the boats they are distributing.

Boat-building training

Following an assessment of boat-building activities in mid-2005, FAO laid a high emphasis in its activities on training and improved quality. FAO boat-building training was conducted on the eastern and western coasts of Aceh to improve skills over a large area; the trainees included 42 boat-builders and three government boat inspectors. Many of the trainees who attended the boat-building courses proved to be excellent craftsmen. Training aimed



at improving the quality, safety and life expectancy of boats.

The training courses brought boat-builders from various places together and created an informal network with one another and with the FAO.

Boat Design and Changes

With its partner boatyards, FAO has introduced improved construction practices such as:

- Careful selection of timber.
- Use of galvanized fastenings.
- Improved construction techniques.
- Use of primers and bedding compound.
- New keel assembly consisting of dead wood and a shaft log.
- Simplified frame construction utilising scarf joint.
- Improved safety in design wherever possible while conforming to local style.

These will improve the life expectancy of boats at a small additional cost. In discussions regarding changes in boat design, some common themes were:

- Additional weight is considered bad by fishermen and in particular with regard to smaller boats.
- Speed is highly valued. Boats slower than competitors' boats are unpopular.
- Increased life expectancy is not necessarily a clear and immediate advantage.

The introduction of safe, appropriate and high-quality FRP boats in Aceh is considered an important development for the future. Numerous FRP boats have already been donated to Aceh both from within and outside Indonesia. This was apparently done without adequate demonstration or training in maintenance and repair. Result: some donated FRP boats have experienced problems with acceptance, quality and safety of operation. Regulations applicable to the construction of FRP vessels in Aceh do not exist.

Sri Lanka

The tsunami destroyed or damaged an estimated 24 000 craft. Early on it was decided that repairing damaged craft and engines would be the quickest and most cost-effective way of getting fishermen back fishing again. As a result, the Ministry of Fisheries and Aquatic Resources (MFAR) prepared a National Programme for Repair of Damaged Craft. Many boatyards were to participate in this programme. But the flood of orders from NGOs for new craft made many boatyards focus on new construction. It became apparent later that many craft regarded as “destroyed” were capable of repair.

The FAO did not get involved in boat-building in Sri Lanka; it facilitated boat and engine repair, and imported inboard and outboard engines.

There is no written scantling specification to monitor hull construction. In many cases the thickness of hull laminate was found to be so low that it would not have been accepted by any scantling rule. It was also noted that older boats generally had thicker laminate than newer boats. It was apparent that the quality of FRP boat-building and repairing was not being given sufficient priority in Sri Lanka.

In many cases the quality of repairs suffered because of repairs being carried out on the beach without adequate protection from sun, rain and humid air. Further, since the

cost of producing an FRP hull in Sri Lanka is mainly that of material cost (labour cost is low), there is a temptation to skimp on the thickness of the laminate in order to save money.

Monitoring the repair of boats in various districts, especially the harbour-based boats, became essential. FAO recruited three national consultant marine engineers and a marine mechanic to monitor the repair of craft and engines in the various districts.

Workers skilled in FRP were very few, and unskilled labour was recruited in some boatyards; the quality of construction may have suffered as a result.

The stability characteristics of certain classes of boats caused concern. Recommendations were made for design modifications to multi-day and 19-foot boats in order to satisfy stability requirements and allow for the safe loading of ice and gear.

Maldives

The Ministry of Fisheries, Agriculture and Marine Resources (MOFAMR) has undertaken to build 89 FRP boats of 4.5 meters (m) in length to replace wooden *bokura* craft damaged or lost in the tsunami. Drawings for the 4.5 m boat were prepared by FAO.

An FAO fiberglass expert prepared a manual on FRP boat-building and repairs. This contained details of the production process at Precision Marine (one of the boatyards) on Thulusdhoo, and the boat-building school at Alifushi. Subsequently he ran practical FRP training courses, including the construction of a 15 ft boat, as well as a FRP theory training course, which included safety, quality control, sequences and repair guidelines. Some 40 trainees, including both boat-builders and surveyors from MOFAMR, participated.

When planning a replacement scheme for *masdhoni* boats damaged by the tsunami, the MOFAMR decided to introduce a new 85 ft (26 m) model *masdhoni*



The Masdhoni of the Maldives. Some 50 Masdhonis, 85 ft long, are being built. Even 107 ft Masdhonis are under construction.

that the average fisherman could afford. MOFAMR plans initially to build 20 of these boats, followed later by 30 more. Bids for building the boats have been received from established boatyards.

The development of the large FRP *masdhoni* in the Maldives has been extremely rapid. The first 70 ft FRP *masdhoni* was built in 1997; today, there are *masdhonies* of 107 ft under construction, with talk of still bigger boats. It is evident that Maldivian boat-builders are not afraid of venturing beyond the limits of their existing experience; however, there are considerable risks, and boats at times need structural modification after launching. In terms of skilled labour, the moulding of FRP hulls and decks is often undertaken by a team of Sri Lankan workers who specialise in this type of work.

The present FRP *masdhonis* are not built according to any scantling rules. Hull skin thickness appears adequate, but deck construction on many boats appears very weak. The Ministry of Transport and Civil Aviation is responsible for regulations on vessel safety, and has expressed the need for assistance in formulating safety regulations for fishing vessels. The development of boats over 30 m in length without

reference to any guidelines or scantling rules for this size of vessel is a cause for concern.

Recommendations

1. Regulations concerning the safety of wooden and FRP fishing vessels are urgently required in the region. These should be locally appropriate and responsive to the needs and capacities of all groups of end users – the builders, vessel owners, fishers and officials.
2. Raising awareness of safety issues (including safety at sea and construction standards) among boat owners and operators, and among NGOs local and international, is vital.
3. Training and skills-upgrading for workers in the boat-building sector, for both timber and FRP boats, is essential.
4. Data collection and updating on needs and progress is critical for the goal of building back better. A single agency should be responsible for coordination. FAO performs this role in Indonesia, Sri Lanka and the Maldives.
5. The capacity of governments and ministries in relevant disciplines needs to be strengthened.

NARA's many-pronged impact on Sri Lankan fisheries

NARA is one of the best-known acronyms in Sri Lankan fisheries. The National Aquatic Resources Research and Development Agency has for the past 25 years organised research, development and management activities on aquatic resources in Sri Lanka.

NARA was established in 1981. The main objective then was to tackle the challenges of the 200 nautical mile Exclusive Economic Zone (EEZ). Sri Lanka's EEZ represents a sea territory of 460 000 sq. km — around eight times the land territory of the country. With jurisdiction over such vast sea territory, it is imperative for Sri Lanka to organise sound management of oceanic resources and to integrate fisheries and aquatic resources into development planning.

NARA lends its expertise to resource management in Sri Lanka, to planning and management of fisheries, and to optimal exploitation of fisheries resources.

Mr K Haputantri is the chairperson of NARA, and Ms K T R Pratapsinghe the Director-General.



The main functions of NARA are to:

- Exercise all the powers and duties conferred on the Agency under the National Aquatic Resources Research and Development Agency Act No. 54 of 1981 as amended by Act No. 32 of 1996.
- Apply and utilize scientific and technological expertise for implementing the national development programme on living and non-living aquatic resources.
- Conduct research to identify, assess, manage, conserve and develop aquatic resources – in marine and inland waters, in particular.
- Organize oceanographic and hydrographic surveys and develop charts and data bases.
- Improve and develop fishing craft, fishing gear and equipment, and fishing methods.
- Undertake social and economic studies on the fishing industry, including the welfare of fishermen and their dependents.
- Advise on the development, management and conservation of aquatic resources in inland waters, coastal wetlands and off-shore areas.
- Provide advisory and consultancy services on scientific, technological and legal matters relating to the exploitation, management, conservation and development of aquatic resources.
- Co-ordinate the activities of institutions engaged in the exploitation, planning, research, development, conservation, control and management of aquatic resources.
- Undertake the collection, dissemination and publication of information and data useful for the management, conservation and development of aquatic resources and the fishing industry in Sri Lanka.
- Develop technologies and standards for product development and quality control of fish and fish products.
- Provide training relevant to the work of the agency.

Besides its headquarters at Mattakuliya, NARA has four regional research stations located at Rekawa, Kadolkele (Negombo), Kalpitiya and Trincomalee. The Agency's 50 researchers and 300 supporting staff carry out activities spread across nine divisions and two supporting divisions, which are described below.

Inland Aquatic Resources and Aquaculture Division

This Division is responsible for management and sustainable utilization of inland aquatic resources and habitats in the country. The main R & D programmes relate to environmental assessment and management for aquaculture development, verification of culture technologies for shrimps, prawns, molluscs, brackishwater fish, holothurians and artemia.

The Division conducts regular training programmes on disease management in ornamental fish farming, fish nutrition and fresh water prawn culture. Farmers have been introduced to a buy-back system where fish exporters and small-scale developers work together with NARA to promote ornamental fish farming in rural areas.

Leaflets and manuals are prepared on various farming practices such as mollusc culture, seaweed farming, shrimp culture and diseases and distributed among entrepreneurs and fish farmers. Resource surveys and conservation programs are undertaken on sensitive ecosystems such as mangroves, salt marshes and other wetlands. The Division prepares Environment Impact Assessments (EIA) and integrated management plans for coastal areas. Advisory services are provided to farmers to prevent and control diseases, water quality management, effluent treatment and sediment management.

The Marine Biological Resources Division

This Division carries out research on management, development and conservation of marine living resources and ecosystems.

- Management-oriented research projects to assess fish, crustacean and gastropod resources.
- Development-oriented research projects to assess the viability of offshore and deep-sea fisheries.
- Research projects on coastal zone management.
- Conservation of coral reef and threatened marine fauna.

Management-oriented assessments are carried from eight coastal areas between Kalpitiya and Trincomalee. The research outputs are designed to benefit mainly fishing communities and investors in offshore and deep-sea fisheries.

The conservation-oriented research aims at conserving the gene pool, creating opportunities for nature studies and ecotourism ventures. Coral reef resources are managed through resource monitoring and data collection. For marine turtle conservation, important nesting beaches are identified, and *in-situ* and *ex-situ* conservation procedures carried out.

The Division has employed a catch and effort monitoring system at six locations between Negombo and Trincomalee. Additionally, a logbook system is being used for recording fish catch data. NARA is planning a coastal resource survey with assistance from NORAD and SIDA. The Agency is also the focal point for a tsunami early warning system in the country.

Socio-Economics & Marketing Research Division

This Division carries out socio-economic studies on the fishing industry, including the welfare of fishers and their dependants, analysis of fish distribution patterns and their impact on consumers. This work is done in collaboration with other divisions of NARA. Collaborative work at present includes consultations with farmers on preparing a code of best practices for shrimp farmers and assessment of the socio-economic impact of coral reef bleaching and degradation. The Division also

produces the annual Fisheries Year Book, which is the official publication on Sri Lankan fisheries statistics.

Fishing Technology Division

This Division undertakes R & D activities in fishing gear technology. Recent activities of the Division include successful demonstration of inshore Fish Aggregation Devices and improving the habitat of spiny lobsters.

Environmental Studies Division

This Division assesses the impact of agriculture on water quality of inland and coastal waters, the accumulation of heavy metals in aquatic fauna and flora, accumulation of pesticides and agro-chemicals in water as well as in fish, the effects of industrial activities on water quality, etc. The Central Environmental Authority and other regulatory agencies utilise the research outputs of this Division.

The Division also carries out EIA for development projects; chemical and microbiological analysis of drinking water, wastewater, sewage water, and industrial effluents. The Division provides advisory services to environmental management committees.

Post-Harvest Technology Division

This Division strives to minimize post-harvest losses of fish and commercialise newly developed fish products. The main activities are introduction of new food processing technologies from locally available under-utilized or non-utilized aquatic resources; and introduction of improved hygienic processing techniques for traditional fish products.

The Division offers laboratory and consultancy services on microbiological assessment, chemical analysis, food preservation, processing and quality control. It conducts research to help minimize the occurrence of human health hazards due to contamination of fish and fish products from chemical residues, antibiotics, bio-toxins and resistant pathogens. It

also undertakes quality monitoring programs for fish and shrimps to ensure compliance with regulations.

Oceanography Division

This Division builds up understanding and knowledge of the marine environment, predicts changes in the ocean environment and manages coastal and marine resources. The Division has a multi-disciplinary team, which undertakes research, does consultancies and advises fishers and industrial managers. The Division conducts:

- Joint research expeditions in the Indian Ocean with international oceanographic institutions to study the monsoon circulation and other oceanographic parameters within Sri Lanka's EEZ.
- A mineral exploration programme off Beruwela to identify and evaluate deposits of heavy mineral concentrations, principally Monazite, Ilmenite, Rutile and Zircon.
- Monitor sea level changes, measure currents, temperatures, waves, tides and salinity and identify areas of ocean energy potential around the country.

The Division investigates the distribution and transportation of nutrients, trace metals, organic matter and other biological assessment in oceanic and coastal waters. It plans to set up a National Oceanographic Data Centre (NODC) for the benefit of the public and for investors in oceanography.

Information Technology Division

The Division provides an IT platform for information gathering, processing, sharing and dissemination among all stakeholders for management, conservation and development of aquatic resources. It provides Internet services, system support, Geographic information Systems (GIS), remote sensing, modeling and training in computer applications. The Division is host to local and regional level databases on aquatic resources and provides links to other institutions concerned with aquatic resources research.

National Hydrographic Office

The National Hydrographic Office (NHO), established in 1984, is accredited to the International Hydrographic Organization (IHO). It carries out hydrographic surveys through systematic data collection in inshore, near shore and offshore areas, extending up to the country's EEZ. Hydrographic surveys are also carried out for inland water bodies.

The immediate outputs of the NHO are nautical charts, thematic maps on fisheries and user-oriented hydrographic maps involving digital & analogue hydrographic data. The data is mainly used for navigation, port & harbour development, coastal zone management, delimitation of national maritime jurisdiction, control of marine pollution, coast conservation, coastal engineering projects and defence and exploration. The NHO is capable of carrying out hydrographic surveys up to a depth of 5000 m, well within the continental margin of Sri Lanka.

Library & Information Division

This Division is concerned with information retrieval, access and dissemination for research & development activities, and preparation of online information for its users.

NARA is thus Sri Lanka's lead organisation for aquatic resources and its management. One of its major constraints of late has been a 'brain drain' – some of its senior staff have left the country for better opportunities abroad. The December 2004 tsunami inflicted heavy damage on the Agency's research laboratories, equipment, computers and on its research vessel 'Sayuri'. The Agency lost valuable records collected during the past 20 years. Oceanographic and bathymetric investigations have come to a halt. The Agency is striving to recover from the effect of the tsunami and resume its pivot role in aquatic resources management and development in Sri Lanka.

NARA celebrates its 25th anniversary in 2007

NARA is convening a two-day International Conference on Tropical Aquatic Research Towards Sustainable Development (15-16 February 2007) to mark its 25th anniversary. The Icelandic International Development Agency is supporting the Conference. Current status, trends and future needs in aquatic research will be the focus of discussion in the Conference. Presentations are invited on the following session themes:



- **Post Harvest Technology & Marketing:** Quality assurance & safety, handling & processing, value addition.
- **Capture Fisheries:** Biology, stock assessment, fishing technology.
- **Aquaculture & Disease Management:** Culture practices, diseases, pathology, shrimp farming, aquatic plants.
- **Ecosystem Conservation & Management:** Coral reefs, mangroves, sea grass, sand dunes, sea turtles, whales, dolphins, seabirds, bio diversity, estuaries and inland waters, waste management & pollution.
- **Ocean Dynamics & Development:** Hydrography, climate, sealevel, ocean disaster, maritime safety, navigation, marine pollution, energy, mineral resources, data management, ocean productivity, ocean circulation, numerical modelling.
- **Socio economics and Community Issues:** Post-Tsunami rehabilitation, impact of globalization, women in fisheries, welfare, community development.
- **Technological Advancement:** GIS and remote sensing applications, potential fishing forecasting, artificial intelligence.

For more details contact the Conference Secretariat at: conference.secretariat@nara.ac.lk

As Others See *Bay of Bengal News*

Some more reactions to 25 years of BBN

"The Bay of Bengal News and I"

I have the rather unique distinction of beginning my professional career with an article for *Bay of Bengal News* (1990). Then, after a decade, I found myself again in the BBN, this time as the author of a cover story about a group of fishers who lived along with their families on a type of boat called the shoe-dhoni in the Godavari belt.

The shoe-dhoni story, when it appeared, was a hit. But I particularly enjoyed a story that my father brought home on the day when one of his senior colleagues walked into his room waving the magazine in front of his face, asking in a dismayed tone: "How could some North Indian working in the BOBP have known about these boat people? They live right under our noses and have been invisible to us for so long." It did not help that I inverted the convention and put my family name behind my proper name, but once my father explained the mystery to his senior colleague, the gentleman relaxed visibly and read the story all over again with a more appreciative frame of mind.

In fact, that particular issue of the BBN carried not one, but two of my articles; the other was about another very interesting speciality of central Andhra Pradesh coast – fish smoking. This brought me to the attention of the powers-that-be at the BOBP's newly started Post-Harvest Fisheries Project, who were impressed enough to give me a contract and fulfil my long-standing ambition to join the immortals at the Bay of Bengal Programme.

Of course, the dreams of immortality melted when confronted by the cold reality of life and the



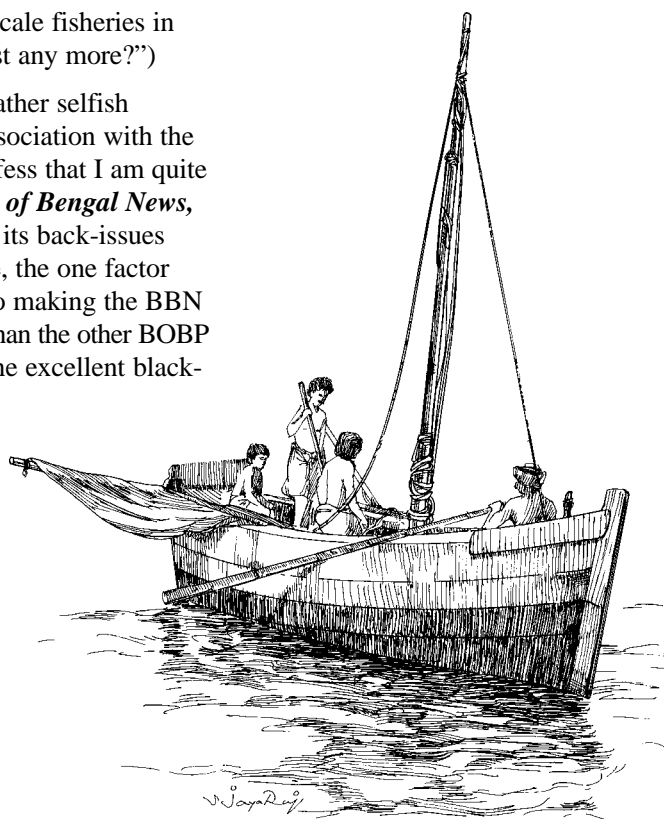
immortals themselves later moved on to other heavens. But the BBN survived and so did my association with it. I wrote many more pieces for the BBN in the intervening years. One of the last pieces I did was a kind of obituary of the Bay of Bengal Programme. (December 1999 – "Bay of Bengal Programme, a farewell and a beginning.") The BBN survived the FAO-BOBP too and has continued to soldier on, albeit in a vastly different form. My March 2000 piece was another kind of obit. ("Small-scale fisheries in India: does it exist any more?")

Apart from this rather selfish account of my association with the BBN, I must confess that I am quite an old fan of *Bay of Bengal News*, and keep reading its back-issues frequently. To me, the one factor that contributes to making the BBN evergreen (more than the other BOBP publications) is the excellent black-



and-white and colour photographs, sketches, drawings and pen portraits that so lushly adorned almost every page. Artists like E Amalore and S Jayaraj almost single-handedly perfected a unique art form that can only be called the 'BOBP School of Art'. And as time passes, their drawings acquire new importance (tinged with pathos) as the way of life they depicted becomes tragically irrelevant.

It might not be an exaggeration to say that some of the pictures carried in the BBN were perhaps the first (and even the last) attempt at



recording a particular aspect of life in the fishing communities and preserving it for posterity. I remember an old man in Chandipur-at-sea in Orissa who flipped through the pages of an old issue of the BBN (which I carried with me for reference). When he saw a particular photograph, he exclaimed, “But they don’t do this any more!” He became quite wistful after that and told me several interesting stories about how life used to be different not so long ago.

Crowded with people and activities

An important point that strikes anyone who goes back to the old issues of the BBN (especially those from the 1980s) is how crowded it used to be: crowded with people, activities, news and, most strikingly, with an infectious sense of optimism. So many things were taking place at so many levels and in so many places that the editor must have had a tough time to reduce the information to manageable proportions.

No wonder then, that the sense of nostalgia that BBN brings to people like my father who had lived through it all is not much different from going back to an old family photo album or reading an old diary; the BBN is in many ways a family heirloom to a whole generation of people. I know an officer in the Department of Fisheries in Orissa who has got the old volumes of the BBN bound in calf-leather and preserves them so carefully that even his wife is forbidden from touching it! Tragically, it was people like this officer – the smaller cogs in a giant system for whom receiving the BBN every three months was not just a means to keep up with the latest developments, but also a symbol of the recognition of their worth – who had been left out of the mailing lists that were culled during the 1990s.

In any case, by the 1990s, the jostling for space in the magazine of people and news and activities subsided and the magazine itself took on a more sober and even



brooding demeanour, notwithstanding the switchover to colour and glossy paper. Its publishing standards, always first-rate, remained the envy of the more commercial journals (as the editor of a well-reputed fisheries magazine in the country once told me, the BBN in its heyday was a formidable rival).

But there was no denying that the newsletter itself became more introspective. And as it entered into the 21st century, it became even more withdrawn, confining itself almost to a matter-of-fact record of the goings on at workshops and other events organised by BOBP and its successor organisation, the BOBP-IGO. The changing tone might be a reflection of the changing fortunes of its parent organisation, but I also tend to see it as a reflection of the changes that have taken place in the larger world, which do perhaps call for more sobriety, more circumspection and less optimism from everyone of us.

So what is the relevance of the BBN in the present time? What does it seek to address and who does it address? Obviously, these are difficult questions, but these must be confronted and addressed if the magazine were to fulfil a useful purpose. Most of the BBN has been written in-house, but it served a few other purposes as well: first, along with its more top-heavy cousins (working papers, reports, manuals) that the BOBP also fathered, it gave the small-scale fishing communities of the east coast of India (and elsewhere in the Bay of Bengal region) a recognition that they richly deserved. It also gave flesh and blood to a way of life that had gone almost unnoticed for a long time

and made it possible for outsiders to relate to, and empathise with, a whole new culture that was yet so close to their own.

Now, as the same people and their cultures face new threats, the BBN must re-invent itself to address their needs in a meaningful manner, as it has done in the past, and this might necessitate broad-basing the magazine to source from, and cater to, a wider range of people and organisations.

– Venkatesh Salagrama
Director, Integrated Coastal Management, Kakinada

“My favourite fisheries publication”

I have been a regular reader of BBN from 1980. I know it as a useful and educative chronicler of BOBP’s work concerning technology, resources, socio-economics, extension, education, biology and management in all the member-countries.

“Glimpses into BOBP projects” were short fact-filled descriptions of activities in the seven member-countries. The statistical factsheets on fisheries were nutshell summaries of the entire fisheries of a state or country in a single page. There were many technology reviews, socio-economic analyses, stories on women in fisheries, personality profiles, World Food Day articles. Every issue of BBN was in fact a wide window opening out into seven member-countries. The evocative photographs captured event and action very effectively. They also mirrored the many moods of fishermen and fisherwomen, ranging from elation to despair.

Over the years, BBN has changed from black-and-white to colour, from litho offset to art paper, but its dedication to insightful reportage and analysis and striking photo coverage remains. It is my favourite fisheries publication.

– M Paramasivam
Joint Director (Retd), Department of Fisheries, Tamil Nadu, Chennai



Inside Japan's Incredible Fish Markets

Early morning view of the harbour at Okinawa Local Wholesale Fish Market, Naha.

They are unbelievable – spanking clean, totally free of odour or clutter. A tour of fish markets and fishing harbours in Japan is almost like touring swanky shopping malls. Hygiene and sanitation are just about perfect.

This photo feature provides glimpses into the Central Wholesale Market of Tokyo at Tsukiji and the fish landing centers at Naha and Nago in Okinawa Prefecture, which I visited in September 2006. The occasion: a field trip during the Training Project for Promotion of Community-based Fishery Resource Management by Coastal Small-scale Fishers. The International Cooperative Fisheries Organization of the International Cooperative Alliance is implementing the project. BOBP-IGO is one of the partners.

The Tokyo Central Wholesale Market of Tokyo is the world's largest – in terms of quantity of fish as well as value. It has 114 staff for day-to-day management. Now 71 years old, the market survived bombing during the Second World War. A separate section in Tsukiji also markets vegetables and fruits.

Seven fish wholesalers (mainly companies) have been permitted by the Ministry of Agriculture, Forestry and Fisheries to conduct business from the Central Wholesale Market. Goods are sold by auction. The market's commission is 5.5 percent of the wholesale price for fishery products.

The market offers approximately 480 kinds of fishery products. Auctions for fresh fish generally start at 4.40 a.m. and proceed for different categories of fishes. The auction hours change marginally from season to season. Open from Monday to Saturday, the market closes on Sundays and national holidays, also on Wednesdays of the second and fourth week of every month.

The fishery products division has 850 intermediate wholesalers approved by the Governor of Tokyo. They run 1 650 shops, each 7 sq. metres in area. They buy from the wholesalers, display products in their shops, and sell to retailers including restaurants. The market also has some 350 authorized buyers such as retailers, processors and supermarket agents, who buy products in bulk. These buyers too have been specially approved by the Governor of Tokyo. They buy from intermediate wholesalers as well as wholesalers.



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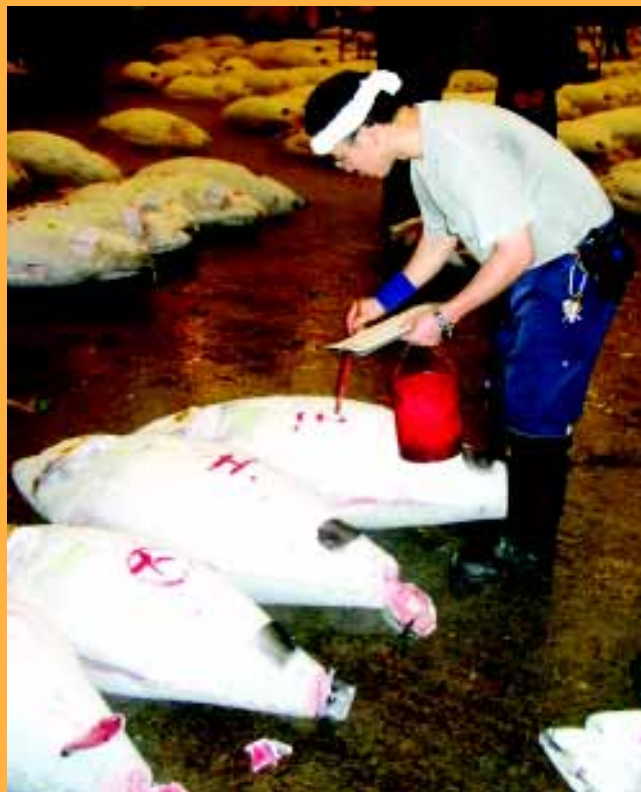


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1. Aerial view of the Central Wholesale Market (CWM) of Tokyo at Tsukiji (Photo courtesy: Tokyo Metropolitan Government).
2. Packaging hall of the CWM.
3. Fresh tuna auction hall at the CWM.
4. Auction in process at the Okinawa Local Wholesale Fish Market, Naha.
5. The intermediate wholesale section at the CWM.
6. Frozen tuna being coded after auction at the CWM.
7. Filleting of tuna after auction at the Okinawa Local Wholesale Fish Market, Naha.



Some vital statistics: The Central Wholesale Market of Tokyo

Parameters	Values
Total area of the market (sq. meters):	230 836
Area allocated for fish wholesalers (sq. meters):	25 003
Area allocated for intermediate fish wholesalers (sq. meters):	118 79
Area allocated for offices of companies and for storage of products:	10 000
Capacity of cold storage facilities (metric tonnes):	26 400
* Total quantity of waste generated (tonnes per day):	60
(i) Combustible waste:	33
(ii) Non-combustible waste:	15
(iii) Polystyrene waste:	12
* Total usage of water (cubic meters per day):	8 100
(i) Water from tap sources:	5 000
(ii) Filtered sea water:	3 100
* Total usage of electricity (Kilo-watt-hour per day):	134 000

* Information pertains to the year 2005.

The most commonly traded fin and shell fishes in the fresh fish category at Tsukiji are yellowtails, jack mackerels, tunas, squids, skipjack, snappers, cod and cod like species, salmon and trout, sardines and flatfishes. In the frozen category, the prominent varieties are tunas, salmon and trout, shrimps and prawns, squid, flatfishes, crabs, billfishes (marlin), snappers and sharks. In FY 2005 (April 2005 to March 2006), 2 140 metric tonnes/ day of fishery products valued at 1 750 million Yen/ day changed hands.

I also visited two fishing harbours and their auction centres in Okinawa Prefecture. This is Japan's southernmost Prefecture, and consists of hundreds of islands in a chain over 1 000 km long. Okinawa's climate is tropical and the Prefecture is famous for its tuna fishery. The first market was located at Tomari Fishing Port in Naha city, also the capital of Okinawa Prefecture.

The Okinawa Local Wholesale Fish Market deals only with fresh fish. It has separate areas for auction of tuna and tuna-like species and for species other than tuna. The Wholesale Fish Market takes a commission of 5 percent from the auction. A retail fish market attached to the wholesale market caters to the needs of local consumers.

The fishing harbour of the Nago Fisheries Cooperative Association (Nago FCA) has an auction hall where catch landed by FCA members is auctioned. This market too deals only in fresh fish. The FCA also charges a commission of 5 percent to maintain the auction hall and provides members with other support facilities.

The hygiene and sanitation standards at both the harbours and the quality of fish landed is very high. Each fish or a batch of similar species is coded to give details of the source of capture, size, etc. Sellers and buyers in the auction are differentiated by the colour of the caps they wear. The FCA staff records all transactions; this information is useful for fisheries management. The FCA staff also ensure that no banned or undersized species are traded by fishers. Stiff penalties are imposed for violating Prefecture Laws.

– Y S Yadava

Some important varieties of fin and shell fish species displayed for auction at the fish markets.

Asia-Pacific Fishery Commission Explores Changing Role

The 29th session of the Asia-Pacific Fishery Commission (APFIC), held from 21 to 23 August 2006, in Kuala Lumpur, Malaysia, reflected its new role as a consultative forum on major issues, and as an adviser to governments and other members of APFIC. Forty-three participants from 14 member countries, plus observers from nine inter-governmental, international and regional organizations took part.

The Commission reviewed the activities of APFIC since its previous session; considered a paper on the status and potential of fisheries and aquaculture in Asia-Pacific; discussed the report of APFIC's Regional Consultative Forum meeting (see pages 29 - 32). It adopted a workplan on major issues APFIC should take up at its

next session, and heard comments from APFIC donors and partners.

Dr Y Bhg Dato' Junaidi bin Che Ayub, Director-General, Department of Fisheries, Malaysia, welcomed participants. Dr Ndiaga Gueye, Chief, International Institutions and Liaison Service, FAO welcomed the participants on behalf of Mr Ichiro Nomura, FAO Assistant Director-General. An opening address was delivered (on behalf of Tan Sri Dato' Sri' Abi Musa Asa'ari bin Mohamed Nor, Secretary-General, Ministry of Agriculture and Agro-Based Industry, Malaysia) by Tuan Haji Mokhtar bin Ismail, Under-Secretary. The speakers urged participants at the session to look at regional recommendations that could form the basis of collaborative work by the Commission's members.

APFIC: Activities since previous session

The APFIC secretariat summarized the main activities undertaken since the 28th session. One of these activities is the recently launched website <http://www.apfic.org>, which has proved to be an excellent medium for information dissemination, especially after the December 2004 tsunami. It also facilitates links with other regional fishery bodies and meets the needs of fishers' professionals in the APFIC region.

The APFIC secretariat has organized four successful regional consultative workshops, with a range of regional institutions. Two of these (in March 2005 and 2006) related to post-tsunami rehabilitation of fisheries and aquaculture; one to low-value and trash fish; and another to mainstreaming fisheries co-management. APFIC also organized the regional consultative forum referred to earlier, and several background reviews that provided preparatory inputs for the forum.

The APFIC secretariat has actively pursued collaboration with regional and international organizations such as the BOBP-IGO, INFOFISH, International Collective in Support

Delegates to the 29th session of APFIC in Kuala Lumpur.



of Fishworkers (ICSF), the Mekong River Commission, NACA, SEAFDEC, etc. A consortium formed with five of these bodies pooled intelligence on the tsunami's impact and facilitated coordination of tsunami responses.

Overview of fisheries and aquaculture

The session discussed an APFIC overview of the "Status and potential of fisheries and aquaculture in Asia and the Pacific". The overview highlighted the fundamental importance of fisheries and aquaculture for the national economies of APFIC member-countries and for their contribution to nutrition, jobs and livelihoods. The region is a dominant world player in fisheries and aquaculture. (In 2004, the region accounted for 49 % of the global production of captured fish and 91% of global aquaculture.)

The main challenges to fisheries and aquaculture relate to (i) marine coastal fisheries (integrated coastal management, increasing benefits through better management); (ii) pelagic offshore fisheries (access to resources); (iii) demersal offshore fisheries (sustainable expansion); (iv) inland fisheries (competing water uses and environmental impacts from external factors); (v) aquaculture (site and feed constraints, increasing trade-related issues).

Some main messages from the overview were that APFIC member-countries would continue to be major suppliers of fishery products. The share of aquaculture is increasing, but there are several significant constraints. The changing trends in regional and international trade, production methods and consumption will impact the prices of fish and its availability. Major issues for the sustainable development of the sector include illegal, unreported and unregulated fishing (IUU) and international trade. During discussion on the subject, several members expressed the need to

improve information-sharing on fisheries and aquaculture to enable better resource assessment and management. Such arrangements should be possible at the sub-regional level.

Many members pointed out that the costs of food safety development, plus the costs of eco-labelling and certification would lead to the further marginalization of small-scale fishers and farmers, and aggravate poverty. The Commission suggested that it could possibly look into the pre-harvest aspects of aquaculture and fisheries, as this was an area that directly affected small-scale producers. The Commission also called for greater collaboration among APFIC member-countries in improving training and capacity-building in food safety and trade.

Low-value and trash fish

The session discussed APFIC's findings and recommendations on low-value/ trash fish emerging from two regional consultative workshops on the subject.

On the basis of reviews of low value/ trash fish conducted by APFIC in Bangladesh, India, Indonesia, the People's Republic of China, the Philippines and Thailand plus a similar study in Vietnam (carried out by the Australian Centre

for Agriculture Research), the APFIC secretariat said the percentage of low value/ trash fish recorded in these countries ranged from 4 percent to 38 percent of the total marine capture landings, with a weighted average percentage across the region of 25 percent. Applying this ratio to the landed catch in 2003 gave a figure of 9.8 million tonnes being used for livestock/ fish, and 29.5 million tonnes used for human consumption. (The Commission noted Vietnam's doubts about the veracity of these figures, and said they would be further reviewed.)

The Commission said that the term "trash fish" is misleading; its use should be discouraged. It agreed with the following definition: "*Low value fish*" refers to fish that are generally of relatively low economic value and typically small sized. They can be used for either human consumption or as animal feeds (both fish and livestock). They may be used directly in both aquaculture to feed other fish or processed into fish meal/ oil for incorporation into formulated diets. The same is true for human food, where the fish may be consumed directly, or further processed often using traditional methods of processing small fish.

The Commission strongly recommended action on three fronts

Some of the member-country delegates to APFIC.



on issues relating to low value fish production in the APFIC region: Improved management of fisheries; improved utilization of low value fish for human consumption; and improved feed for aquaculture.

Suggested action to improve management of fisheries included:

- Reduce trawling and push net effort and fishing capacity (and clearly monitor the effects of capacity reduction).
- Improve the selectivity of fishing practices/ fishing gear, in particular gear to increase the size of fish captured.
- Introduce mechanisms for rights-based fisheries and co-management (to facilitate a reduction in the 'race for fish').
- Establish mechanisms to identify and protect juvenile nursery areas (refugia/ closed areas, seasonal closure).
- Provide alternative income-generating activities.
- Link fisheries and aquaculture policies to policies in other sectors (particularly agriculture) and to more general development policies.

Suggested action to improve utilization of low-value fish for human consumption:

- Improve post-harvest fish handling for human consumption and enhance food safety measures.
- Develop new fish products through processing.
- Promote the benefits of fish for improving food security and reducing poverty in the region.

Suggested action to improve feeds for aquaculture:

- Fast-track the change-over from direct feeding to pellet feeding (shrimp aquaculture is already based on pellet feed);
- Reduce the fish meal content of aquaculture feeds;
- Invest in feed research for inland/ marine species; and
- Encourage integrated fish farming for the culture of herbivorous and omnivorous species.

Selected issues of regional importance: co-management, governance and institutions

The Commission discussed a document on "Mainstreaming co-management" based on APFIC workshops and background papers. There have been several successes with co-management – which is based on decentralization, and a partnership between government and local communities using this approach. But these have been supported by donors in pilot projects rather than by governments. The challenge is to find a way to make co-management a mainstream practice of both government and non-government organizations and communities.

The Commission agreed with the following definition for fisheries and aquaculture co-management:

Fisheries/ aquaculture co-management is a partnership approach where government and the fishery/ aquaculture resource users share the responsibility and authority for the management of a fishery or fisheries/ aquaculture resources in an area, based on collaboration between themselves and with other stakeholders". It recommended that to mainstream co-management the member-countries should:

- ensure that co-management addresses key national policy objectives such as reducing

What is APFIC?

The Asia-Pacific Fishery Commission (APFIC) was established in 1948 as Indo-Pacific Fisheries Council. The name changed to Indo-Pacific



Fishery Commission in 1976, and its present name in 1994. Set up under the aegis of FAO (Article XIV of FAO Constitution), the Commission works from the FAO Regional Office for Asia and the Pacific, Bangkok, Thailand. The Commission covers the Indo-Pacific area (including inland waters). The Commission is mandated to "promote the full and proper utilization of living aquatic resources by the development and management of fishing and culture operations and by the development of related processing and marketing activities in conformity with the objectives of its members".

overexploitation of fish stocks, and reducing poverty;

- review, develop and amend national fishery policy and legislation, where necessary, to support fisheries and aquaculture co-management;
- invest adequate resources in developing co-management;

APFIC discussed and recommended a number of actions on low-value fish production.



- ensure appropriate budgets for fisheries co-management practices at all levels;
- define and communicate the respective roles and responsibilities of all stakeholders;
- assist in the empowerment of communities, and ensure equitable distribution of the benefits of co-management; and
- facilitate human and institutional capacity-building at all levels across communities and scales, in particular ensure that government staff at all levels are adequately skilled and experienced to facilitate the implementation of fisheries co-management.

Policy Challenges

The APFIC secretariat had commissioned a policy analysis to examine the main policy directions being taken in fisheries and aquaculture, and the main drivers of policy change. The study examined national policies relating to extension of fishing effort to offshore areas, creation of alternative livelihoods to assist fishers to leave fisheries, growth targets for aquaculture and capture fisheries, co-management initiatives and prioritising poverty alleviation targets. Although the details of fisheries and aquaculture policy differed between countries, the study found a surprising degree of similarity between the main policy directions and strategies. Almost all policies in the region stated food security, poverty alleviation, community/ co-management and decentralization, fishing capacity reduction, improvements in administrative efficiency, and cross-sectoral collaboration as policy objectives.

Discussing the Forum's findings, the Commission highlighted some more points: (i) the need to enhance the economic and social status of fisherwomen whose roles are critical in poverty alleviation; (ii) fisheries management and aquaculture growth; (iii) the allocation of money



APFIC discussed co-management (partnership between government and local communities) in both aquaculture and fisheries.

to reduce fishing capacity and to address IUU fishing; (iv) the management and resolution of conflicts between large-scale and small-scale fisheries; (v) better and more secure livelihoods of small-scale fishing communities through *inter alia* better safety at sea, conditions of labour and health; (vi) the encouragement of policy harmonization across the region while respecting policy differences resulting from differences in economic and social development; (vii) regional and bilateral cooperation and agreements to better regulate fisheries and strengthen MCS; (viii) the need for better information and research to inform policy-making; and (ix) the potential of biotechnology in better fish utilization.

The Commission concluded that, in general, the region is well served by policy and strategies. But future work should focus some more on policy implementation – policy development by itself is not enough. Better participation by stakeholders in formulating policy will improve implementation.

Emerging issues

The APFIC Secretariat informed the Commission about two emerging issues revealed by the 2006 edition of APFIC's *Status and potential of fisheries and aquaculture in Asia and the Pacific*. These were illegal,

unreported and unregulated fishing and aquaculture and fishery products standards and trade. (see article on pages 29-32, for more information).

The Commission reaffirmed that the overarching focus of APFIC should be small-scale fisheries and rural aquaculture that lead to poverty reduction, especially for women and socially deprived communities. It recommended the following two priority areas to be included in the next workplan of APFIC:

(i) Managing fishing capacity:

This should include reducing and combating IUU fishing; improving co-management in both the small-scale and large-scale sub-sectors; a special focus on low value fish; developing management plans at all levels, including region-based plans; resource assessments; and promoting regional and sub-regional cooperation.

(ii) Fish trade and standards: This should include both aquaculture and capture fishery products; issues of eco-labelling and traceability; better pre-harvest management; bilateral cooperation; and improved sharing of information and human capacity building.

APFIC's workplan for 2006-2008 was also discussed. The Commission agreed to host the next session in Indonesia in August 2008.

Reforming fisheries and aquaculture: APFIC Forum provides food for thought

Many significant ideas and suggestions on “Reforming fisheries and aquaculture” emerged from the regional consultative forum of APFIC (Asia-Pacific Fishery Commission), which met in Kuala Lumpur from 16 to 19 August 2006.

The Forum preceded the 29th session of APFIC, held from 21 to 23 August 2006 at the same venue. (an article on the main APFIC meeting appears on pages 25 - 28). It was attended by 88 participants from 16 APFIC member-countries and 15 international, inter-governmental, and non-governmental organizations active in the fishery sector.

The goal of the APFIC Forum meeting (referred to as RCFM) was

to analyse and agree on actions needed to reshape fisheries and aquaculture in the Asia-Pacific region. Specifically, RCFM was to provide background material on the status and trends of fisheries and aquaculture in the Asia-Pacific; develop action plans to address two major issues (trash fish fisheries and fisheries co-management); and discuss two other issues – fish trade and standards; and illegal, unregulated and unreported (IUU) fishing. The RCFM also addressed broader policy challenges facing all members, such as incorporation of fisheries and aquaculture concerns into national poverty reduction strategies; and integration of fisheries management into large marine ecosystem management.

The Director-General, Department of Fisheries, Malaysia, Y Bhg Dato’ Junaidi bin Che Ayub, welcomed participants. He said the forum would strengthen the role of APFIC through better knowledge of fisheries issues, sounder policy formulation and assistance to member-countries in reshaping their fisheries.

In a thoughtful keynote address, Mr Ichiro Nomura, Assistant Director-General, FAO Fisheries Department, described the evolution of APFIC as a regional consultative forum. He said the forum would act as a neutral platform to assist its members in discussing emerging issues in fisheries and aquaculture.

Participants at the APFIC Forum.





Mr Nomura said that successive waves of “boom and bust” had characterised the development of fisheries and aquaculture in Asia and the Pacific. In fisheries, stocks and habitats were being exploited one after another by newer and more effective fishing techniques to meet widening demand and expanding markets for fish. This phenomenon had led to the decline of pearling in the 1800s, trawling in the 1960s, and purse seining for small pelagics in the 1970s. About a decade ago, a point was reached where under-exploited stocks were very few, so were areas for fleets to develop.

As regards aquaculture, Mr Nomura said that remarkable growth had occurred in some parts of the region; but there were also rapid shifts in technology and in species farmed. There are today many constraints to further development of aquaculture – including the supply of aquaculture feed and the areas of expansion.

He said that in view of the unprecedented changes in fisheries and aquaculture in the Asia-Pacific region in recent times, reforming fisheries and aquaculture was urgent – to ensure sustainability and to strengthen livelihoods and economies in the region.

The RCFM was officially opened by Dato’ Seri Hj. Mohammed Shariff Hj. Omar, Deputy Minister of Agriculture and Agro-based

Industry, Malaysia. He said that regional fisheries bodies should assist members in addressing the issues that now confronted fisheries and aquaculture. In this context, Malaysia welcomed the new role of APFIC as a consultative forum.

Dr Derek Staples, secretary of APFIC, explained the arrangements for RCFM, its objectives and expected outcomes. RCFM was designed as a platform for discussion, he emphasised. Forum participants debated four main themes, which are among the hottest issues in global fora today.

- The future of fisheries and aquaculture in Asia and the Pacific region and the low value/ trash fish problem.
- Co-management, governance and institutions.
- Policy challenges.
- Emerging issues.

The Forum’s final session heard a summary and a presentation of the recommendations to be forwarded to APFIC. Posters prepared by members concerning national experiences with policy development, co-management and other issues, enriched the information exchange.

Theme 1: The future of fisheries and aquaculture in Asia and the Pacific, and the low-value/ trash-fish problem

Discussing the status and potential of fisheries and aquaculture in the

region, Dr Staples said that the world produced about 95 million tonnes from capture fisheries; the Asia-Pacific region contributed nearly half of this amount. In aquaculture, the region’s contribution is about 90 percent (40.4 million tonnes out of 45.5 million tonnes). Production in the region has grown by 3 percent since 2002 for capture fisheries, and by 12.5 percent for aquaculture (excluding aquatic plants). China and Thailand are among the world’s top five exporters of fish. As regards employment, Asia accounts for 87 percent of the world’s fishers and fish farmers, with 33 million people engaged in fishing and 9.5 million in fish farming. Many of these activities are pursued on a part-time basis as part of a complex livelihood.

In capture fisheries, production of pelagic species peaked in the late 1980s and then declined and levelled off. Demersals peaked in the mid-1970s, declined and then levelled off and never returned to the mid-1970s level. Unlike capture fisheries, aquaculture production is continuing to grow. There has been a steady increase in the APFIC region’s production with a dramatic increase reported for China (about 70 % of the total production from the region). Eight APFIC member-countries (including USA) are among the top 10 producing countries.

Scientific surveys have been conducted in many areas of Asia, including India, Indonesia, the Philippines, Thailand and Viet Nam. All of them show dramatic declines in stocks, with current biomasses between 6 percent and 30 percent of the biomass recorded 20 to 30 years ago. There are 65 large marine ecosystems (LMEs) worldwide, of which 20 are in the APFIC region.

Dr Staples summarized the challenges to fisheries and aquaculture in five sub-sectors:

- marine coastal fisheries — integrated coastal management, increasing catches through better management;

- pelagic offshore fisheries – access to resources;
- demersal offshore fisheries – sustainable expansion;
- inland fisheries – competing water use and environmental impacts from external factors; and
- aquaculture – site and feed constraints and increasing trade related issues.

Addressing these issues requires action both regionally and by countries. The Forum agreed that all countries should:

- apply a number of fishery management interventions (reducing the capacity of trawlers and pushnetters; improving gear selectivity; introducing more effective rights-based management; protecting nursery areas; and seeking alternative employment options for fishers);
- improve post-harvest interventions that could be used to improve the utilization of low value/ trash fish (improve onboard handling, diversify product forms); and
- address the demand for low value/ trash fish by aquaculture by improving feeds for aquaculture

Theme 2: Co-management, Governance and Institutions

The Forum debated co-management, one of the buzzwords

in fisheries today (management can't succeed without active co-operation on the part of all stakeholders). Presentations were made by Mr Robert Pomeroy of the University of Connecticut, USA (on lessons learned in Asia, Africa and the Caribbean on mainstreaming fisheries co-management); by Mr Pedro Bueno of NACA (on co-management in aquaculture); by Mr Simon Funge-Smith of FAO-RAPA (on strategies and action to mainstream fisheries co-management in the APFIC region); and by Mr Suriyan Vichitlekarn of SEAFDEC (on fishery rights). It also heard country experiences in co-management from Australia, Bangladesh, Cambodia, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, Philippines, Pakistan, Sri Lanka, Thailand and Vietnam.

The Forum defined fisheries co-management as “a partnership approach where government and the fishery resource users share the responsibility and authority for the management of a fishery or fisheries in an area, based on collaboration between themselves and other stakeholders.” The Forum recommended that fisheries co-management be mainstreamed into national systems of management in the countries of the Asia-Pacific region, building on previous activities. It suggested that APFIC members should invest enough

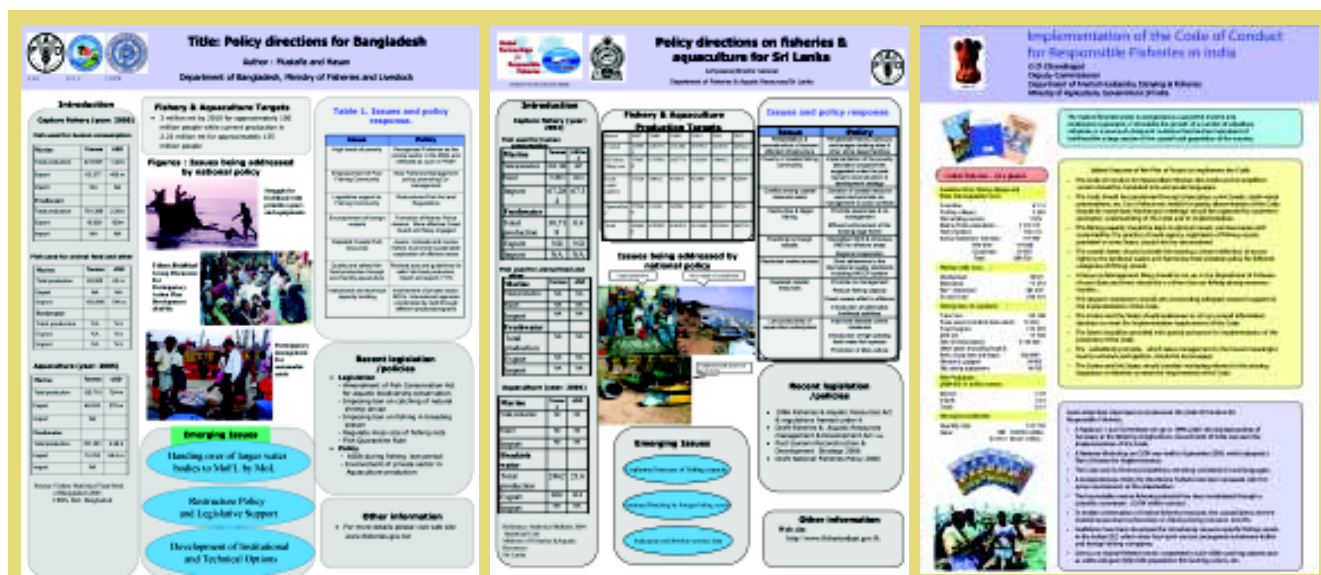
money to develop co-management and allocate budgets for fisheries co-management practices at all levels. Co-management should address key national policy objectives such as reducing overexploitation of fish stocks, overcapacity and poverty reduction.

The Forum urged members to assist in the empowerment of communities, facilitate capacity-building at all levels across communities and scales, and particularly ensure that government staff at all levels are adequately skilled and experienced to facilitate the implementation of fisheries co-management. The Forum urged all parties to share information and experiences on co-management and asked research agencies to undertake applied research on co-management, and particularly utilize traditional knowledge, management practices and experiences.

Theme 3: Policy challenges

The Forum undertook a policy review of member-countries to provide a regional synthesis of topical policy issues and to consider key policy drivers. Describing some of the findings of the review, Mr Graeme Macfadyen of the Poseidon Aquatic Resources Management Ltd said that many national policies referred to poverty alleviation and increases in exports as key objectives but did not address distribution aspects or the impact of trade.

Posters presented by Bangladesh, Sri Lanka and India at the Forum.



Mr Andy Thorpe of the University of Portsmouth presented a paper highlighting the fact that though Asia is the foremost producer in capture fishery and aquaculture, the two subjects were hardly mentioned in poverty reduction strategies. He suggested that “flagship” projects should be established in fisheries and aquaculture to highlight their importance at the regional level. Links should be established with the UNDP to develop fish trade strategies.

The Forum referred to “policy gaps” and suggested “harmonization” on some matters between the national policies of countries, particularly neighbouring countries. There was no reference in many national policies to international and bilateral arrangements. Likewise, there were few references to gender-related issues. There was little investment in fisheries management. On poverty reduction practices, the Forum suggested that countries of the region should do more to link with and influence the policies and activities of international agencies, such as UNDP and UNESCAP, which had a sub-committee on Poverty Reduction Practices.

The Forum expressed concern that the Asian Development Bank has “de-prioritized” support to fisheries. It suggested measures to improve understanding among fishing communities, managers, and policy-makers of the linkages between

fisheries and the ecosystem. This could lead to integrated fisheries and habitat/ ecosystem management. It was also necessary to build the capacity of the authorities concerned to ensure that fisheries issues were integrated into the overall marine management framework.

Theme 4: Food quality & safety in the context of trade

Mr S Subasinghe of INFOFISH described major trends in the global seafood trade and how these related to the Asia-Pacific region. He said that cultured shrimp was rising in importance globally, while shrimp seems to have replaced canned tuna as a consumer favourite in the US. In the European Union, there has been a sustained increase in consumption and demand for all products, both fresh and frozen, from the Asia-Pacific. He said that increased purchasing power is also driving the import of more expensive products. Developed countries seem to have lowered tariff barriers but increased non-tariff barriers. Supermarket purchasing power is a strong influence on global trade and is emerging in both developed and developing countries. The power of supermarkets strongly affects markets and trade, so does environmental lobbying.

The Forum noted that with increased trade in fish products,

food quality and safety issues had become increasingly important for countries in the APFIC region. There is some concern that small-scale fishers and unorganized farmers are at a disadvantage in trade if very strict measures are put in place on food standards issues. Public support for small-scale farmers and fishers should be sustained to enable them to confront the impact of the new standards. A harmonized approach to HACCP standards for aquaculture must be worked out across countries in the Asian region.

About illegal, unreported and unregulated fishing – another “emerging issue” – the Forum said that many countries do not have the capacity to adequately address IUU fishing. There is no mechanism in place for regional co-ordination of management measures, including management of foreign vessels’ access to EEZs and international waters. Monitoring, control and surveillance are poorly developed across the region and compliance is low.

Excess capacity is one of the main drivers of IUU fishing. Countries should urgently begin to manage the issue of overcapacity of their national fishing fleets, review national legislation on IUU fishing and support international initiatives on the management of shared stocks and IUU fishing. A more coordinated regional and sub-regional approach must be adopted to IUU fishing. The Forum recommended that countries should sign on to and implement international instruments such as the UN Straddling Stocks Convention and the FAO Compliance Agreement.

As the end of three days of substantive discussion and debate, participants agreed with Mr Ichiro Nomura: “The need to reform fisheries and aquaculture is urgent – there is simply no other choice.”



Marine Fisheries Census for India, 2005

The publication “Marine Fisheries Census 2005,” out recently in two volumes, is the outcome of a massive census effort relating to marine fishers and fisheries in India. Compiled by the Central Marine Fisheries Research Institute (CMFRI), Cochin, and the Fishery Survey of India (FSI), Mumbai, it provides a wealth of data invaluable for planning, research and decision-making, and for formulation of long-term strategies to meet current and future challenges.

Reliable data and databases are a pre-requisite for sound development plans. Marine fisheries planning and governance depend on reliable databases concerning human, material and financial resources – fishers, catches, craft and gear, fishing effort, prices and markets.

Capture or management interventions also require detailed information on landings, trends, species ratio and compositions, size at capture, length frequencies, catch per unit effort, mortality rates, and many other parameters.

Census history

The publication “Marine fisheries census 2005,” is a treasure-house of factual data. The CMFRI did the census for all maritime states and mainland Union Territories (UTs); the Fishery Survey of India executed the work for the UTs of Andaman and Nicobar and the Lakshadweep Islands. The Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture funded the census.

A preamble to the publication recalls the CMFRI's first census on marine fisheries carried out way back in 1948-49. It was a survey of marine fishing villages and landings. Progressively better and more detailed surveys were carried out in 1957-58, 1961-62 and 1973-77.

In 1980, a well-organised and systematic census was carried out in all the maritime states of the mainland (except Maharashtra where the state government organised a census the previous year). It yielded valuable micro-

level data on all maritime states. The results were published by CMFRI in its *Marine Fisheries Information Service* No. 30, published in 1981.

The 2005 census was carried out after a gap of two-and-a-half decades, a period of substantial change in the marine sector – characterized for example by the introduction of mechanized trawlers and purse-seiners, the motorization of country craft, the advent of multi-day fishing crafts and new livelihood challenges facing fishers. The most extensive and intensive census so far, it was preceded by planning, technical consultations and census design exercises, by data collection schedules and awareness-raising publicity materials such as posters and handouts, and by sample surveys to test the schedules and train data enumerators.

The census was carried out from April 15 to May 15, 2005 in all marine states except Tamil Nadu

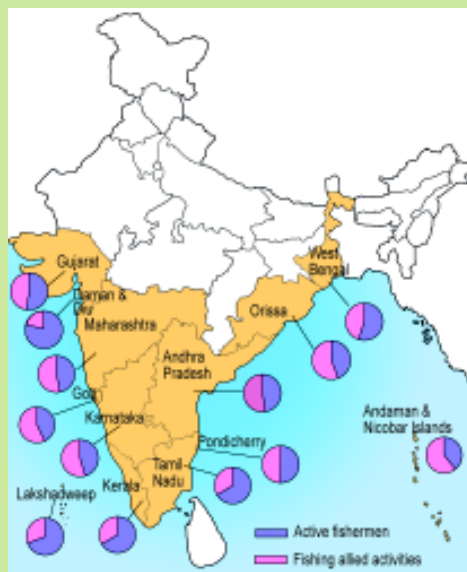


and Pondicherry, where it was put off to November-December, because of tsunami relief operations and the resettlement of fishers. A network of CMFRI officials conducted and coordinated the entire exercise, which covered 3 202 fishing villages, 1 332 landing centres and 756 212 households along maritime states.

The census data were collected at two levels. The enumerators



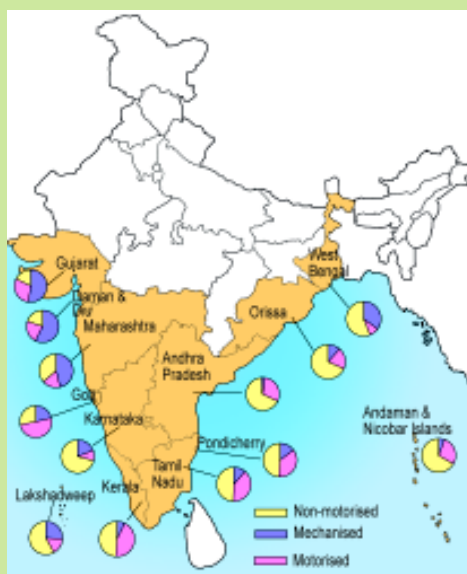
State-wise profile of fishers engaged in fishing, and fishing allied activities



Degree of mechanisation



State-wise profile of fishing craft ownership



Maps – not to scale

obtained micro-level data on individual households. Macro-level village-wise data, mainly on infrastructure facilities, was compiled by supervisors (CMFRI staff).

Some glimpses into summaries of data follow, along with graphs and tables prepared from selected data. In some cases, the results of the 1980 and the 2005 censuses are also compared (see table 1).

Glimpses into the summary data (census in coastal States and UTs)

Fisher population: Some 3.52 million fishers and family members who belong to 756 212 households live in 3 202 marine fishing villages of India. Orissa has the largest number of fishing villages – 641; Daman & Diu has the least (22). Women form 48.6 percent of the population; there are thus 948 females per 1 000 males. The average family size is 4.7. It is the highest in Karnataka (5.7), the lowest in Pondicherry (3.7).

Education: Nearly 56.5 percent of the fisherfolk are educated, the levels of education varying from primary (28.6% of the fisherfolk) to above-secondary education (5.6%). Kerala records the highest percentage of educated fisherfolk (72.8%), Andhra Pradesh (67.5%) has the highest percentage of un-educated fisherfolk.

Occupations of fishers: About 25.7 percent (889 528) of the fisherfolk are active fishers, of whom 80.7

percent (717 999) are full-time fishers. Table 2 details the occupations of fishers in India. About 46.8 percent of the fisherfolk engage in fishing and fishing-related activities. Among men, the major fishery-related occupations are labour (39.2%), net-mending (28.6%) and marketing (14%). The major women's occupations are marketing (41.8%), labour (18.4%) and curing/ processing (18%). Women dominate in fish marketing (73.6%), while men dominate in net-repair and net-making (nearly 80%) and in providing labour to fishing boats (69.5%)

Religion: Hindus constitute 74.1 percent of fisherfolk families, Christians 16.6 percent and Muslims 9.2 percent. Christians dominate in Kerala (42.4%), followed by Hindus (30.7%) and Muslims (26.9%). Christians are significant also in Goa (37.3%) and Tamil Nadu (34.6%).

Fisheries co-operatives: About 15 percent of the fisherfolk are members of fisheries co-operative societies, one in five fisherfolk is a member of some co-operative society (either fisheries or any other). Tamil Nadu, Pondicherry, Kerala and Karnataka record significant percentages in co-operative membership.

Craft: Of the 238 722 fishing craft in India, 58 911 are mechanized and 75 591 motorized. Maharashtra and Gujarat account for 44.5 percent of the mechanized craft (Maharashtra has 13 053, Gujarat has 13 047). Of the 29 241 trawlers in the fishery, Gujarat accounts for 8 002, Tamil Nadu for 5 300, Maharashtra for 4 219, Kerala for 3 982. Tamil Nadu, Andhra Pradesh and Kerala together account for nearly two-thirds of the motorized craft. East coast states account for about 73 percent of the non-motorised/ non-mechanized craft.

Craft owned by fisherfolk: Of the 185 438 craft owned by fisherfolk, 35 806 are mechanised, 52 971 motorized and 96 661 non-motorized/ non-mechanized.

Table 1: A comparison of census figures from 1980 & 2005 – landing centres, fishing villages & fisher population

State/ Union Territory	Landing centres (nos)		Fishing villages (nos)		Fisher population	
	NMFS 1980	NMFS 2005	NMFS 1980	NMFS 2005	NMFS 1980	NMFS 2005
West Bengal	47	44	303	346	83 561	2 69 565
Orissa	56	57	236	641	1 17 144	4 50 391
Andhra Pradesh	379	271	453	498	3 26 304	5 09 991
Tamil Nadu	375	352	422	581	3 95 903	7 90 408
Pondicherry	27	26	27	28	25 312	43 028
Kerala	222	178	304	222	6 39 872	6 02 234
Karnataka	105	88	147	156	1 12 893	1 70 914
Goa, Daman & Diu	54	41	61	61	39 912	39 973
Maharashtra	182	152	315	406		3 19 397
Gujarat	173	123	179	263	1 52 015	3 23 215

Note: Maharashtra data are taken from Handbook on Fisheries Statistics 1977

Trawlers account for 39.6% of the mechanised craft, gillnetters for 31.3 percent, dolnetters for 19.2 percent. Gujarat (4 300), Tamil Nadu (3 274) and Maharashtra (2 526) are leaders in trawlers owned by fisherfolk, while West Bengal, Maharashtra, Gujarat and Orissa account for the bulk of the gillnetters. Of the 52 971 motorized craft owned by fisherfolk, 48 percent are fibreglass boats. Plank-built boats account for 22 percent and catamarans for 20 percent.

Other salient features: Nearly 62 percent of fisherfolk families involved in fishing do not possess any craft, about 49 percent have no gear. Nearly 47 percent of the families possess neither craft nor gear. In the maritime states, Kerala has 66 percent of such families, followed by West Bengal (49%), Tamil Nadu (46%) and others. In 10 percent of the fisherfolk families of Maharashtra, only women take part in fishing or allied activities. At the all-India level, this figure is 5 percent. The housing pattern is enormously varied. The proportion of *kutch* houses varies from 8 percent in Maharashtra to 91 percent in West Bengal. Kerala, Karnataka, Maharashtra and Gujarat are leaders in the number of primary educational institutions in fishing villages. In Kerala, Karnataka and

Maharashtra, almost all fishing villages are electrified. West Bengal and Orissa languish at the bottom of this table.

Health infrastructure (number of primary health centres and hospitals) is unsatisfactory in West Bengal, Orissa and Andhra Pradesh. Kerala, Karnataka, Maharashtra and Gujarat lead in the number of financial institutions. As for boat-building yards, Kerala leads with 112, followed by Karnataka with 32.

Kerala also has the largest number of freezing plants. According to the census, India has 399 processing plants and 471 cold storage facilities. There are 176 EU-approved processing and cold-storage facilities; also 303 units, both EU-approved and non-EU approved, that follow HACCP standards. This information is based on the data provided by the Marine Products Export Development Authority.

Table 2: Occupation status of fishers in India

State/ Union Territory	Full-time	Part-time	Occasional	Total working fishers	Fisher population
West Bengal	50 924	15 630	4 196	70 750	2 69 565
Orissa	74 980	34 315	11 987	1 21 282	4 50 391
Andhra Pradesh	1 09 644	13 008	15 962	1 38 614	5 09 991
Tamilnadu	1 85 603	15 954	5 351	2 06 908	7 90 408
Pondicherry	9503	401	437	10 341	43 028
Kerala	1 24 103	10 488	5 631	1 40 222	6 02 234
Karnataka	32 274	4 152	1 206	37 632	1 70 914
Goa	1 511	817	187	2 515	10 668
Maharashtra	54 901	12 484	4 689	72 074	3 19 397
Gujarat	68 956	10 185	4 181	83 322	3 23 215
Daman & Diu	5 600	194	74	5 868	29 305
Andaman & Nicobar	3 279	718	250	4 247	15 266
Lakshadweep	2 624	2 417	2 999	8 040	40 322
India	7 23 902	1 20 763	57 150	9 01 815	35 74 704

Glimpses into summary data (census in Andaman & Nicobar and Lakshadweep islands)

The Andaman-Nicobar group has 500 islands, a coastline of 1 912 km (one fourth of India's coastline) and a land area of 8 249 sq. km. The census here was launched on November 20 2005, in Port Blair. (The previous census was conducted in 1990.) It began with the training of 52 enumerators in Port Blair, most of them recruited from fishing villages and islands, educated up to higher secondary level or beyond. They obtained data from 100 marine fishing villages of Andaman-Nicobar, covering 3 275 fisher families.

Lakshadweep has 10 inhabited islands, a coastline of 132 km and a land area of 32 sq. km. Sixty-five enumerators selected in Lakshadweep covered the 10 inhabited islands for the census. Here are some of the findings.

Fisher population and occupation:

The total fisher population of Andaman-Nicobar, from 3 275 families in 100 fishing villages, is 15 266. Of these, 13 098 live in 75 villages of Andaman, 2 168 in 25 villages of Nicobar. Diglipur in north Andaman has the largest number of villages (28), and the largest number of households (664). The average family size is 4.66. In the Nicobar group of islands, Car-Nicobar has the highest number of households (195), followed by Cambell Bay (124). Women form 47.23 percent of the population.

77.2 percent of the fisherfolk are full-time fishermen, 16.9 percent part-time, 5.89 percent occasional fishermen. Some 43.1 percent of the fisher population take part in fishing-related activities. Women engage in fish marketing, net-making and mending, fish processing and in labour operations. Only 7.92 percent of the fisher population were members of any society, fisheries or any other.

In Lakshadweep, the 10 inhabited islands have a fisherfolk population of 40 322 who belong to

5 381 families. Androth has the largest number of households (1 302), with a population of 9 994. The average family size is 7.49. Women form 48.03 percent of the population.

One-fifth of the fisherfolk population in Lakshadweep engage in fishing activities. One-third of the active fishermen are full-time fishermen, 30 percent are part-timers, the rest are occasional fishermen. Net-making and repair is the most popular fishing-related activity among men (27%), curing is the most popular among women, with 54 percent.

Religion: 85 percent of the population of Andaman-Nicobar are Hindus, 13 percent are Christians, 2 percent are Muslims. The entire fisherfolk population of Lakshadweep are Muslims.

Education: About 67 percent of the fisherfolk population of the Andaman-Nicobar group are educated, in Lakshadweep the figure is 76 percent.

In Andaman-Nicobar, 42.5 percent of the population are educated up to the primary level, 20.8 percent up to the secondary level, 4.3 percent above the secondary level. Comparative figures for Lakshadweep are 35 percent (primary), 45 percent (secondary) and 20 percent (above secondary).

Craft: There are 2 783 fishing crafts in the Andaman-Nicobar islands, of which 2 539 are in Andamans and 244 in Nicobar. Andamans has 165 mechanised crafts, 90.9 percent of which are gillnetters; the others are trawlers and liners. There are no mechanized crafts in Nicobar. Andaman and Nicobar have 781 motorized crafts (97.8% of them in the Andamans) – mainly dugout canoes, catamarans, plank-built boats, ring seiners, FRP and ferro-cement boats. There are about 1 837 non-motorized boats – dugout canoes, catamarans, plank-built boats. Fisherfolk own 97.3 percent of the craft in Andaman, and 91.8 percent of the crafts in Nicobar.

Lakshadweep has 2 384 fishing craft including 667 mechanized craft (27.98%). Non-motorized craft account for 56.25 percent of the total. Most of the craft (2 275) are owned by fisherfolk. Of these, 26 percent are mechanised, 16 percent are motorized and 58 percent are non-motorized. Pole and line craft constitute 67 percent of those owned by fisherfolk. Kalpeni Island has the largest number of owned craft, with 894.

Gear: Gillnet and hook and line are the main fishing gear in the Andaman-Nicobar islands. Gillnet alone forms 78.8 percent of the total gear, followed by hook and line (15.67%), longline (1.2%) and others. Most of the gear are owned by fisherfolk. Shore seine is the only gear that is shared.

In Lakshadweep, the most popular gear are pole & line, gill nets, hook and line, shore seines and traps. Gill nets are used with 30 percent of the craft owned by fisherfolk, followed by hook & line (22.37%), troll nets (12.82%), seine nets (11.28%), pole and line (10.08%).

Infrastructure facilities: Seventy-six fishing villages in the Andaman-Nicobar group of islands are connected by road, 91 villages have electric power. Of the 59 hospitals and dispensaries, 41 are in Andaman, 18 in Nicobar. Most of the fisherfolk population live in *kutchha* houses. Almost all islands have schools that offer primary and secondary education; but colleges and technical institutes are found only in Port Blair. Most of the fisheries infrastructure is in Port Blair (three boat-building yards and two of the three freezing plants). The government has provided a deep freezer in every island for the benefit of fishermen.

In Lakshadweep, all the villages have been electrified and provided with medical facilities. 80 percent of the fisherfolk live in *pucca* houses. The UT has two technical institutes, three colleges, 16 secondary schools and 30 primary schools. There are two boat-building yards.

Sea safety programmes for artisanal and small-scale fishing communities: Role of gender

Chandrika Sharma, *Executive Secretary, International Collective in Support of Fishworkers (ICSF), Chennai, India*

Safety at sea: Improving the focus

Fishing is one of the riskiest occupations. Fishers everywhere are vulnerable to accidents, injuries and death. Some 24 000 deaths occur every year in fishing, besides an estimated 24 million non-fatal accidents annually.¹ In the developing world, accidents and deaths are frequent in small-scale fishing operations. Some of the reasons: inadequacies in safety and communication equipment, in search-and-rescue (SAR), and early warning services.

This paper discusses the role of gender in sea safety programmes for artisanal and small-scale fishing communities.

The gender-based division of labour in small-scale marine fisheries in

developing countries is interesting: while men go fishing, women are busy processing and selling fish. But this scenario isn't uniform. In some places, the entire fisheries chain is male-dominated. It's the men who fish, sell and process the fish. In some other regions – Peru, Thailand, Philippines and the Pacific islands – women turn fishers, particularly in near-shore waters. Women have been traditional fishers in a few places. And in recent times, women have functioned as crew in fishing vessels – when vessel owners found it difficult to employ or pay male crew. It is common for women and children to engage in gleaning/collecting/ gathering of seaweed, shellfish, etc – for domestic consumption or for sale.

A noteworthy fact: people engaged in shore-side activities – which do not require the use of fishing vessels – are rarely seen as fishers. They

therefore fall outside the ambit of instruments/ programmes aimed at improving sea safety or conditions of work. At the 93rd Session of the International Labour Conference (ILC) that discussed the proposed *Convention on Work in the Fishing Sector*, the ICSF stressed the need to broaden the definition of a 'fisher' and thereby promote the rights of those undertaking commercial beach-seine operations, diving and gleaning – activities that do not necessarily involve the use of fishing vessels. There can be little doubt that the nature of work performed exposes this sub-group to specific hazards.

In the severe cyclone that hit Orissa, India, in November 1996, 2 560 people lost their lives, of whom as many as 1 435 were fishers. Six hundred of these died on mechanized boats at sea; 830 others were out in inshore waters collecting shrimp seed (Salagrama, 2002)². The shrimp seed collectors – women, children and men – had been away at sea before the cyclone started and had received no warning about the impending cyclone.

There are also several reports that indicate that, as coastal ecosystems face greater degradation and pollution, the health risks to those who collect/ fish in the backwaters, mangrove habitats and other coastal areas are increasing. Specific

This article is based on a presentation by the author at the Third International Conference on Fishing Industry Safety and Health, Mahabalipuram, 1-4 February 2006.



¹ ILO (2000): *Safety and Health in the Fishing Industry: Report for discussion at the Tripartite Meeting on Safety and Health in the Fishing Industry, Geneva, 13-17 December 1999*, International Labour Office.

² Salagrama, Venkatesh (2002): *Reading the Perfect Storm*, SAMUDRA Report, July 2002.

attention clearly needs to be paid to addressing the safety and health problems faced by those working in this transitional zone that exists between land and sea.

Safety at sea programmes thus need to directly address the safety and health not merely of men and women who fish on board small-scale fishing vessels, but also of those who fish in coastal and inshore areas, often without fishing vessels. An understanding of some of the problems specific to women in the fishing sector would be an important prerequisite for the better design of these programmes – relating, for example, to sanitation facilities, the ability to swim, etc.

Safety at sea:

A community approach

In many parts of the world, fisheries is as much a way of life as a profession. Entire communities depend on the sector. An accident at sea has repercussions within the family and the community. There are many documented cases, particularly from the industrialized world, where women from fishing communities have organized themselves to draw attention to issues of safety at sea. They have demanded action by governments to improve working conditions and safety.

Example: The foreword of the book *Turning the Tide: The 1968 Trawler*

*Tragedy and the Wives' Campaign for Safety*³, by Rt. Hon. John Prescott MP, draws attention to a unique kind of political struggle that took place in the UK in 1968. The book is the story of their effective campaign for improved safety at sea.

“I was present at the wives’ meeting in Victoria Hall on Hessle Road that cold night in February 1968. It was not the kind of political meeting I was used to attending. Outside were prams, and inside, the hall was packed with women holding children and babies. Their grief was almost unbearable to witness. This was a meeting where political struggle was being experienced not as theory or ideology, but at the level where it mattered most—in the heart of a community that saw itself under threat and was determined to effect change.”

This meeting was organized in the aftermath of the trawler tragedy in 1968, when three Hull trawlers sank and lost 58 men. The women of the Hessle Road community decided that they would no longer accept the loss of their men as an accident of nature.

There are several other examples. In Iceland, from the earliest times, women from fishing communities were active in the Icelandic Association for Search and Rescue

(IASR) established in 1929. They drew attention to safety issues, to promoting Search and Rescue (SAR) groups for fishing communities around the coast⁴. They also strove to raise funds for equipment needed to facilitate search and rescue.

Women were very active in the Norwegian Society for Sea Rescue (NSSR), a nationwide humanitarian and voluntary organization formed primarily to save lives and property at sea, and to provide various forms of assistance along the Norwegian coast. Similarly, the Gloucester Fishermen’s Wives Association in Massachusetts, United States, is represented on the national advisory committee concerned with fishing safety.

In the developing world as well, women have been drawing attention to safety issues. A meeting of women of fishing communities in Northern Chile, for example, organized through CONAPACH, the national fishworker organization in Chile, stressed the need to deal with the high accident rates among divers in Chile and the need to use decompression chambers⁵. In Asian countries, the struggle by fishing communities against bottom trawling is partly linked to the loss of life and property resulting from collision/ conflicts of their vessels with trawlers in inshore areas. Women have often taken an active part in these struggles. In Sumatra, Indonesia, women who have been widowed because of collisions/ conflicts between small boats and trawlers have attempted to organize themselves as part of the *Sarekat Nelayan Sumatera Utara* (SNSU)⁶. They have urged that the ban on trawling must be properly enforced.



³ This book by Rupert Creed, has been edited by Sara Hawkins and published by Back Door Press (1998).

⁴ Petursdottir, G., Hannibalsson, O., Turner, J.M.M (2001): *Safety at Sea as an integral part of fisheries management*. FAO Fisheries Circular No. 966, Rome, FAO, 2001.

⁵ Jéssica Alfaro Alvarez (2001): *Women Weaving Networks*, Yemaya No 7, August 2001.

⁶ Sharma C (2000): *Skirting the ban*. Yemaya No. 3, March 2000.

Administrators keen to promote the use of safety equipment and a culture of safety and conscious of the fact that men are away at sea and difficult to reach, have sometimes, but not often enough, aimed safety awareness campaigns not only at fishermen but also at their spouses and family members.

Safety at sea: Getting the larger picture

The following are extracts of a report⁷ from the forum on “Working Conditions and Safety at Sea and Ashore” organized during the AKTEA Conference, *Women in Fisheries and Aquaculture: Lessons from the Past, Current Actions and Dreams for the Future* which took place during 10-13 November 2004 in Santiago de Compostela, Spain. The Conference brought together 170 fisherwomen, shellfish gatherers, fish processors, fish sellers and researchers, administrators, social workers and women organizers.

The issue of safety on the boats was discussed. Women felt that men’s attitude towards safety matters is driven more by machismo than by the need for family security. Women face problems in convincing the men to use safety equipment.

Some of the participants (from Portugal, Spain and France) felt that the European fishing fleet needs improved safety measures. They underlined the importance of financing the construction of new vessels with the necessary safety standards.

Deteriorating working conditions were seen as another reason for accidents at sea. These resulted from the decrease in the number of crew on board the vessels, and the longer working hours, enforced because boat owners need to economize to meet with rising investments, decreasing fish prices and higher debts. Alcohol and drug consumption on board boats were also responsible for accidents.

Some of the forum participants (from Canada, Ireland and Norway) felt that increasing the cost of



Fisherwomen awaiting the return of their menfolk from a fishing trip.

insurance may encourage more safety practices, but also place a burden on small businesses and fishing enterprises.

It was furthermore discussed that women should demand the recognition of occupational illnesses of not only men but also women working at sea, shellfish gatherers, fish sellers, etc. In Canada, shellfish processing workers are struggling with occupational asthma and with cumulative trauma disorders (like carpal tunnel syndrome).

The women delegates drew attention to technical aspects of sea safety (need for new vessels built according to safety standards), as well as to social and economic aspects responsible for compromising safety on board.

They stressed that issues of safety at sea have to be seen from a technical as well as from a social, economic and resource perspective. They said that women from fishing communities often have a direct livelihood stake in these discussions; as fisheries moves towards energy and capital-intensive forms, women with little access to capital are often ousted from the sector.

What appears to be important, therefore, is a mechanism for dialogue between administrators and fishers to identify the entire range of

issues that have a bearing on sea safety. Clearly, the issues involved are complex and linked to those of fisheries resources management and the very model of fisheries development being espoused.

Women from fishing communities, experiencing social and economic pressures in very direct ways, are well placed to take part in this dialogue. They should be encouraged to take the initiative to propose measures for a fishery that is sustainable and that ensures better returns to small-scale fishers and their communities.

And finally, there is a strong case for adopting a comprehensive approach towards reducing the vulnerability of coastal fishing communities to natural disasters on the sea and on land. There is also a strong case for integrating sea safety programmes with community-based disaster preparedness programmes.

This is especially because fishing communities in the developing world, occupying the very margins of the land mass as it were, are continually exposed to natural disasters. The December 2004 tsunami is a recent and dramatic example.

⁷ Quist, C and Frangoudes, K. *A Sea of Women* (2005): SAMUDRA Report 41, July 2005.

Rebuilding Fisheries after the Tsunami: Highlights of Sri Lanka's Strategy and Programme



An outline of the plan to rebuild the fisheries sector – in the short-term and the long-term.

How can Sri Lanka “build back better” after the havoc of the December 2004 tsunami? A strategy and a programme have been devised for post-tsunami reconstruction and development in marine fisheries by the Ministry of Fisheries and Aquatic Resources (MFAR) with FAO support. Details of the programme have been published in a 76-page booklet. It will help efficient coordination and utilization of relief effort by governments, UN agencies, NGOs and others. Highlights of the strategy and the programme are summarized here.

Impact of the tsunami

Some 35 000 people in Sri Lanka perished in the tsunami, and nearly half a million people lost their livelihoods. Thousands of houses collapsed, three-fourths of the fishing fleet of approximately 32 000 boats were damaged. (The cost of boat and gear repair and replacement is estimated at US\$ 57 million). Large urban fish markets and many retail outlets sustained heavy damage; so also did some 200 fish landing sites, 10 fishery harbours and 37 anchorages plus associated ice plants, cold stores, buildings and vehicles in the affected areas. Coastal habitats, particularly coral reefs, mangroves and coast protection structures suffered varying degrees of damage.

Extensive havoc was caused to many fishery-related institutions – buildings, assets, training vessels, research tools.

Fish production in 2005 (statistics not available yet) was perhaps about 46 per cent lower than in 2004. Foreign exchange earnings from fish exports (particularly species such as ornamental fish, lobster, grouper, chank and *beche de mer*) were substantially lower.

Goals of reconstruction

The government wants to use the challenge of reconstruction as an opportunity to “build back better,” to create a world of fisheries and fishing communities better than it was before the tsunami.

The goal of the strategy is to provide fishing communities with more secure livelihoods, higher standards of living, better protection from natural disasters and safety at sea, better risk insurance, restoration and conservation of the fisheries resources and of the marine and coastal environment.

The strategy stipulates as essential sustainable management of Sri Lanka's fisheries and coastal zones; it seeks to restore private assets, rebuild and enhance public goods; and improve governance of the fisheries sector by public agencies at all levels.



Several agencies will play a pivotal role in the programme – the Department of Fisheries and Aquatic Resources (DFAR), the Department of Coast Conservation (CCD), the National Aquatic Resources Research and Development Agency (NARA), National Aquaculture Development Authority (NAQDA), and the National Institute of Fisheries and Nautical Engineering (NIFNE).

The fisheries reconstruction and development programme will be coordinated by the Programme Coordinating Unit in the MFAR. It will also establish an overall monitoring and evaluation system, and guide project-level implementation.

Key Guiding Principles

Key Guiding Principles have been enunciated for both short-term and long-term reconstruction. They are as follows:

- Provide the basis for sustainable management and development of the fisheries and aquaculture sectors;
- Ensure that reconstruction and development efforts are perceived by local communities as a right and addressed in a compassionate manner;
- Adopt a livelihoods approach;
- Adopt a coordinated and transparent approach;
- Promote the enhancement and conservation of coastal and aquatic resources through integrated and participatory management; and

- Ensure compliance with international and regional conventions, agreements and guidelines (such as the UN Convention on Law of the Sea, FAO Code of Conduct for Responsible Fisheries, UN Fish Stocks Agreement, FAO International Plans of Action (IPOAs) and others.

The Short-Term Programme

The short-term rehabilitation and reconstruction programme will build upon and complement ongoing humanitarian and recovery work that started in January 2005. It will focus on repair and replacement of damaged and lost fishing boats and gear; re-establishment of fish processing, distribution and marketing chains; and capacity strengthening for reconstruction and development at all levels.

Rehabilitation activities needed urgently at the village level include repairs to damaged village roads, clearing of beaches from debris, cleaning up of drainage canals, planting mangroves, etc.

Infrastructure facilities to be provided should include basic facilities such as water, electricity, communication, health, etc; community recreational facilities, libraries, pre-schools and vocational training centers; and warning

systems including public access corridors and roads for quick evacuation at times of future natural disasters.

The short-term reconstruction programme will cost an estimated US\$ 78.43 million (Table 1). The details of the short-term programme are as follows.

1) Repair and replacement of damaged and destroyed fishing craft and gear: While high priority is given to repairing damaged craft, and to replacing boats destroyed and fishing gear lost to enable fishers to resume fishing quickly, boat replacements shall not be allowed to lead to an uncontrolled intensification of fishing effort and worsening resources overexploitation.

District-level coordination and information exchange between boat suppliers and fisheries officials shall be promoted to ensure that the number of vessels will not exceed that before the tsunami.

Replacement of boats will require entitlement certificates issued to fishermen. New boat manufacturing facilities will not be encouraged so as to avoid over-capacities.

To satisfy essential safety standards for new boats, the present boat-building practices and standards shall be reviewed and minimum

standards for design and construction shall be introduced.

Provision of fishing gear will be in accordance with existing regulations. Gear suppliers will be discouraged from delivering nets and other fishing gear that are harmful to the resource and/ or environment.

2) Re-establish private fish retail outlets and municipal fish markets:

Financial, technical and logistical support is necessary to help a large number of small players – fish stall owners, bicycle and motorcycle fish vendors, other traders – to re-establish themselves in business. Minimum hygienic requirements for fish marketing should be met to ensure food safety and improve food quality. To improve temporary storage facilities, unhygienic wooden boxes will be replaced as containers by durable plastic boxes. Better access roads are needed from landing places to main roads, especially along the east coast; and quality water for making ice.

There is an urgent need to re-establish the three fish market at Galle, Matara and Hambantota, which were completely destroyed. Grants, debt relief or new loans will be considered for reconstruction of privately owned fish retail outlets and the network of cycle/ motor-cycle vendors.

3) Re-establish fish landing facilities at fishery harbours, anchorages and landing sites:

The formulation of a master plan for fishing harbours, anchorages and landing sites will be accorded high priority.

Establishment of adequate public access to the beach has been identified as an urgent need, the lack of which hampered evacuation of people from beaches during the tsunami. While there is a need to relocate man-made infrastructure (hotels, residences) located in the no-build reservations and other highly sensitive areas, 'reconstruction/ development' activities within the sensitive coastal reservation areas including low-

Table 1: Cost estimates for short-term rehabilitation

Programme Activity	Year and cost (LKR million) - if applicable -		
	2005	2006	Total
Repair and replacement of fishing craft and gear	3043	2641	5684
Re-establish private fish retail outlets and municipal fish markets	10	44	54
Re-establish the fish landing facilities at fishery harbours, anchorages and landing sites	10	21	31
Rehabilitate damaged coast protection structures and coastal habitats	40	900	940
Re-establish essential institutional support services and facilities		822	822
Capacity building in support of district-level planning and implementation		128	128
Promotion of sustainable fisheries management		141	141
Institutional strengthening		43	43
Total	3103	4740	7843

lying beaches will be regulated under the framework of the Coastal Zone Management Plan.

4) Re-establishment of essential institutional support services and facilities: Damaged infrastructure of government support services and agencies needs to be quickly restored to enable the reconstruction process. This includes the reconstruction of district fisheries offices, restoration of laboratories, repair or replacement of research and surveillance vessels (NARA), scientific equipment and radio communication systems, and training vessels and demonstration equipment (NIFNE).

To strengthen the livelihoods and earnings of fishers, R & D activities will aim at tapping under-exploited resources, at increasing the participation of women in fisheries activities, promoting income-generating activities, and improving fish processing and marketing. It is recognized that the early rehabilitation and management of coastal habitats is vital to the sustainability of the fishing industry.

5) Capacity-building in support of district-level planning and implementation: District offices of DFAR will have a pivotal role in the programme. They will have to streamline operating procedures, including effective communications, capacity building and support systems. The responsibilities of the local administration under the programme would include:

- Organizing meetings and detailing procedures for prioritizing, planning, implementing and coordinating reconstruction and development programmes with fishing communities;
- Strengthening fisheries co-operatives and other local organizations;
- Providing assistance in project planning and implementation;
- Improving communications systems, including television and radio broadcasting, video and printed material;

- Coordinating improvements to access roads, fish market infrastructures, potable water supplies and other amenities;
- Ensuring training that includes disaster warning, management systems and practices in coastal areas;
- Ensuring efficient credit operations for programme beneficiaries, particularly women, to undertake family supplemental income activities; and
- Ensuring programme monitoring and impact assessment.

To achieve this, the facilities, capabilities and services of DFAR and CCD personnel at district levels will be further strengthened to allow them to play a proactive and supporting role. An institutional needs assessment will be carried out at DFAR and other agencies.

6) Sustainable fisheries management:

Sri Lanka has a long history of heavy investment in shore-based fisheries infrastructure (including harbours, landing sites and boats), but catches per unit effort have been modest, as fishery resources (especially inshore) have been over-exploited. A closer analysis is needed of the maximum sustainable yields of the main commercial species, the ideal fleet size and composition, and the required institutional facilities and human capacities for fisheries management at all levels. Improvements are needed in fish catch monitoring, licensing and regulating fishing crafts, use of fishing gear, surveillance of exclusive fishing zones and the boundaries of fishing areas under the jurisdiction of local governments.

7) Institutional strengthening:

To implement the planned reconstruction and development programmes as well as to achieve competent technological standards, some of the Ministry's agencies such as DFAR and NARA need strengthening through capacity building, state-of-the-art technologies and facilities, and programme monitoring.

There is an urgent need to rehabilitate the quality control laboratory at NARA. This will help exporters meet the rigorous quality standards of shrimp and tuna in American and EU markets. Planners and policy-makers, fishers, fish traders and exporters will benefit immensely from a trade and market information system that incorporates basic fisheries data.

Over the years, agencies such as NARA, CCD, NIFNE and DFAR have lost experienced staff through retirement or resignations while recruitments have been minimal. Capacity-building and training are essential so that these agencies recover from the devastation of the tsunami and fulfill their mandates.

Medium/ Long-term Programme:

The medium and long-term development programme will focus on improving the livelihoods of fishing communities beyond pre-tsunami levels. It will promote economic diversification and sustainable utilization and management of coastal resources. It is envisaged that this phase will be completed in 2009.

1) Strengthening communities and their productive activities: The scope for further increases in marine catch is limited. The focus has to be in the following areas:

- value-addition through improved onboard and onshore post-harvest practices and fish processing;
- increased profitability of fish harvesting through effective fisheries management that prevents economic waste;
- better designs for multi-day boats to improve operational efficiency, product quality, and safety at sea;
- prevention of over-fishing, restoration of fish stocks and protection of critical fish habitats; and
- promotion of economic diversification through aquaculture development and tourism-related services.

Fisheries cooperatives will be strengthened through better facilities in fish handling, training in skills development, and credit schemes.

The programme to help fishing communities will give priority to women.

Specific training for coastal communities will promote value-added fish products and better handling and processing of fish and the utilization of fish waste to prepare marketable products such as poultry feed and handicraft, particularly by women's groups.

The MFAR will seek to strengthen interaction of coastal communities with humanitarian and technical NGOs as well as private companies.

2) Reconstruction and modernization of anchorages and fishery harbours: The Ceylon Fishery Harbours Corporation (CHFC) has prepared detailed cost estimates for re-establishing 37 anchorages and rebuilding 10 fishery harbours. A master plan for the reconstruction of anchorages and landing facilities will be developed and implemented in co-operation with the fishing communities. Several donors have already taken on responsibility to repair damaged harbours.

3) Sustainable fisheries management: During the short-term phase the focus is on creating management awareness and avoiding excessive fleet size. Medium and long-term activities will focus on strengthening institutional structures and capacities for routine fisheries management (vessel registration, fishing licensing and community-based management systems). Current MCS (monitoring, control and surveillance) activities are ineffective. These must be strengthened and expanded – more patrol boats, better infrastructure facilities, higher manpower skills.

High priority will be accorded to a rapid assessment of fish resources in the wake of the tsunami and to the proposed comprehensive fish resources survey to be funded by SIDA and NORAD. A comprehensive evaluation of fishing practices in each district will then be undertaken, so that management

Table 2: Cost estimates for medium to long-term development

Programme Activity	Year and cost (LKR million) - if applicable -			
	2007	2008	2009	Total (Preliminary)
Strengthening communities and their productive activities	96	228	91	415
Reconstruction and modernization of fishery harbours and anchorages	1 827	1 450	420	3 697
Sustainable coastal area management	1 000	1 000	560	2 560
Total	2 923	2 678	1 071	6 672

needs and strategies can be determined on the basis of resource survey findings.

Priority will be given to technologies to reduce post-harvest losses through improved onboard and onshore handling practices, and to development of value-added products.

To ensure participatory fisheries management, plans with clear objectives and responsibilities need to be developed for each of the managed fisheries. A management plan is also needed for the offshore fishery that will be compatible with regional management needs.

4) Sustainable coastal area management: Many natural coastal habitats such as mature sand dunes, mangrove belts, coral and sandstones, reefs at one time functioned as effective barriers to reduce the impact of cyclones and tsunamis. Participation of coastal

communities will be enlisted to protect these coastal habitats from destructive human activity.

The CCD has identified critical sites to be managed under Special Area Management (SAM) plans, with the active participation of coastal communities and other stakeholders.

5) Capacity-building in support of planning and implementation:

Activities will build on and complement ongoing work started during the short-term phase. Mid-level cadres of the MFAR and the DFAR should be built up as a matter of high priority. At the district-level, officers of DFAR, CCD and other fisheries agencies need to be supported with logistics, transport and communication facilities.

Cost estimates The medium to long-term reconstruction programme will cost an estimated US\$ 88.85 million (Table 2).

Boat replacement and repair – an important part of short-term tsunami rehabilitation.



BOBP's 2007 calendar promotes the Code of Conduct for Responsible Fisheries

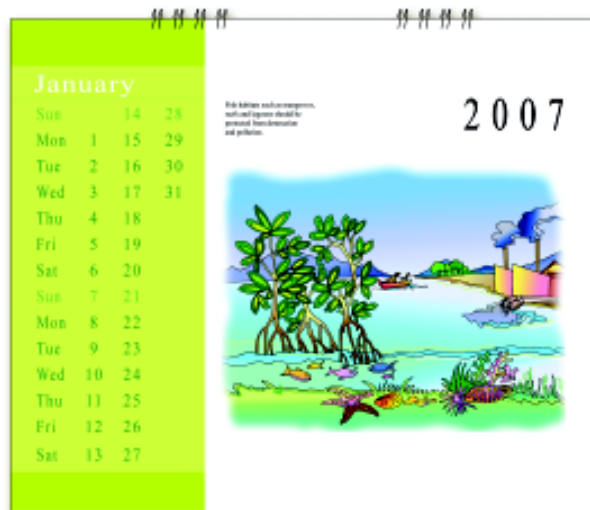
Is the Code of Conduct for Responsible Fisheries too abstract, too philosophical, too difficult for fishers to follow? Look out for the BOBP-IGO's 2007 calendar, which gives visual shape to the Code – through simple, attractive sketches and equally catchy messages.

The Code was adopted in Rome by 170 member-countries of the FAO in 1995. It is a collection of principles, goals and action elements. It covers just about everything relating to fisheries – the capture, processing and marketing of fish stocks, their management, and aquaculture.

Everyone agrees with the Code – as they would with motherhood or patriotism. But compliance is voluntary, not mandatory. Fishers, boat owners, even governments have yet to take action or change their practices to conform to the Code.

New habits and attitudes are slow to develop. The BOBP-IGO's workshops and publications on the Code have been useful for officials. But thousands of small-scale fishers still haven't heard of the Code.

Hence the 2007 calendar. It conveys the messages of the Code through sketches, headings and simple text. Avoid



overfishing. Keep the fleet size right. Do away with destructive fishing practices. Use selective fishing gear and methods; avoid small-mesh nets and catch-everything gear. Ban dynamiting, poisoning and other destructive fishing practices. Protect and promote fish habitats. Enhance fish stocks with artificial reefs. Ensure people's participation in planning and tapping coastal resources. Cut post-harvest losses. Ensure safety at sea and the health of fishers. Collect and record data systematically – on fish landings, species, sizes... Make every harbour a haven for fishing vessels, with facilities for vessels, vendors and fish buyers. Introduce co-management. Avoid and combat pollution.

BOBP's annual theme-based desktop calendars have been in high demand – significant content, handy size, visual appeal. The 2007 calendar should be a hit too. The text is in English. We would like to consider vernacular versions – donor support would be welcome!



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.

