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One of the matters uppermost in the minds of people who have been associated with the Bay of Bengal Programme (BOBP) is whether it will develop as an Inter-Governmental Organization (IGO) to meet the growing needs of the coastal fisheries in the Bay of Bengal (BOB) region – or end up as a page in the annals of history.

The Documentation of Learnings of the Third Phase (BOBP/REP/85), though not intended to explore the member-countries' views on the future of BOBP, came out with a clear message that the Programme should continue to tackle the challenges of fisheries in the region. Subsequently, in Phuket, Thailand, representatives of the national governments at the 24th Advisory Committee Meeting in October 1999 voiced clearly and categorically, through the Phuket Declaration,their desire to see BOBP emerge as an IGO.

Why an IGO?

The role of coastal fisheries in food security, employment and income in the BOB countries is critical. The BOB large marine ecosystem supports some 6-8 million fish harvesters directly, of whom about 90 percent are small-scale fishermen. Besides, about 35-40 million others are engaged in ancillary activities relating to fisheries. The region covers some of the most productive waters in the world and a fisheries which is characterized by complexities of multi-gear and multi-species resources.

However, in the new millenium, small-scale fisheries in the BOB region is confronted with tough problems and challenges. Declining catches, continuous degradation of the environment, post-harvest losses, conflicts between large-scale and small-scale harvesters, and a host of other issues fast threaten the livelihood of millions of small-scale fishers.

Governments in the region have long recognised the need for fisheries management to improve the situation, but have lacked resources and technical expertise, even the will. The changes necessary to develop small-scale fisheries in general, and in the BOB region in particular, are influenced by the complex interaction of social, political, economic and technological forces. Further, there is often strong resistance to change – because small-scale fisher communities are deeply rooted in tradition. To effect substantive transformation through changes in attitudes, knowledge, and skills and through the adoption of more efficient and effective methods of resource utilization, substantial effort would be required at all levels.

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BOBP's New Coordinator

Dr Yugraj Singh Yadava, 47, who joined BOBP as Interim IGO Coordinator in August 2000, brings to the organization 24 years of varied experience in India and elsewhere.

A master's in zoology from Kanpur University and a PhD from Gauhati University on "Fisheries management in floodplain lakes", Dr Yadava started his scientific career with the Indian Council of Agricultural Research as a Scientist. He conducted pioneering investigations on the floodplains of the Ganges and the Brahmaputra, and helped develop technologies for small-scale carp and cat fish farming in the north-eastern States of India. He worked on optimization of fish yield in small reservoirs and impoundments, and carried out ecological investigations in the Sunderbans delta in the State of West Bengal. Dr Yadava also had a brief stint with the Institute of Freshwater Ecology (Edinburgh laboratory) where he undertook studies on eutrophication processes in some selected sites of special scientific importance.

During his seven-year tenure with development organisations in the Government of India, Dr Yadava served as Advisor Fisheries to the North-Eastern Council based at Shillong, Meghalaya; in June 1994 he took up the important post of Fisheries Development Commissioner in the Ministry of Agriculture, New Delhi, and had the unique opportunity of overseeing the development of both marine and inland fisheries (including aquaculture).

Under his leadership, fisheries in India witnessed dynamic changes and the introduction of policies and programmes which in the long run will foster the development of sustainable and responsible fisheries. Optimisation of the marine fishing fleet, implementation of a uniform ban on fishing during the monsoon, cleaner fishing harbours, revalidation of the fisheries potential of the Indian seas, small-scale rural aquaculture, introduction of exotics and movement of live aquatic animals, use of turtle excluder devices in fishing trawlers, and sea safety programmes for fishermen are some of the areas where considerable work was done during his tenure.

Dr. Yadava's contributions to development of environment-friendly shrimp aquaculture have been substantial. As the first Member Secretary of the Aquaculture Authority, set up as per the directions of the Supreme Court of India in 1997, he was instrumental in formulating rules of procedure, guidelines, etc.

Dr Yadava is a well-known face in international fisheries, having contributed to several expert consultations, ad-hoc working groups, inter-governmental meetings, regional conferences, etc.

Dr Yadava's association with the BOBP dates back to the early 1990s. As a scientist with the Central Inland Fisheries Research Institute, Barrackpore, he was associated with the Programme's environmental studies (published as BOBP/REP/67, "An environmental assessment of the Bay of Bengal Region"). Subsequently, as Fisheries Development Commissioner, he played a pivotal role in implementing the Programme's Third Phase activities in India. He chaired the annual review meetings of BOBP activities in India and also some of the Advisory Committee Meetings, where his insights helped provide direction and guidance on the Programme's work. Along with Dr. Gary Preston, Dr. Yadava documented the Learnings of the Third Phase (published as BOBP/REP/85), which spelt out in clear terms the need for an inter-governmental set-up in the region.

Dr Yadava takes over the helm of affairs at BOBP at a very crucial juncture, when he has to steer the process of institutionalisation of the Programme as an Inter-Governmental Body within a small time frame set by the FAO.

Administrators and decision-makers in fisheries in the region wish Dr Yadava all the best in his new role as the Interim IGO Coordinator.

S R Madhu

The CHONG Years

The BOBP's Third Phase began late in 1994. The first two phases saw the generation and extension of new technologies to better the living conditions of fisherfolk through higher incomes. The Programme was active on many fronts: developing more effective fishing boats and gear, extension techniques, aquaculture and post-harvest technologies, and resource knowledge. A steady stream of reports, pictorial newsletters, video films and audio-visuals flowed throughout the first two phases, much to the acclaim and delight of fisheries staff and scientists of the region.

The Third Phase saw a new dimension to BOBP's role in the region. Thematically the Programme switched its focus to management – which was at once less easy to visualize, more difficult to design, more time-consuming to implement, than production. This Phase also saw a greater emphasis on national execution as opposed to the earlier direct field work by the BOBP staff.

Kee-Chai Chong was the right choice as Director for this new phase. He tirelessly preached the values of frugality, consultation and consensus. His pet themes were that man must respect nature instead of ravaging it, eschew past extravagance, draw on traditional wisdom and knowledge, and attempt to do more with less.

The Third Phase, in tune with the contemporary global initiatives, promoted consciousness about fisheries management throughout the region. The stakeholder approach to planning and management – under which all possible stakeholder types are identified, problems jointly discussed, possible solutions listed, and mechanisms for solutions through co-operative effort laid down – was introduced in every country through pilot activities, and written about extensively in *Bay of Bengal News.*

The pilot management activities which BOBP helped implement in the seven countries were remarkable for their variety. The conflict-prone fisheries of Kanniyakumari is far different as a management issue from the resource problems posed by push nets and set bag nets in Bangladesh. The ornamental fisheries of Sri Lanka are a unique problem. So are the reef resources of Maldives. Phang-Nga bay in Thailand, where community-based fisheries management was attempted through a whole package of management measures, was perhaps the most successful and the most instructive of all the projects. Pulau Payar marine park, Malaysia, was again one of a kind, an example of how resources could be conserved and expanded by designating and setting apart marine protected areas. Lessons from this project are applicable wherever governments wish to tap the wealth of marine parks. The management approaches for small-scale fisheries developed in Indonesia were taken up by a larger regional project.

That a small programme based in Chennai with limited resources could help develop management initiatives and solutions in as many as seven countries was quite remarkable. One reason is that Dr Kee-Chai Chong succeeded wherever possible in leveraging BOBP and FAO assistance to maximise development impact in an area.

To get its message across, the Programme in the Third Phase leaned heavily on workshops and publications. Being a prolific writer, Chong wrote a number of articles on various aspects of fisheries management. These were useful in view of BOBP's mandate to set a new paradigm for fisheries management in the region.

Chong believed passionately that BOBP should continue in some form after the expiry of Programme funds. He ceaselessly advocated the setting up of an inter-government body to take over from BOBP. He felt that an organization that had accomplished so much should not be allowed to wind up without a trace. If today the outlook for such a body is better than before, Chong (now a roving consultant on the eastern side of the Bay) is perhaps more responsible than anyone else.

BOBP wishes Dr Chong and his family all the best in the years to come.

S R Madhu

Exploratory Fishing Trials: training workshop on design, implementation and management

A 5-day training workshop on the design, implementation and management of exploratory fishing trials was held from March 20, 2000, at the Central Institute of Fisheries Navigation and Engineering Technology (CIFNET) in Chennai.

Organised by BOBP, the workshop was meant for Fisheries Department officers from India's four east coast states of Tamil Nadu, Andhra Pradesh, Orissa and West Bengal.

Seven officials from Tamil Nadu and one from Andhra Pradesh took part in the course. Two resource persons from the CIFNET (Mr. R. Mohanam and Mr. M.P. Mohanan), one from the Central Marine Fisheries Research Institute (CMFRI) – Dr. E. Vivekanandan; and three from the Fisheries Survey of India (FSI) – Mr. Mangala Das, Mr. Anrose and Mr. J.E. Prabhakar Raj – served as resource persons. On behalf of BOBP, Mr. A.D. Isaac Rajendran (training coordinator) and Mr. P.V. Ramamoorthy provided inputs as resource persons.

Dr Kee-Chai Chong, Director of BOBP, inaugurated the workshop. Mr. R. Mohanam, Deputy Director of CIFNET's Chennai unit, chaired the inaugural session.

Workshop topics:

- Information on fish resources in offshore waters based on desk research
- Coastal fisheries resources of the four east coast states
- Status of resources in inshore waters, and need for scientific management
- Options for fishery resource management and diversification from inshore to offshore fishing
- Methodologies for participatory offshore pelagic fishing trials for fishermen using shrimp trawls. Introduction to multi-day fishing with multi-gear operations in untapped fishing grounds
- Planning, design and implementation of participatory exploratory fishing trials for adoption in each state.
- Day and night signals for fishing vessels, and navigational equipment for offshore fishing
- Deckfitting requirements for offshore surface gillnet and line fishing
- Methodology to determine deck fittings and line haulers for fishing vessels
- Commercial exploratory fishing on pilot scale
- Preparing for fishing voyages
- Scouting and reconnaissance operations for fishing voyages
- Maintenance of fishing vessels on board and on the shore
- Compilation and recording of data in logbooks for fishing operations.
- Code of conduct for responsible fisheries
- Methodology for data analysis
- Economics of exploratory fishing trials; adopting the results of fishing trials for commercial use.

A fishing day trip was held with a private 43 ft. trawler converted as gillnet vessel on 23 November, to give the participants practical experience and acquaint them with operational details concerning the organization of voyages and gillnetting.

Workshop participants got background papers and work sheets in advance as reading materials to help prepare for the workshop. The audio-visual aids at CIFNET were put to good use by the resource persons.

Background to the workshop

The workshop was an outcome of recommendations made at a high-level meeting to review BOBP-assisted activities in India, held on June 29, 1999. Top fisheries officials at the centre and the four east coast states took part in the meeting, at which BOBP briefed participants about coastal fisheries management activities in Kanniyakumari district, Tamil Nadu. They were told that inshore waters in the area had got crowded with fishing vessels of different types. As a result, catch per unit of the vessels had stagnated, even fallen, and conflicts had broken out between fishermen.

In an effort to tackle the problem, BOBP in consultation with the stakeholders and the Department of Fisheries, Tamil Nadu, prepared a project proposal for exploratory offshore fishing trials. "The idea is to facilitate and encourage diversification of the trawl fishery in the state," said Mr. Isaac Rajendran. "With some low-cost modifications, the 43 ft trawlers or trawl boats can operate pelagic gillnets and longlines in offshore waters. They can also put cruising time to and from fishing grounds to good use by operating trolling lines."

In its project proposal, the DOF, Tamil Nadu, said that the exploratory fishing operations would be participatory – in co-operation with fishermen operating trawl boats. The operational base would be the Chennai and Chinnamuttom (capital of Kanniyakumari) fishing harbours.

Consequently, a five-year proposal was forwarded to the Government of India for financial support. However, the Ministry of Agriculture pointed out that a national policy for marine fisheries was being developed to direct and facilitate the management of coastal and marine fisheries in India. The five-year project proposal could be taken up once this national policy was finalized. Meanwhile, BOBP could go ahead with the training of east coast fisheries officials (training of trainers) in the design, conduct and management of exploratory fishing trials. Once the national policy got under way and funds became available, a programme for diversification of inshore trawl fisheries could be implemented.

BOBP then held discussions with CMFRI, CIFNET and FSI about a training workshop on exploratory fishing trials. The three organizations offered to make facilities and resource persons available.

"Participants at the workshop took active part in the discussions," said Mr P.V. Ramamoorthy. "They also discussed ways and means of interacting usefully with fishermen during offshore fishing operations. The one-day fishing trip was useful too ... The workshop was a good preliminary step. Participants will be able to provide inputs and support when a programme to diversify fishing from inshore to offshore waters is eventually implemented."

BOBP as an IGO

(Continued from Page 1)

With the emergence of a new global order in the management of fisheries, the responsibilities on the national governments have increased manifold. Therefore, attainment of national economic and social goals for the well-being of fisher families and for the sustainable development of fishery resources would call for much greater effort on their part.

Can the national efforts be supplemented and complemented by regional initiatives?

The BOBP has an excellent track record as catalyst and consultant in developing, demonstrating and promoting new techniques and technologies to help improve the conditions of small-scale fisher communities in the region. The Programme's past activities – many of them of a pioneering nature – have laid a strong foundation for small-scale fisheries development and management. An IGO would carry the work forward.

The IGO would stimulate and strengthen national management efforts, the prime need in fisheries today. More. Experiences in every member country of BOBP through the Programme's pilot activities provide lessons and learnings useful for all, obviating the need for expensive duplication of effort. During the Third Phase, Malaysia's experiences with national parks, India's efforts with conflict resolution in Kanniyakumari, Thailand's work with community-based fisheries management, and Sri Lanka's pilot project on ornamental fisheries were instructive examples of complex and significant management initiatives. BOBP has been instrumental in sensitizing national governments to the needs of good management. This work requires continuity. The benefits of management are now well recognized, but the methods and approaches are still not well understood or implemented. The Code of Conduct for Responsible Fisheries needs to be taken to user groups. People's participation and women's empowerment must be institutionalised, and be an integral part of the development and management process – at the policy-making level, also at the grassroots level, in the many thousand fishing villages of the region. Management regulations must be harmonised and streamlined.

There are many other areas where regional or sub-regional initiatives would be of immense value. Enforcement of regulations concerning capture fisheries. A common vessel monitoring system. Stock surveys. Methods to estimate harvestable potential. Networking of fishermen cooperatives and associations. Networking of information. Quality assurance in fish and fishery products. Specialised services for technical backstopping. Communication strategies for fisheries management.

Establishing a new order in fisheries management in the BOB large marine ecosystem can be possible only through co-operative effort, joint initiatives and a better understanding by member-countries of the region of one another's problems. Shared waters need shared management. There cannot be a better mechanism than the BOBP for establishing a new paradigm in natural resources management or for addressing the common requirements and needs of small-scale marine fisheries of the region.

As a powerful catalyst of small-scale fisheries development and management in the region for over 20 years, BOBP has effectively demonstrated what regional co-operation can achieve. It is incomparable within the region as a generator of ideas, as an engine of change or as a promoter of exchange of experiences in small-scale fisheries. As an IGO, it will continue to meet the aspirations of member-countries for promoting sustainable and responsible fisheries.

BOBP as an IGO will be the best gift of the new millennium to fisheries in the region. *Let us join hands in making this gift possible.*

Y.S. Yadava

Documentation of Learnings, Bangladesh*

The estuarine set bagnet and push net fisheries in Bangladesh are traditional fisheries that employ large rural populations; but both are resource-damaging. BOBP work in Bangladesh on managing the two fisheries has yielded some useful lessons concerning management options and implications.

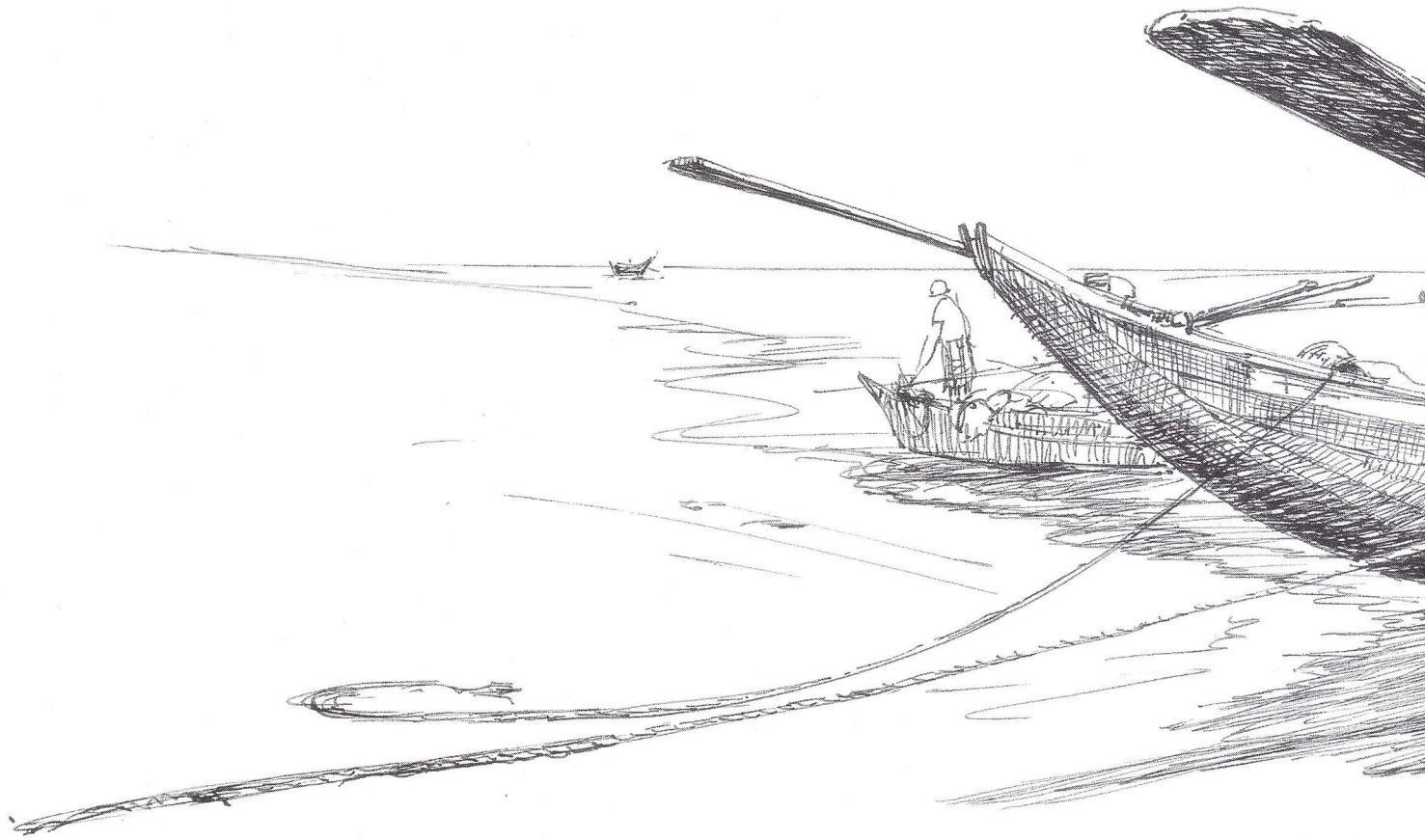
An estimated 20% of Bangladesh's population of over 123 million people live in coastal areas. A majority of them are fisherfolk or people dependent on marine resources for their livelihood. A situation analysis undertaken by the Bangladesh Department of Fisheries (DOF) of the Ministry of Fisheries and Livestock (MOFL) in 1994 identified the estuarine set bagnet (ESBN) and push-net fisheries as problem fisheries whose management needed immediate improvement. The analysis was based on a bio-socio-economic study of the fishery for tiger shrimp *(Penaeus monodon),* undertaken during the second phase of BOBP.

The ESBN fishery is a traditional fishery. It is not only a source of livelihood for a large population of mostly poor rural inhabitants, but is also responsible for much of the country's marine and brackish-water capture fisheries production. The fishery provides most of the animal protein consumed by the rural poor in coastal areas. The ESBN fishery interacts with at least seven other fisheries and has been shown to be destructive. It could lead to growth and recruitment overfishing of several important marine and brackishwater species.

It is widely agreed that the only realistic option to improve the management of this fishery is to reduce the fishing effort – through closed seasons or closed areas, for instance. However, this depends not only on ESBN fishers and other stakeholders being aware of the need for, the benefits of and methods of management, but more importantly, on their having alternative sources of income generation to ensure livelihood and food security.

Another approach may be to attempt gear modification to make it less destructive, but it is not yet clear how this could be done.

* A summary of comments made by a two-member Mission (G.L. Preston, Y.S. Yadava) that visited Bangladesh in 1999 to review BOBP's work during its Third Phase (BOBP 3).



The large number of fishing gear currently in use means that any organism discarded alive would quickly be captured again by another unit of gear. There may be potential to use aggregators to collect shrimp seed for capture, but this is an alternative, not a technological improvement.

The push-net fishery is of more recent origin, having evolved to supply Bangladesh's rapidly growing coastal aquaculture industry with *P. monodon* and *Macrobrachium rosenbergii* post-larvae. The fishery is very destructive because over 90% of its catch consists of juveniles of other commercially important species of marine and brackishwater organisms, which are discarded. The fishery not only provides the vast majority (over 95%) of the seed requirement of the coastal aquaculture industry (which is Bangladesh's second largest foreign exchange earner), but also provides seasonal livelihood for several thousand poor people, including a high proportion of women and children.

The best management option for the push-net fishery would be to ban it completely. However, this is impossible, given the coastal aquaculture sector's dependence on it, not to mention the number of poor men, women and children who make a living from it. The Government of Bangladesh is nevertheless under pressure from trawler owners to ban both the ESBN and push-net fisheries, which they claim are reducing their yields.

The purpose of BOBP's intervention in Bangladesh was to facilitate and enable improved management of the ESBN and push-net fisheries in selected coastal areas. This was to be achieved through awareness-building, strengthening the institutional capacity of concerned agencies, and provision of technical assistance.

As regards the ESBN fishery, it was decided that the BOBP project should focus on awareness-building of stakeholders at all levels, and in building the capacity of the DOF and the Fisheries Research Institute (FRI) in participatory techniques. It was also agreed that several pilot activities on seasonal and area closures of ESBN fishing would be attempted to test the feasibility of the idea and to gauge the social and economic implications of such initiatives.

As regards the push-net fishery, BOBP hoped to influence policy through awareness building and consultation amongst stakeholders in order to move towards more sustainable aquaculture practices based on hatchery-produced seeds. Hatchery development is seen as a long-term mitigating measure, but the small number of hatcheries in the country (14-24 according to different commentators) is constrained from growing by lack of investment capital. BOBP also aimed to work with the seed collectors and other stakeholders to reduce by-catch mortality, as well as the mortality of shrimp seed themselves during handling and transport.

BOBP's initial activities in Bangladesh took place in 1995. DOF and FRI staff were trained in participatory techniques, and in the planning of field work to undertake a series of stakeholder studies in three areas selected for this purpose. Subsequently, in 1996, several workshops and stakeholder consultations were held at which the strategies for the two fisheries were articulated and refined into a more detailed work plan. This involved identifying alternative income-earning opportunities for ESBN

fishermen, and research on aspects of by-catch and seed transportation mortality in the push-net fishery. The stakeholder consultations led to links with SAVE, a development NGO that specialises in the production of media and awareness materials. SAVE was commissioned to produce poster exhibitions, audio tapes and radio programmes to be broadcast on Radio Bangladesh, and comic books in support of the project's awareness-raising activities. Most of these tasks have been completed, although there were some delays in actually having the radio programmes broadcast once they were made.

The research work and stakeholder consultations led to the selection of the Cox's Bazaar area for a trial closure of the ESBN fishery. Seasonal closures during February-March and September-October were proposed as these were times of high shrimp seed catch. To prepare for the closures, a study of alternative income-generating (AIG) opportunities was carried out in six villages of the area by the Community Development Centre, an NGO based in Chittagong. Various options were identified, including betel-nut growing, small trading, crop cultivation, salting of hilsa (river shad), mechanical repair, etc. In reality, however, the solution of using AIG as a fishery management tool is fraught with problems, including the establishment of suitable banking and credit arrangements, dealing with seasonality of occupation, and preventing new economic migrants from entering the fishery if current fishermen move to alternative occupations.

At present it seems that there is little to prevent new fishermen coming into the fishery to replace those who move out. Many of the present push-net fishermen are new entrants who were previously working in unskilled or low-paid jobs such as rickshaw-pullers, and others may be waiting in the wings to replace those who leave the fishery. Part of the plan to support AIG activities involves the setting up of a financial or banking scheme which will be administered by DOF and implemented by selected NGOs, who will be able to make credit available to fishermen for AIG activities. However, the size and complexity of this task appears to have been underestimated by the DOF. Promoting AIG schemes is a complex and expensive task that requires skill training, credit support, managerial assistance and marketing help, and without the support of other government agencies and donors it will be difficult for DOF to do justice to this task, with or without BOBP assistance.

The state of play at the time of the study was that a series of public consultations would take place in order to promote broader public understanding of, and hopefully support for, the proposed closure. It was intended that this would be accompanied by training in reduction of shrimp mortality (e.g. through the use of air pumps). Subsequently, DOF will be able to move ahead with implementation of the seasonal fishery closures, in parallel with the AIG activities described above. The seasonal closures were originally scheduled for June 1999, but at the time of the present study (July 1999), the process had not really commenced.

In general, therefore, BOBP's primary activities in Bangladesh have proceeded in the direction planned, but there have been delays in some components. The level of performance of junior and middle-level DOF officers is said by BOBP staff to have been high, and in some cases outstanding, with many officers being enthusiastic about the project and the concepts it introduced. However, the organisational culture and management environment of the DOF are often not conducive to supporting innovative and creative efforts such as fisheries management. Funding shortages appear to be an important constraint; it not only makes national execution difficult, but raises the question of post-project sustainability.

The Marine Wing of the DOF, which is responsible for implementation, does not have a staff presence at the district and thana levels, and this may result in implementation problems. Testing of management initiatives will require issue of regulations, ordinances and notifications which can be delayed due to lengthy bureaucratic processes, and this can delay the project. Management initiatives, all of which depend on reduction of fishing effort, will succeed only if AIG options exist and are accessible, but initial indications are not very promising. Essentially, the fishery management problems being faced are huge and intractable.

Other activities have also been carried out, such as provision of training on participatory exploratory fishing trials, which took place in 1996 through a consultancy input but seems to have led to little in the way of follow-up by DOF. In 1998 BOBP organised a workshop on the Code of Conduct for Responsible Fisheries in Bangladesh as well as a workshop on monitoring and evaluation of fisheries development and management. BOBP has also worked with DOF, FAO and the British Department for International Development (DFID) to organise a National Workshop on Fishery Resources Development and Management. This was held in 1995 and brought together policy-makers, planners, administrators, fishery professionals, industry representatives and fisherfolk to discuss the status of Bangladesh's fishery resources and give directions for the future. In 1997, the same group of agencies organised a senior decision-makers' consultation which brought together Members of Parliament from the coastal constituencies, as well as ministers and technical advisors from government departments concerned with coastal development, to discuss coastal management and food security issues. The meeting provided an opportunity for senior administrators, policy-makers and politicians to be exposed to the needs and problems of coastal communities, and was viewed as a very valuable and important exercise.

It was noticeable from the study team's discussions in Bangladesh that BOBP was considered a small and somewhat insignificant project compared to the numerous and much larger national projects that are being developed, and which include elements of community-based management of coastal resources. The consultants were advised about several such projects, varying in magnitude between US$ 7 million and $ 26 million, that were currently in the planning phase, with support from a range of donors including the UNDP, GEF, and the British and Dutch Governments. Compared to these projects, the inputs from BOBP are indeed relatively tiny. However it was gratifying to observe that the approach and methodology pioneered by BOBP were being adopted by other donors in formulating these projects. In one case, BOBP had been formally invited to provide direct assistance to the project design process in order to ensure that the participatory approach was fully embedded in the project.

Other issues raised in Bangladesh related to some of the procedures used by BOBP. There was a broad feeling that

national officers working with the project had too little say in the decision-making process (especially financial), and that the Programme itself was 'too remote', with actual in-country interventions being relatively limited. This was considered by the study team to be a reflection of the limited resources available to BOBP3 itself, and perhaps also to the above-mentioned factor, that in Bangladesh BOBP3 is a very small project compared to many others being established in the country.

From another standpoint, it is clear that the Bangladesh Government's procedures for approval of activities and financial disbursement are not at all geared to the type of work promoted by BOBP. The Government system requires a rigid work programme and a budget approved far in advance, and makes little or no provision for modifications or amendments as the activity progresses. This approach is unsuitable to a BOBP3-type project, where the learning process is continuous, and activities need to be developed or modified in response to study findings or outcomes of the participatory process.

In spite of all these constraints and problems, a lot has been achieved in Bangladesh. Significant capacity-building within the DOF has been realised, and test management initiatives are ready for implementation. The participatory principles on which BOBP3 has operated have been adopted by at least two other, much larger aid-funded projects aimed at managing fisheries through the empowerment of coastal communities. In one case this is a direct result of BOBP involvement in project formulation. At the senior decision makers' consultation organised by BOBP, MOFL announced the development of a comprehensive fisheries policy and proposed the establishment of a high-level, inter-ministerial task force, with the Prime Minister as Chairperson, to give direction to, coordinate and oversee coastal development, including development and management of marine and coastal fisheries. With MOFL taking increasing responsibility and gearing itself up for testing management initiatives, it is intended that BOBP's role during the remainder of the project period will be reduced to conducting reviews and providing technical assistance as required.

"Public hearings" on managing the ESBN & PN Fisheries in Bangladesh

As part of the fisheries management effort initiated by BOBP, nine "public hearings", a consultation and a road show were held on the country's push net fisheries from November 1999 to June 2000.

A push net team picked 50 push net collectors from three fishing villages (Samity Para, Saikat Para, Kalatala or Laboni Para) for the public hearings).

During the first hearing, the push net collectors agreed that their nets are destructive and harmful to marine fisheries resources. They said they had started releasing by-catch back into the sea, but faced some problems.

- They had no pots or containers to hold the by-catch and put it back into the sea
- Not all the PL-collectors were motivated.
- There was no legislation to protect the resource.

The collectors requested a supply of containers, and suggested that vigilance groups supervised by the Department of Fisheries should monitor the activities of the collectors. Legislation should ensure that PL was released back into the sea.

During the first public hearing, participants were asked to practise PL collection carefully, without harming the marine resource. Techniques to reduce PL and by-catch mortality were demonstrated. The PL collectors were enthusiastic and agreed to act in the nation's interest by accepting the advice of the Department. The first hearing was thus useful in building awareness among PL collectors and providing them with an impetus to move ahead.

In response to requests made at the first public hearing, a hundred aluminium vessels and 15 air pumps were later brought and distributed among 100 fisherfolk.

A second set of public hearings was held after four months. Participants were divided into four groups of 50 persons each. One person in each group was given the responsibility of monitoring the activities of all the group members. At this hearing, techniques to cut down PL and by-catch mortality and the practice of releasing by-catch at hip-depth water were demonstrated. Every group member expressed his view on how the PL collectors could be persuaded to reduce the mortality of shrimp larvae and by-catch.

The participants' response was encouraging. They told the team about some techniques they had developed through experience. They said they were themselves alarmed at the depletion of fisheries resources, and agreed they had a responsibility to the country to save these resources from destruction. The low-priced fish that was once a part of their diet were no longer available cheap. They even suggested that people who do not release fry back into the sea should be punished.

It was decided that every participant should motivate 10 push net collectors. One of them announced, to enthusiastic applause, that he had motivated as many as 40 collectors.

A final phase pf public hearings, held during May-June 2000, focused on alternative income-generating activities such as poultry-rearing, running a small shop, goat-keeping, fish culture, fish trade etc. But as the fisherfolk lived on the seashore, there wasn't much scope for alternative income-generating activities.

The Department of Fisheries believes that shrimp post-larvae collection is still more profitable than any other occupation. It is highly unlikely that the push net collectors will relinquish it and take up anything else for a living, despite what they say. But they need some help to organise themselves to solve the problems of overfishing and declining resources.

Some PL collectors said they were forced by middleman (to whom they owe money) to operate the push nets even during the slack season. If they get loans, they will repay the middlemen and practise restraint in capturing shrimp post-larvae.

ESBN fisheries

Pilot awareness-building activities started in October 1999 instead of May because of both bureaucratic and weather delays. Three model villages of ESBN fisherfolk were selected in Cox's Bazar district. They were Gorkghata Jaladas Para and Mudirchara-Ahamadiakatta from Moheshkhali Upazila, and Teknaf Jalia Para from Teknaf Upazila. A public hearing was conducted in the three villages from April 5 to 10, 2000. Day-long activities in the villages included lectures, discussions, distribution of comic books, audio-visual programmes and mobile exhibitions. Participants outlined the past and present state of marine coastal fisheries resources, the life cycles of important shrimps and fishes, their exploitation by different types of gear, and the management of gear by the government.

Documentation of Learnings, Sri Lanka*

In Sri Lanka, BOBP supported a wide range of knowledge-building and awareness-raising activities about management of the ornamental fishery, and promoted consultations among various stakeholder groups on management plans for the fishery.

BOBP3's work in Sri Lanka has focussed on establishing management arrangements for the expanding ornamental aquarium fishery in the country, with a particular focus on the southwest coast from Puttalam to Hambantota. The project's objective is to facilitate and enable improved management of the ornamental fish sector through awareness building, strengthening the institutional capacity of the agencies concerned and technical assistance. Although focussed on aquarium fish, BOBP's work is intended to take place in the broader context of conservation of critical aquatic habitats such as coral reefs, lagoons, mangroves, sea grass beds, estuarine and riverine systems, and to promote sustainable resources utilisation from such habitats.

Aquarium fish collection is not a new activity in Sri Lanka, which was a pioneer in the industry. Between 1930 and 1960 the country had a thriving trade in the export of ornamental freshwater fish, which were sent mainly to Europe by ocean steamer. However, the industry declined due to a combination of factors, including competition from other countries, a failure to keep up with technology, and an unfavourable business environment created by a protectionist government economic policy.

In more recent times the industry has revived again, thanks to the opening up of the economic system and the growth of the tourist and air travel industry, which has provided direct air cargo connections to numerous destinations in Europe, the Middle East, Asia and Japan. The current phase of ornamental fish industry development began around 1991, when live fish exports were valued at about 5% of the total fish export value. In the subsequent seven years there was a 13-fold increase in the value of exports (compared to an eight-fold increase in the value of total fish exports) which resulted in aquarium fish accounting for about 8% of the total. About 60% of the ornamental fish exported are marines with the rest being brackishwater or freshwater species. Although there are numerous companies registered as live fish exporters, only about 20 are actually exporting at present.

Despite its rapidly growing economic importance, not much information exists about the ornamental fish sector in Sri Lanka and there are no data to suggest that any of the stocks are under stress or in danger. However, Sri Lanka's BOBP3 situation analysis, conducted by the Department of Fisheries and Aquatic Resources (DFAR) in 1994, identified the ornamental fish sector as a problem fishery whose management was considered a high priority need for the following reasons:

- Ornamental fish are collected from some of Sri Lanka's most vulnerable environments, including coral reefs, mangroves, lagoons, estuaries and sea grass beds. There was therefore concern about the future sustainability of the country's rich aquatic resources. Several NGOs had expressed concern that activities such as collection of ornamental fish were destroying Sri Lanka's biodiversity and putting the environment and the people at risk;
- Several government agencies have mandates that oversee wildlife, environment and natural resources utilisation. Legislation, rules and regulations in regard to some of them were in conflict with one another. The government felt the need to rationalise the process to promote a more coordinated multi-disciplinary approach;
- DFAR was of the opinion that the lessons learnt from improving the management of the ornamental fish sector would guide and give direction to processes to improve the management of larger and perhaps less organised fisheries that target food fish.

To this list should perhaps be added a national-level fisheries management programme that was already operating in Sri Lanka at the time BOBP3's work programme was being planned. This five-year initiative, funded by the UNDP and executed by FAO, aimed at improving the management of all types of marine food fisheries throughout the country. In addition to the reasons cited above, it seems only natural that DFAR should have selected an area for BOBP3 attention that was not already being addressed by another Programme.

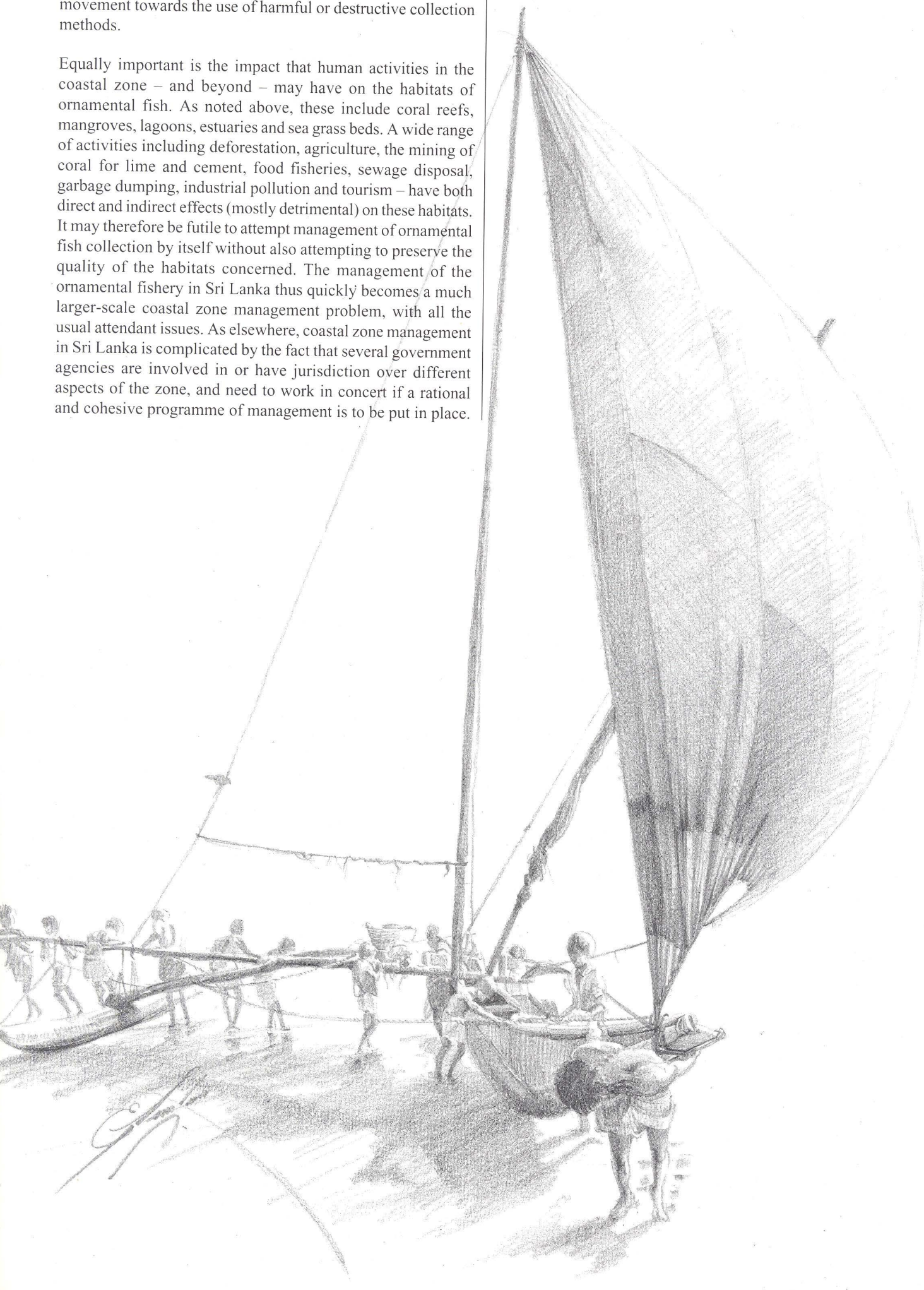
Little is known about the populations or the biology of many of the ornamental fish species being collected. Some are rare or endemic to Sri Lanka, and there is a concern that the rapid growth of the industry or indiscriminate collection could lead to overfishing. Management of the fishery thus relies on improving knowledge of the biology and ecology of the species concerned.

There is also the question of how the fish are collected. So far, toxic poisons or narcotics do not seem to be used as collecting tools, as they are in many other countries, and Sri Lankan aquarium fish have an enviable reputation of being 'drug-free'. The government has also placed a ban on some fishing gears which are not eco-friendly, such as 'moxy' nets (a type of surrounding net which touches onto the coral and which may

* A summary of comments made by a two-member Mission (G L Preston, Y S Yadava) that visited Sri Lanka in 1999 to review BOBP's work during its Third Phase (BOBP 3).

be used in conjunction with coral smashing). Management arrangements for the fishery will need to ensure that there is no movement towards the use of harmful or destructive collection methods.

Equally important is the impact that human activities in the coastal zone – and beyond – may have on the habitats of ornamental fish. As noted above, these include coral reefs, mangroves, lagoons, estuaries and sea grass beds. A wide range of activities including deforestation, agriculture, the mining of coral for lime and cement, food fisheries, sewage disposal, garbage dumping, industrial pollution and tourism – have both direct and indirect effects (mostly detrimental) on these habitats. It may therefore be futile to attempt management of ornamental fish collection by itself without also attempting to preserve the quality of the habitats concerned. The management of the ornamental fishery in Sri Lanka thus quickly becomes a much larger-scale coastal zone management problem, with all the usual attendant issues. As elsewhere, coastal zone management in Sri Lanka is complicated by the fact that several government agencies are involved in or have jurisdiction over different aspects of the zone, and need to work in concert if a rational and cohesive programme of management is to be put in place.



Against this background, BOBP 3 began a process of stakeholder identification, problem identification, and awareness-raising. Ministry of Fisheries and Aquatic Resources Development (MFARD) designated DFAR and National Aquatic Resources Agency (NARA) as the primary agencies responsible for implementation of the BOBP-assisted effort, and the activity was incorporated into Sri Lanka's 1995-2000 National Development Plan. The Government committed a budget of Rs. 500,000 into the fisheries plan to facilitate national execution of the project. Four staff of NARA were trained in undertaking stakeholder identification, stakeholder analysis and stakeholder communications and perceptions analysis. A one-day stakeholder consultation was held with selected NGOs interested in and concerned with the ornamental fish sector, which resulted in the concerned NGOs agreeing in principle to participate in the management process. BOBP and Project staff undertook stakeholder analysis by meeting representatives of concerned government agencies, the Live Fish Exporters' Association and the Ornamental Fish Breeders' Association.

The findings of the stakeholder analysis gave direction to the development of a project strategy and detailed work plans for 1996 and beyond. The analysis suggested that while differences existed in the perceptions of problems and solution options by the various stakeholders, there was a clear commonality, in that all parties feel that they stood to benefit in the long term from a programme that would ensure the sustainability of the resources and the habitat.

The central aim of the BOBP-assisted work was thus determined as being to promote consultations and negotiations amongst and between stakeholder groups in order to arrive at a negotiated management plan. To aid and assist the consultation process, two parallel activities were planned. One was to add to knowledge of the status and trends of resources and habitats to provide the stakeholders with the best available scientific information on which to base their decisions. The second was awareness-building on the need for, benefits of and the methods of management amongst all stakeholders. Once the broad approaches had been agreed, BOBP provided support to a wide range of activities, including the following:

- BOBP and DFAR conducted a two-day Orientation Workshop on Fisheries Management for all middle and senior level staff of MFARD and its associated agencies, including District Fisheries Extension Officers;
- BOBP and MFARD conducted a stakeholder consultation to bring together senior administrators and technical staff of 15 government agencies, interested in and concerned with the management of the ornamental fish sector to discuss the issues and concerns and to invite suggestions on how to improve coordination and co-operation in the sector's management;
- 12 staff of DFAR were trained in the conduct of a study on regional values, perceptions and attitudes of fisherfolk and other stakeholders towards fisheries resources, fishing practices and fisheries management;
- DFAR and BOBP conducted one-day meetings with ornamental fish divers and collectors in the Colombo and Negombo areas so as to better understand their problems and elicit their views on solution options. An important issue that came up was mobilization of the divers into an association or a union to represent their interests;
- DFAR and BOBP had discussions with leading insurance companies regarding the possibility of developing custom-designed insurance schemes for accident and life coverage of divers. With the co-operation of MFARD, insurance schemes have been initiated for fisherfolk and divers;
- MFARD organized a meeting of the stakeholders of the ornamental fish sector. The meeting resulted in a recommendation to the Minister for Fisheries and Aquatic Resources Development to request the Cabinet to establish a high-level, inter-ministerial task force on policy and strategy for the conservation and management of critical aquatic resources and habitats, which would coordinate and oversee conservation and management efforts;
- BOBP co-sponsored a trade fair and a seminar to promote the development and management of the ornamental fish sector with MFARD and the Live Fish Exporters Association of Sri Lanka;
- DFAR, NARA and a locally commissioned artist/ diver prepared identification catalogues of ornamental fish species whose export is either banned or restricted. The catalogues, intended for use by the Flora and Fauna Task Force of Sri Lanka Customs, were prepared in the form of loose-leaf binders and were handed over to Sri Lanka Customs by DFAR;
- Water-resistant ornamental fish identification cards, illustrating the species whose export is either prohibited or restricted, were designed and produced for exporters, breeders, collectors, divers and customs staff;
- A study on the Status and Trends of Ornamental Fish Resources and Habitats was commissioned. A senior staff member of the University of Colombo was assigned to conduct the study. MFARD and DFAR organized a workshop to review and discuss the report, which was subsequently modified in the light of feedback received from the workshop;
- A diagnostic study of the monitoring and evaluation system of MFARD by the Ministry of Plan Implementation and independent consultants was set in motion. When completed, the study is expected to give direction to the Ministry's efforts to strengthen its monitoring and evaluation system;
- In direct response to requests from divers, preparatory activities were undertaken to design and develop a comic book on diver safety and conservation.

Some of the BOBP-assisted activities, such as the conduct of stakeholder studies, were impeded by the security situation in Sri Lanka. This has also affected funding of BOBP's counterpart agencies, which has in turn resulted in delays in project implementation. Another concern in regard to national implementation is the acute shortage of trained manpower in fishery agencies, particularly in sections concerned with fisheries management. In the case of the BOBP-assisted

activities, this has resulted in some of the agreed activities not being followed up by the counterpart agencies.

During discussions with concerned parties in Sri Lanka, the study team found a high degree of satisfaction with the activities of BOBP 3. This was particularly so on the part of the aquarium fish collectors themselves, who attributed many of the positive developments that have occurred – such as formal recognition of their profession, issuance of identity cards (to assist relations with security forces patrolling the Colombo Harbour security zone) and organisation of fishermen's groups – to BOBP-generated activities. At a higher level, senior Government officers consulted recognised that the organisation of the industry at all levels had been assisted by BOBP, whose activities may have further accelerated the growth of an industry already expanding rapidly.

MFARD is keen on further improving management of the ornamental fish sector by developing a precautionary plan of management, which will involve all the key stakeholders. The Ministry is in the process of amending the Fisheries Act and establishing a working group to evolve the precautionary plan. Given the government's concerns for fisheries resources and development and the enthusiasm of the stakeholders to ensure some sort of a sustainable future, it seems reasonable to expect that these concerns will translate into policy and action. MFARD has taken an important step at the request of the stakeholders, and proposed the establishment of a high-level task force to oversee and coordinate the conservation and management of critical aquatic resources and habitats. However, given the multi-sectoral nature of the problem, progress may be slow and will need facilitation and support. With adequate capacity building inputs to DFAR and technical assistance to the task force, a lasting national effort towards conservation and management or ornamental fish resources and habitats should be possible.

He was a lovable character

By Mahinda Rajapakse

Sri Lanka's Minister for Fisheries and Aquatic Resources Development pays a moving tribute to Dr Anton Atapattu, Director-General of the Department of Fisheries, who died recently. This article is reproduced from the Daily Mirror, *Colombo, of June 8, 2000, with the kind permission of the Editor.*

In the death of Dr Anton Atapattu, Sri Lanka has lost an expert of very high calibre and a very able advisor. He leaves a great void which cannot be filled for quite some time.

Looking back at the knowledge, experience, management skills, international exposure and academic achievements of Dr Atapattu, acquired during the last 28 years, I begin to realize that the choice made by the late George Rajapakse to recruit Dr Atapattu to the Department of Fisheries was far-reaching and wise.

Dr Atapattu had an unchallenged reputation as an expert and I had no hesitation in appointing him to the newly created post of Director-General of the Department of Fisheries and Aquatic Resources in January 2000. I knew that he had far-reaching plans for the development of the fisheries sector. With his new position and new responsibilities he would have made an unparalleled contribution. Dr Atapattu was an affable and friendly character who never got ruffled. His commitment to his official duties always took priority over anything else.

Dr Atapattu joined the Department of Fisheries in May 1972 as a District Fisheries Extension Officer. He became Assistant Director of Programme and Planning in 1980. It did not take him much time to get promoted as Deputy Director of Fishery Development. In this capacity he handled a number of foreign-funded projects and the success of these projects took him to the position of Director Fisheries in 1982. During this period, he concurrently held the posts of Acting Chairman of Fishery Harbours Corporation and President of the Sri Lanka Fisheries Cooperative Federation.

By the year 1989, Dr Atapattu had gained international recognition as a fishery management expert and was in great demand from various foreign fishery organizations . In September, 1989 he was called to function as Fisheries Credit Advisor for Eastern Caribbean states. Once again, in 1997, he was called upon to serve as Fisherfolk Organizations Development Advisor of the Ministry of Agriculture,

Fisheries and Rural Development in Barbados, West Indies. In Barbados, he planned and organized fisherfolk and set up national organizations for better management of fisheries. On his return, after the two-year assignment abroad, Dr Atapattu was appointed to the newly created post of Director-General.

During my stint as Minister of Fisheries and Aquatic Resources Development, I was impressed by Dr Atapattu's deep knowledge of the fishing industry and his desire to document his knowledge so that others could benefit. He has produced research papers of very high quality, an example for others. He attended some 30 international conferences and symposia on fisheries. At the time of his demise he was the first Vice- Chairman of the FAO Sub-Committee on Fish Trade.

In the sphere of academics, he focused attention on his professional working environment. This is reflected in his PhD thesis on the subject "Bio-economic Management of Tuna Fisheries in the Indian Ocean with special reference to Sri Lanka." He served as a visiting lecturer in three universities and also at the Central Bank Staff Training College.

The loss of this lovable expert is a great shock to his colleagues and friends. From what I hear in the rooms and corridors of this Ministry, it will take a long time for all of us to get over this shock. On behalf of everyone associated with fisheries, I express my deepest sympathies to his beloved wife Sherin Atapattu and his daughter.

Documentation of Learnings, Thailand*

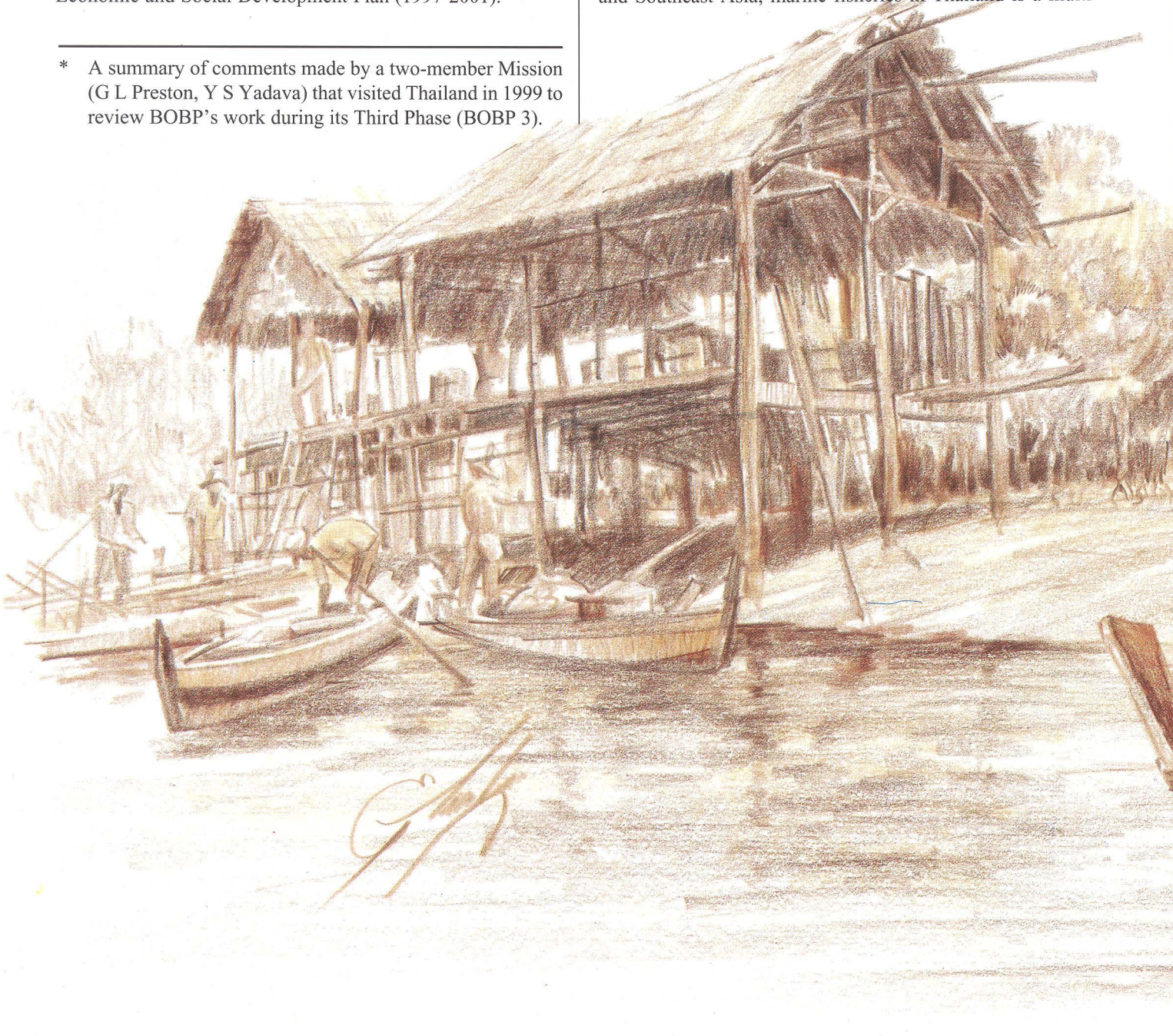
"The Bay of Bengal Programme during its Third Phase has been highly successful in Thailand. The Project stands out as a big success story."

Since the launching of the First Five-Year National Economic and Social Development Plan in 1961, fisheries development has been an integral part of the social and economic development of Thailand. The fisheries sector now contributes significantly to the country's economy, and in particular to food and employment generation. Under the Seventh National Economic and Social Development Plan (1992-1996), increased attention was given to the rehabilitation of fishery resources and fish habitats in the Thai marine waters through more effective fisheries and environmental management measures. The same strategy has been adopted with renewed vigour by the Thai Department of Fisheries in the current Eighth National Economic and Social Development Plan (1997-2001).

The Gulf of Thailand (FAO Statistical Area 71) and the Andaman Sea off the west coast of Thailand (FAO Statistical Area 57) comprise the major fishing areas of Thailand. The Andaman Sea, with an area of about 126 000 sq. km and a coastline of about 740 km. is deeper than the Gulf of Thailand. In the Andaman Sea, from Phuket Province to Ranong Province, the continental shelf is narrow and the sea bottom mainly comprises muddy sand and coral remnants.

Small-scale fishermen are important constituents of the fishing industry in Thailand and account for nearly three-quarters of the total fishermen population. As in other countries of South and Southeast Asia, marine fisheries in Thailand is a multi-

* A summary of comments made by a two-member Mission (G L Preston, Y S Yadava) that visited Thailand in 1999 to review BOBP's work during its Third Phase (BOBP 3).



gear, multi-species fisheries, conducted by a large number of small-scale fishermen. Trawl netters of various sizes, followed by gill netters, dominate the marine fisheries.

Several factors such as improved economy, imported fish capturing devices, fishing technologies and methodologies and rapidly increasing demand in the domestic and foreign markets for fish and fish products have induced rapid marine fisheries development during the last 3-4 decades in Thailand. This has, in turn, resulted in a drastic decline in the abundance of coastal fishery resources, both in the Gulf of Thailand and the Andaman Sea. As a consequence of depleting stocks, conflicts between small-scale and commercial fishermen have been rising.

The theme of the Third Phase of BOBP in Thailand, as suggested by the National Economic and Social Development Plan, focussed on development of community-based participatory approaches to the management of fisheries and aquaculture in a coastal zone context. Phang Nga Bay along the Andaman Sea coast of Thailand was selected as the focal site, with the Department of Fisheries (DOF) as the main implementing agency. A few Non-Governmental Organisations (NGOs) and universities were also identified as implementing agencies. Presently, Mr. Jate Pimoljinda, Director, Andaman Sea Fisheries Development Centre, Phuket, is the National Project Coordinator.

Phang-Nga Bay, with an area of about 1,960 sq. km, is considered the most important bay on the Andaman coast of Thailand, covering parts of Phuket, Phang-Nga and Krabi Provinces of southern Thailand. There are 114 villages located along the Bay with a population of approximately 0.1 million. Fishing and aquaculture activities, followed by tourism, comprise major occupations of the communities residing in the Bay.

In the past, tin mining in Phuket, Ranong and Phang Nga Provinces was the main cause of marine pollution, affecting the health of coral reefs and the seagrass bed. With the decline in tin mining activities in recent years, the main cause of pollution is now effluents released from the growing number of houses, hotels, and restaurants and from tourism, especially in Phuket Province. As a microcosm of Thai fisheries, Phang-Nga Bay displays almost all the problems encountered in Thailand.

The Situation Analysis in Phang Nga Bay identified progressive use of harmful fishing practices, reduction in demersal catch, over-exploitation of both pelagic and demersal fisheries, changes in species composition, difficulties in enforcement, degradation of the fisheries habitat, pollution caused by sedimentation, increased nutrients from industrial sources, and conflicts between small-scale and large-scale fisherfolk, as key issues. The Analysis also brought out the Government's keenness to develop management approaches facilitated by the establishment of marine parks, the deployment of village-based artificial reefs, and better enforcement by improving people's awareness and participation.

During the first year of the DOF/BOBP Third Phase, the objectives, design and early implementation of a CBFM Project in Phang Nga Bay on the issues identified by the Situation Analysis were developed. Introduction of community-based fisheries management (CBFM) started in four villages – Ban Hin Rom, Ban Klong Kian, Ban Haad Sai Pleug Hoy and Ban Ao Makham. Based on the initial success of the Project in these four villages, more than 10 villages are presently involved in the programme. Some of the important activities undertaken by the project so far include:

- DOF/BOBP CBFM Workshop in which fisherfolk, village leaders, government officials, NGOs, universities, BOBP and FAO participated. It was for the first time that the fisherfolk met with government officials to plan fisheries management.

- Release of juveniles of tiger prawn, blue swimming crab and sea bass in five villages of the Bay. This activity is ongoing and is being rotated between Bay villages.
- Rehabilitation of mangrove and sea grass area.
- Setting up of cages in four villages to place gravid female crabs caught by fisherfolk. Once the crabs release their eggs, the crabs are sold and the profits are used for village CBFM activities.
- Sensitizing push-net fisherfolk to give up their destructive push nets. Supply of gill nets to encourage greater compliance of the push-net ban.
- Public hearings (bi-monthly) with fisherfolk in the Bay, with more and more suggestions for resolving problems of resource degradation and pollution.
- Training of fisherfolk in data collection techniques and establishment of standard data protocols on catch, habitat conditions and bio-indicators.
- Establishment of volunteers for surveillance of illegal fishing.
- Setting up of revolving funds.

Representatives of the fishermen community interviewed were very supportive of the activities initiated under the Project. They were of the view that after they joined BOBP, the message of conservation has spread and the villagers now realise the importance of conservation. Protection of sea grass close to the shore is their own idea, and marker buoys are placed to demarcate such zones. This demarcation has helped in conservation of juveniles of many fish species, thus enhancing the fisheries. In the sea grass area, the use of environment-friendly gear is now propagated by the fishermen. Some 60 fishermen have formed a co-operative society, and a revolving fund has been set up for uses such as village development, soft loans to fishermen, gear procurement, etc. Presently, four villages in the Bay have set up the revolving fund.

The most significant impact due to the Project's activities (like release of gravid females of crab species) has been in increase of fin and shell fish landings and the increase in catch per unit effort (CPUE) from 8 to 10 kg/boat/day. This has also increased fishing effort in the Bay, and it is felt that this could have an impact on the fisheries in the long run. However, the fishermen were of the view that in case the CPUE goes down in future, the fishermen would be advised to reduce effort in the area. This development has brought out the need for a sound sampling programme to continuously monitor commercially important fisheries so that corrective measures can be taken as and when there is shift in the CPUE.

The Mission observed that while there has not been much impact on the use of environment-friendly gear, conservation aspects appeared to be more clear to the fishermen now. However, the DOF is of the opinion that the use of destructive gear is on the decline. One village has set a good example, other villages can also follow this example. The villagers are receptive to the idea of conservation and sustainable development. The DOF is also of the view that if the programme continues, conservation and development of the resources would be much faster since the initial difficult stage of sensitizing the fishermen is over. Whatever fishermen have learnt will continue since they are now convinced of the benefits of conservation.

Sea ranching of commercially important finfish and shellfish species has been one of the important activities pursued by the Thai Department of Fisheries during the last two decades. While no study seems to be in place to assess the impact of sea ranching in Thai waters, the DOF correlates the increased landings to sea ranching. Under the DOF/BOBP Project, juveniles of tiger prawn, blue swimming crab and sea bass have been released to not only increase the abundance of stocks of these species in the Bay, but also to inculcate the idea of conservation amongst the fishermen. To sustain sea ranching in the future, greater emphasis would be required on hatchery-based seed production and related aquaculture activities. Issues such as supplementary feed of animal origin, trained manpower, disease management, etc. would have to be considered more carefully while pursuing large-scale sea ranching programmes.

Many recommendations of the Workshop on Community-based Fisheries Management held during 14-16 February 1996 at Phuket (RAP Publication 1998/3; BOBP Report No. 78) enhanced the Project.

Meetings with fishermen groups at regular intervals have been a strong point of the work programme. The meetings are held at bi-monthly intervals, and have helped find solutions to many critical issues. Besides fishermen and DOF officials, district leaders, health officials and police officers have taken part in these meetings. The participation of representatives of the Fishermen Association of Phuket (representing commercial-scale fishermen) has helped foster a better understanding between the small-scale and commercial fishermen groups.

The DOF had some NGO groups participating in the Project in the beginning, but they later withdrew from the Project. There are many strong NGO groups in Thailand dealing with coastal fisheries management. The DOF is of the view that it would be most appropriate for the NGOs and the villagers to handle the projects themselves. The DOF also wanted contact with the NGOs to be established through the DOF, and not directly.

The Mission observed extensive rubber plantation and shrimp aquaculture activities in the catchment area of the Bay. The run-off from such activities would be instrumental in increasing the nutrient load in the Bay, leading to higher eutrophication levels. To minimise such impacts it is essential to integrate all the stakeholders into the Programme and ensure their participation. Presently, only those fishermen who are not boat owners or who work on shrimp farms are actively participating in the programme. Participation of the boat owners and those who own shrimp farms or rubber plantations should also be ensured in the discussions to make the exercise more productive.

Gender involvement in the Programme and its sensitivity to the objectives of CBFM could not be assessed directly. However, the feedback the Mission obtained during discussions with fishermen revealed that while the women fisherfolk in the target area are not involved directly in fishing, they play an

important role in marketing and processing activities. They are also happy with the fishery conservation programme and would like the activities to make further progress.

The advantages of a regional project *vis-à-vis* a nationally executed programme (with or without external funding) was raised during discussions with DOF officials. There was strong support in favour of a regionally executed project due to various reasons. A regional project enables a country to share ideas and experiences in areas of common interest with other countries. Regional projects have a certain flexibility, which makes them more successful than nationally executed projects. Fishermen are proud to be part of a regional project, and this feeling has contributed substantially to the success of the project. The information contained in BOBP Newsletters was appreciated as being wide in scope and application. The DOF officials were also of the view that the results of projects carried out by BOBP in other member countries could be considered for implementation by Thailand at an appropriate stage.

Several other issues relating to CBFM surfaced in the discussions with stakeholders. It was generally felt that CBFM alone may not be the panacea for all ills plaguing the fisheries sector. It needs to be supported by technological developments and a legal framework wherever necessary. Issues such as technological back-up to check proliferation of seagrass, ways to resolve multi-user conflicts, empowerment of the coastal communities, quantification of juvenile abundance in the sea grass area, cap on effort, etc. came up in the discussions.

The Mission was informed that many activities complementary to the BOBP Project are being undertaken by the Andaman Sea Fisheries Development Centre, Phuket. These include collection of catch data (including species composition and size distribution of economic species), training for data collection, data on the value of the catch landed, and some socio-economic aspects. The catch statistics from 1995 till date are available. The DOF also has an experimental project on the colonisation of seagrass beds for the Andaman Seas. The Ministry of Science and Technology has established a committee to study all types of pollution in the coastal areas.

During the course of discussions with the DOF staff and the stakeholders, some constraints in implementation of the Programme and suggestions for future consideration figured. The DOF was of the view that while the budget for implementation of the Project may not have been a constraint (about US $ 20 000 were available), the availability of capable and willing manpower was an impediment. Therefore, even if a national budget was available, there was no provision to use it. A consultant to provide regular assistance was needed.

Engagement of new employees/personnel for the Project was essential. Only short-term ad-hoc arrangements were made, which did not serve the purpose. DOF provided only a temporary biologist (Mr. Sakul Supongpan) to assist the Project. The Project should have allocated funds for hiring experienced workers. Organisation of domestic tours was also difficult at times.

The need for more ideas /technologies on post-harvest aspects (focus on value addition) was felt. There should have been greater regional exposure in this subject. Depending on the availability of funds, representatives of the communities engaged in the Project could be taken on tour to observe success stories elsewhere. Villagers were of the view that an ice plant or cold storage could improve their income, since the catch would be in a better condition for marketing. The findings and learnings of the Phang-Nga Bay should be documented and distributed to other areas in the coastal region. DOF believed that a Situation Analysis should be done at the end of the Project as was done in the beginning.

The BOBP3 has been actually implemented only during the last three years. The first two years were taken up in planning. The Department believes that the Project should be extended for at least another five years. This request takes into account the needs of the fishermen who would like the Project to be extended to pursue community-based fisheries management. The Mission feels that the delay in starting of the Project justifies the request of the DOF and of the Project fishermen for extension of the project for a reasonable period. The Project is quite essential to the Department of Fisheries (DOF), and if BOBP does not continue, the DOF will set up its own programme to continue the activities.

Another CBFM project has already started in the Gulf of Thailand (Bang Sapan District, Prachuas Kiri Khan) as a nationally executed programme.

Summing up, the Bay of Bengal Programme in its Third Phase has been highly successful in Thailand, and terminating the Project at this stage may not be worthwhile. The Project stands out as a big success story. Work carried out in Phang Nga Bay could be replicated elsewhere in Thailand and also in the Bay of Bengal region. While a strong national commitment to take up similar work was apparent from the discussions, it would be worthwhile to pursue and ensure a logical conclusion to the III Phase activities, even if it means extending the Project. A vacuum left by the Third Phase for national execution would not be constructive – because project officials working at Phang-Nga Bay may lose their momentum, and the interest of the fisher community in fully integrating the objectives of the Programme in their day-to-day activities may slacken.

Cage culture in Thailand

Contradictions in Sustainability*

The concept of sustainability is riddled with conflicts and paradoxes

Stephen Dovers & John Handmer

Sustainability has emerged as an umbrella concept beneath which integration of the many interrelated issues of environment and human development can occur. There are two distinct aspects to this. The first is the overarching concept of **sustainability,** which is the long-term and difficult goal of reaching an ecologically sustainable state. The variable process by which we might move somewhat nearer to this goal is **sustainable** development, a subsidiary notion. The two are not the same.

Sustainability has been discussed intensively in the past few years, and it is not surprising that contradictions within the concept are now emerging. Sustainability is indeed characterised by deep-seated contradictions – paradoxes, conflicts and tensions – between perhaps irreconcilable goals or directions. Here, we comment on eight of the most common contradictions.

1. Technology and Culture: Cause vs Cure

This contradiction is really a paradox and, with human over-population and wastefulness, is a key underlying factor of the global environmental crisis. Humanity's natural inclination for culture, in all its forms, and of which technology is as tangible example, is the basic reason why we can impact so heavily on our environment (the 'techno-addiction' described by Boyden (1987). The development and application of technology for practically all purposes has enabled, and indeed continues to encourage, an increase in our consumption of resources and production of wastes. There is no general questioning of the implicit assumption that virtually any application of modern technology is necessary or desirable. Problems of human and environmental cost are often acknowledged, and further applications of technology are sought to resolve them.

Yet the same aptitude for culture that is the cause of our dilemma offers the only means of moving towards sustainability and is the 'eco-cultural paradox' of Boyden & Dovers (1992). It is of course only our cultural ability to reason, communicate, plan and invent that allows us to contemplate desirable change.

2. Humility vs Arrogance

Despite an ever-increasing quantity of information, our comprehension of the global environment is characterised by greater and greater uncertainty. This has been termed the 'ignorance explosion' (Smithson 1992). To a western culture underpinned by a belief in the certainty and resolving power of science and technology, this is a disturbing situation, and the realisation of this may even be a threat to the social fabric (Ravetz 1986). Current policy-making processes are not good at recognising and coping with uncertainty.

We need the humility to acknowledge that none of us is or ever can be all-knowing. At best our knowledge will always be incomplete, while at worst it may be wrong in every respect. We need humility to maintain an open mind on new knowledge and experience, to listen to new ideas and leaders, and to ensure that we are flexible enough to deal with entirely new circumstances (see contradiction 7).

At the same time, we must have the arrogance to make decisions in the face of this inevitable ignorance. Curiously, at present we seem to have humility only in the face of the status quo, and arrogance mainly in terms of defending it.

3. Inter-generational vs Intra-generational Equity

Inter-generational equity, or justice between generations, is the ultimate moral principle behind the notion of sustainability. However, simply assuring resources for the future is seen by many as inadequate if the grotesque inequalities in the world today continue. These disparities are most obvious between the industrialized and industrializing worlds, but exist even within the world's richest countries.

But if resources are to be held over for the future, can enough of them be made available at present for those millions of humans who now lack even their most basic needs? Simplistically, either the resource supply is enlarged or redistribution occurs, and the former options seems increasingly unlikely on the ecological evidence. As the World Commission on Environment and Development (1987) noted, if the developing and less developed world was brought up to the consumption level of the industrialised countries, a five-fold increase in total load on the biosphere would result, as measured by energy use. Can we contemplate a five-fold (or more) escalation in the rate of environmental degradation?

Massive redistribution of resources – physical, economic and environmental – thus appears to be the ecologically defined avenue. The profound conflict is political, because it would seem that any realistic scale of redistribution must be judged in the West as politically impossible.

4. Growth vs Limits

In the view of some people, the joining together of the two words 'sustainable' and 'development' produces a self-contradiction. This view would see 'development' – equalling the kind of economic growth that is so widely experienced in the modern era – as being thoroughly unsustainable in that it is the

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actual cause of our ecological predicament. Others see a different, less environmentally damaging form of growth in the future as possible and indeed essential.

Certainly, constant growth in an intellectual, spiritual or artistic sense would be environmentally feasible; but growth as currently understood is largely a physical or material concept. The notion of endless growth in material consumption and in the environment load of the human population raises the prospects of ecological limits. If there are eventual limits, as would seem to be the case, humanity has certainly come much closer to them than ever before – or, as some suggest, may even have exceeded them already (Meadows et al 1992). It is of course far more politically palatable to suggest that economic growth can continue, albeit redefined, than it is to suggest that it has reached or will inevitably reach, some limit.

5. Individual vs Collective Interests

The notion of individual choice is a basic tenet of the political and economic arrangements of western cultures. In practice, individualism is epitomised by, among other things, our automobile culture, our attitudes to land tenure and our seeming preference for smaller and smaller household units. But environmental issues, and sustainability generally, are overwhelmingly collective problems arising from the sum of individual preferences and consumption. Those who consume little will bear the costs of total consumption just as much as those who consume a great deal. So the tensions between individual and broader goals are thrown into sharper contrast.

This tension also exists internationally. The rights of nations are fundamental to the modern world order, even if reality for many smaller countries might be very different for nations and for the macro-scale building blocks of the human world. There are obvious conflicts in balancing the rights and conversely, the responsibilities of individual nations regarding global environmental damage. For example, Australia uses less than 1% of the world's primary energy but has one of the highest per capita rates of usage. On what basis is Australia's contribution to reducing global CO_2 emissions to be judged?

6. Democracy : Diversity vs Purpose

Issues of conflict also arise in questions of preferable social and institutional arrangements. Often, after looking to the

Stella Maris Girls Pledge to Protect the Environment

The Stella Maris College in Chennai has launched "Bhoomi Vandanam" (Tribute to Mother Earth), a series of programmes to create awareness on environment and pollution issues among students.

Ms. Anna Thomas, Treasurer of the Students Union, said "We are 2800 in all. An active core group among us motivates students to protect the environment and combat pollution through various programmes".

The Inaugural Day was marked by a dance performance and a display of beautiful posters put up by the students of the college. The BOBP was also approached to display its posters. Select BOBP posters and publications were distributed to students.

Pic. E. Amalore

natural world for answers to our human environment problems, the idea of diversity has been mooted. The basic idea is that in diversity, as opposed to its absence, there lies a greater range of potential answers to problems and a swifter ability to response: a movement away from the immutable, centralised and monolithic structure of industrialised societies is thus indicated.

However, while such an approach may encourage local responsibility and local action, the situation at the global level requires collective international action. A competent democratic handling of local environmental issues may well be swamped by global environmental change, unaddressed because of the impracticability of common-purpose action in a world that is structured by a myriad of unconnected autonomous regional economies which are going about their own business. Self-determination and participatory democracy are promoted as basic rights; but the paradox is that this aim may contradict the need for purposeful action at the global level.

7. Adaptability Vs Resistance

Modern industralised societies and their institutions are particularly good at resisting major change, which is paradoxical for structures set up by that most adaptable of species, *Homo sapiens*. One side of this is that the strength of these societies is their ability to perpetuate themselves. Unfortunately, this very success at maintaining the basic social structure is a major impediment to making the major changes that are necessary for sustainability, as a reactive form of resilience is far more common than a proactive form (Dovers & Handmer 1992). Institutions which have spent most of their existence actively resisting change are likely to find sharp redirection difficult; change is likely to be deferred or resisted until it happens in a very painful way.

8. Optimisation vs Spare Capacity

Another basic assumption lying behind our current situation is that of optimisation: to make the 'best' possible use of such resources as are available within a given constraint set. This notion supports neo-classical economics in particular, and public policy processes generally – unused resources are viewed as waste , and everything that can be used is defined as a resource.

From an environmental viewpoint, the critical result of this goal of optimisation is that we tend to view unused resources as a waste, and, to make up for this, expand use to the limit. Using the environment to the fullest possible extent, we leave over very little of the spare capacity that may be so useful, when confronted by the need to change. In a fully utilised world, change even at the operational margins has greater human and environmental costs. This is particularly the case in marginal environments and for those who dwell in them – generally the poor and dispossessed. Spare capacity would appear to be desirable for sustainability. But the conflict is that fuller and fuller use of resources is a moral and survival imperative for those who lack basic needs.

Conclusion

What are the implications of these contradictions and paradoxes for the future of humanity and the achievement of an ecologically and humanly sustainable world? There are three possibilities. First, the above discussions point to pessimism as an obvious and logical position: the deep-seated nature of these contradictions indicate that they are perhaps insurmountable. The magnitude of the problems of environment and development can be overwhelming enough, let alone when matched with the magnitude of the cultural and political obstacles.

Second, it may be that confronting these contradictions is simply an unavoidable part of the process of societal change on the pathway to sustainability. In that event they should become increasingly visible and problematic, and then in time be steadily resolved as societies adapt their structure and functioning to new ecological realities.

Third, the existence of these contradictions *per se* may not be as big a problem as at first glance. We humans are fully capable of holding apparently contradictory beliefs while undertaking actions which conflict with all our beliefs. This ability to live with paradox may ultimately prove to be a great strength, enabling us to make quite rapid shifts and changes in priorities as global ecological constraints are realised and redefined.

This brief exploration of the contradictions in sustainability can end with yet another: are these conflicts too great to be resolved, or does our apparent innate ability for logical inconsistency represent an avenue for escape? Can we find our way through the labyrinth of contradictions that sustainability represents?

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Cleaner Fishery Harbours in the Bay of Bengal: IMO-supported project strengthens infrastructure, information base and awareness

Workshops, pilot projects in Vizag, Phuket and Male, publications, a final consultation among key fisheries decision-makers of the region to discuss learnings and lessons and up-to-date concepts concerning harbour upkeep, the Chennai Declaration – these are some highlights of the IMO-supported project on Cleaner Fishery Harbours in the Bay of Bengal, which began in 1989 and concluded early this year.

In 1987, the International Maritime Organization (IMO) and the Food and Agriculture Organization of the United Nations (FAO) agreed that the two organizations should co-operate through the BOBP to address marine pollution in the Bay of Bengal region. Under the project "Cleaner Fishery Harbours in the Bay of Bengal," the BOBP was to implement IMO-supported pilot activities to reduce pollution in fishery harbours and thereby improve the harbour environment.

After an IMO appraisal mission in 1989, a pilot project to upgrade the reception facilities for garbage and liquid, dry and oily wastes in Visakhapatnam fisheries harbour, India, was formulated by IMO and later implemented by BOBP with the assistance of the Visakhapatnam Port Trust. Under the project, a road tanker was acquired to receive oily residues from harbour vessels. Garbage skips were provided at strategic positions to receive and take away wastes generated in and around the harbours. An information drive was launched - a video film was made, and billboards with slogans stood at select locations.

This was followed by a BOBP-IMO initiative to assess the status of important fishery harbours in the region. Surveys were conducted in select fishing harbours in India, Indonesia, Malaysia, Maldives, Sri Lanka and Thailand by teams of national experts in marine pollution and post-harvest technology. The findings were discussed at a regional consultation

organised in Penang, Malaysia, in December 1991.

The surveys for the consultation showed that the main activities in harbours - such as fish handling, bunkering, fish marketing and repair - generated pollutants in proportion to the size of the fleet and the number of people using the harbours. Oil leaks, bilge discharge, fish waste, garbage, inflow of industrial effluents, and sewage discharge were the main forms of pollution.

The consultation recommended a series of short-term measures (improving facilities for garbage collection and disposal, providing basic toilet and fresh water facilities in harbours, carrying out awareness-building among harbour-users and children on the need for a clean environment) and long-term measures (integrated effort by those responsible for the environment, urban planning, industrial development, health and fisheries; establishment of acceptable standards of water quality; in-depth surveys including one on the socio-economics of harbour development).

A series of pilot projects followed – based in Phuket, Thailand; Negombo, Sri Lanka; and Male in the Maldives. A comprehensive manual of information and guidelines about pollution in fishery harbours was brought out. A final wrap-up consultation on cleaner fish harbours and fish quality assurance was held in Chennai, India, on 25-28 October, 1999. A Chennai declaration was adopted by the participants.

- The Phuket pilot project was meant to improve the fishery port environment in Phuket. It was implemented by the Fish Market Organization in co-operation with the Phuket Marine Biological Centre, with assistance from the BOBP.

  The main project activities were a study tour for harbour personnel of three fishery harbours in Malaysia and two in Singapore, to study pollution control and mitigation practices; augmenting garbage reception facilities by providing a garbage collection truck and deploying garbage bins; and making available a mobile tanker with pump for oily waste reception and a quayside fixed tank for bulk storage; and an awareness campaign based on interpersonal communication and the use of video and slide shows, posters, stickers and signboards, and group activities.

- In Sri Lanka, the National Aquatic Resources Agency, did a baseline study of the Negombo fisheries harbour to collect information on the types and levels of pollution generated by various harbour activities, as well as the sources of pollution, and the existing facilities for reception and disposal of wastes. The National Institute of Fisheries Training undertook a KAP (knowledge, attitude and perceptions) stakeholder study to understand the perceptions and behaviour of the many harbour-user groups. An interesting finding was that many believed that fish caught in the deep sea could not be contaminated by harbour water; another was that using harbour water to clean the fish gave the fish a better taste. The KAP study has been published in Sinhala and widely distributed.

  The study's recommendations on the use of various media to create awareness about pollution were implemented. The Fisheries Radio Unit broadcast stories on harbour pollution and its abatement. Posters and stickers were prepared, distributed to stakeholders and displayed at town centres and schools at various fishery harbours. A high-profile exhibition was held on a "Cleaner Harbours Day" with panels highlighting the causes of pollution and what should be done to combat it. It was inaugurated by the Deputy Minister for Fisheries, and generated many stories in the local and national press. Since the KAP study pointed out that comic books are very popular among fisherfolk, an 8-page comic booklet on pollution abatement was produced and distributed.

- In the Maldives, an inter-Ministry meeting was called by the Marine Research Section of the Ministry of Fisheries and Aquatic Resources to discuss inputs and allocate responsibilities for a cleaner harbour environment. MRS entered into an agreement with an NGO, VESHI (Volunteers for Social Harmony and Environment) about an awareness campaign. This was launched on a national "clean-up day", when floating and submerged garbage from the Male harbour was removed with the assistance of the public, leaflets were distributed and billboards put up to highlight cleanliness messages. VESHI designed and developed awareness materials such as posters, billboards, leaflets and radio scripts. A video film was produced with inputs from Worldview International and the BOBP's Information Service.

- A significant project input was a "Fishery Harbour Manual on the Prevention of Pollution", written by two consultants. The book describes pollutants generated by harbour activities and contaminants that may find their way into the harbour from outside sources. It discusses the standards needed for water quality, and procedures to maintain standards. It discusses waste management and effluent treatment, and concepts, such as HACCP, designed to ensure fish quality. In sum, the manual is an invaluable reference guide for all harbour managers.

To build on the foundation of learnings from all project activities, and involve key decision-makers, a four-day Expert Consultation on Cleaner Fishery Harbours and Fish Quality Assurance was held in Chennai in October 1999. Some two dozen decision-makers from the region and two consultants discussed the design of fishery harbours and their infrastructure, fishery harbour management, seafood quality assurance, and the handling and storing of fish.

The Chennai Declaration passed at the consultation contained a useful package of recommendations. It called for wide stakeholder participation in the siting, planning and management of harbours, the factoring of resources availability in the design of harbours, mechanisms to promote inter-departmental co-operation; training for harbour managers in seafood quality assurance; rigorous enforcement of rules and regulations, including speedy removal of encroachments; training of harbour and landing site managers; a balanced

A montage of BOBP publications relating to the cleaner fishery harbours project.

approach to privatization of fishing harbours and landing sites; development of a model fishing harbour; and support from FAO for developing such a model harbour.

Participants expressed appreciation of the contributions made by the IMO-supported Cleaner Fishery Harbours project to promoting awareness on harbour pollution, strengthening the information base, and catalysing action among all types of stakeholders.

The main information outputs from the IMO-BOBP co-operation on cleaner fishery harbours were:

Publications:

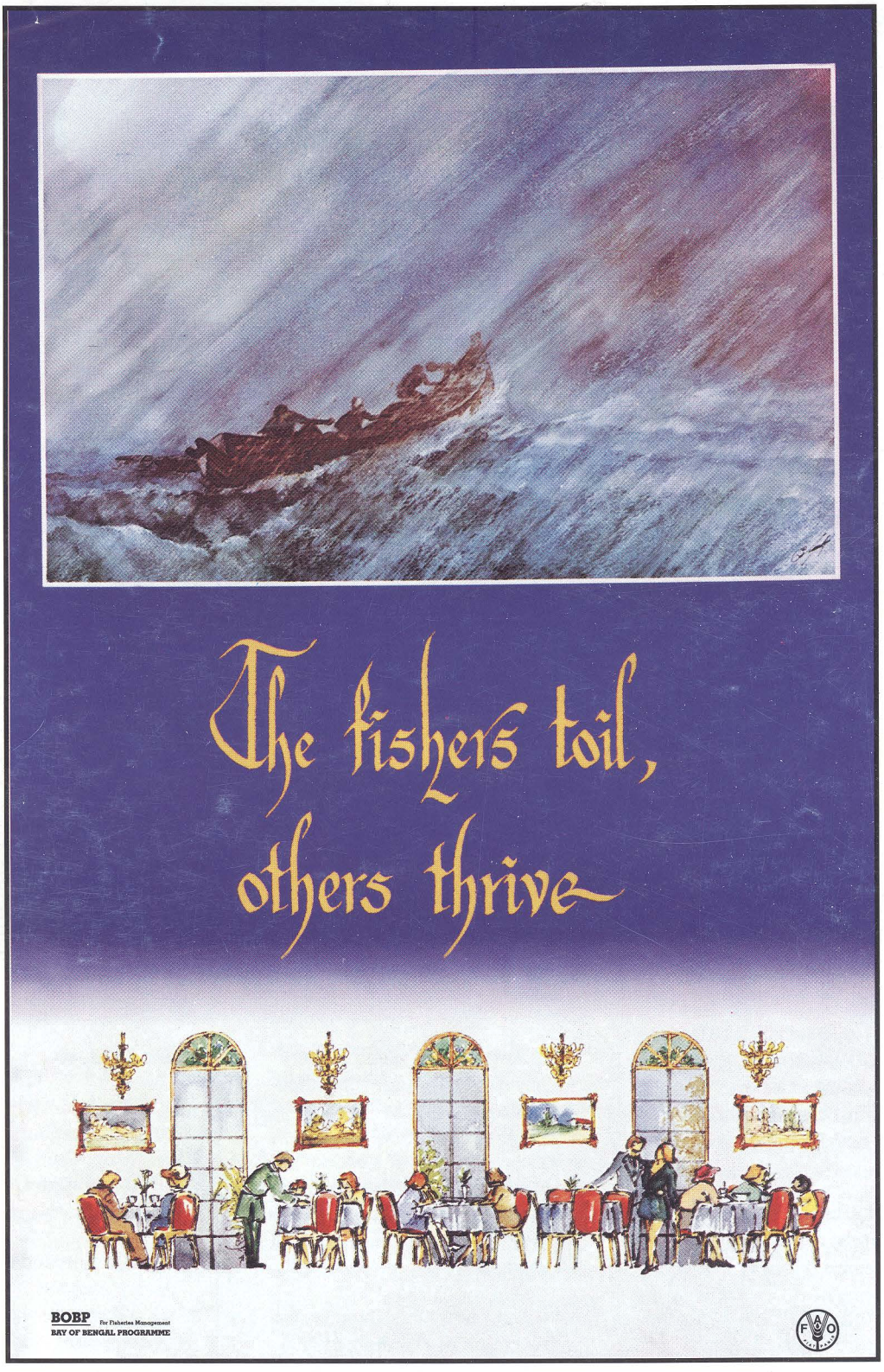
- Cleaner Fishery Harbours in the Bay of Bengal (1992) BOBP/WP/82
- Guidelines for Cleaner Fishery Harbours (a 16-page illustrated booklet) (1993) BOBP/MAG/17
- Dealing with Fishery Harbour Pollution - the Phuket Experience (1994) BOBP/WP/93
- Fishery Harbour Manual on the Prevention of Pollution (1999) by J A Sciortino and R Ravikumar BOBP/MAG/22
- Report of the Expert Consultation on Cleaner Fishery Harbours and Fish Quality Assurance (2000) BOBP/REP/84
- "Keeping your harbour clean: do's and don'ts" (leaflet for the Visakhapatnam fisheries harbour)

Video films, etc:

- Video film "Towards cleaner fishing harbours" in English
- Video film in Dhivehi for the Maldives
- Video film and slide show in Thai
- KAP (knowledge, attitude and perception) study of stakeholder perceptions in Sinhala
- Posters in all project locations: Visakhapatnam, Phuket, Negombo, Male.
- Photo exhibitions in Phuket, Negombo, Male and Chennai

S R Madhu

The latest poster from BOBP



BAY OF BENGAL NEWS

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