ISSN 0971-3077

The Journal of

BOBP For Fisheries Management

BAY OF BENGAL PROGRAMME

Sponsored by the Governments of Denmark and Japan

BAY OF BENGAL NEWS

Vol.II No. 12 DECEMBER 1998

Marine Parks of Malaysia

Success Story in Resource Conservation

Five marine parks were set up in Malaysia in 1985. They have proved to be an excellent measure to conserve marine resources. How these parks are administered is discussed on pages 6-8. A regional workshop on the management of marine protected areas and marine parks will be held in Malaysia in September 1999. (Details on page 9)

BOBP in the Field

BOBP's third phase closes a year from now. 1999 should be regarded as a year of opportunity for concrete action. Member-countries and the BOBP should ensure that a solid foundation is laid for fisheries management. The Programme's closing activities aim to set out clear directions for the future on the basis of past learnings. Some of these activities are described below.

Management initiatives for set bagnet and push net fisheries in Bangladesh

The Ministry of Fisheries and Livestock (MOFL) convened a meeting on 22 October, 1998, to review BOBP-assisted activities in Bangladesh. During the last four years, Department of Fisheries (DOF) officers had evolved two pilot projects on the basis of stakeholder consultations and other studies to test management initiatives in the estuarine set bagnet and push net fisheries. The problem was that neither DOF nor BOBP had sufficient funds to implement the pilot activities. The 22 October meeting, led by the Secretary of MOFL, decided that during 1999, BOBP-assisted activities should confine themselves to awareness-building and mobilization among fishers, using the awareness materials already developed, to lay the foundation for management initiatives.

It was agreed that actual management actions would be initiated by DOF under the new Project on Strengthening Coastal Fisheries Management, as well as two pipeline projects funded by UNDP and DFID (UK). Interestingly, as the Secretary pointed out, these three projects built on the foundation that BOBP had laid, and used similar approaches to management and development. This proves that catalytic regional projects, small as they may be, can leave behind large footprints when other projects build on the initial work.

Immediately after the review meeting, a National Workshop was organized by MOFL and BOBP on the Precautionary Approach to Fisheries Management and the Code of Conduct for Responsible Fisheries. The workshop gave fisheries stakeholders in Bangladesh a chance to learn about the approach and the Code. It also enabled a lot of discussion, from which emerged a series of recommendations on how Bangladesh could launch the precautionary approach and the Code to give direction to fisheries development and management in the country.

National Workshop in Bangladesh on Precautionaiy Approach to Fisheries Management and Code of Conduct for Responsible Fisheries. From left – Dr Kee-Chai Chong of BOBP; Mr MdAyub Quadri, Secretary, Ministry of Fisheries; Mr Satish Chandra Roy, State Minister of Fisheries and Livestock; Mr H Konuma, FAQ Representative in Bangladesh; Mr MA Matin, Director-General of DOE

Following this, a three-day workshop in Chittagong organized by DOF and BOBP provided training to several staff from DOF and FRI (Fisheries Research Institute) in Monitoring & Evaluation methods. The workshop used the logframe approach and enabled DOF officers to develop an M & E system for the BOBP-assisted activity, which could be used to track the performance of the activity when it is initiated. The workshop was also used to think through and plan the activities for 1999, as agreed to at the Dhãka review meeting.

Improving the management of ornamental fisheries in Sri Lanka

The BOBP-assisted pilot effort in Sri Lanka to improve the management of the ornamental fish sector is poised at a critical stage. The many and various stakeholders in the sector have been identified, and have had several opportunities to meet by themselves and amongst themselves. Everyone seems committed to improving the management of the sector to ensure its sustainability and to conserve the critical aquatic habitats. Everyone realizes that this can be done only.. by all parties getting actively involved in the process.

Professor S U K Ekaratne's study on the status and trends of ornamental fish resources and habitats is expected to be finalized and released soon. It will form a benchmark against which new research and data collection will have to be undertaken. Plastic identification cards are being distributed to help pin down species whose export is banned or restricted; the cards will thus facilitate enforcement of regulations. The question now is – where do we go from here in 1999?

The Ministry of Fisheries and Aquatic Resources Development (MFARD) – unable to establish an inter-ministerial task force suggested by stakeholders to oversee the management of the sector – has come up with an alternative. Under the Fisheries Act, MFARD can establish an *ad hoc* committee of experts and stakeholders to evolve a precautionary management plan for the sector after detailed consultations with all the stakeholders. This is what they hope to do with BOBP's assistance. The precautionary plan will enable the sector to kickstart its management process, and also give direction to research and data collection necessary in the future.

Good management requires tracking of performance to ensure quality outputs; adhering to time and money schedules and budgets; and, more importantly, achieving what each project or activity actually set out to do. This requires a good monitoring and evaluation system, which provides decision-makers with the right information at the right time. With BOBP's assistance, MFARD is undertaking a major diagnostic study of its M & E System with a view to strengthen it. Consultants from the Post-Evaluation Unit of the Ministry of Plan Implementation and Parliamentary Affairs, along with independent consultants, will undertake the study over the next few months. The findings and recommendations will be discussed at a national workshop.

The heart of the ornamental fish sector is in collection: this determines the resource and the quality of the products. It also determines how the environment is treated. The thousands of divers who work in the sector are slowly getting organized. They are very keen to learn safety practices that would reduce their risk and prevent accidents. MFARD is also very keen to build awareness on conservation. Both these are being attempted through the development of an illustrated comic book on diver safety and conservation to be developed by MFARD, DFAR and NARA (National Aquatic and Resources Agency) with support from **BOBP.**

These little building blocks may provide a foundation for the ornamental fish sectorupon which future management for sustainability can be built.

Studies and Workshops in Indonesia on CBFM and Sea Farming

With support from BOBP, the Directorate-General of Fisheries, Indonesia, is studying, analysing and documenting traditional practices of fisheries management – which may facilitate promotion of participatory integrated fisheriesresource management in Indonesia.

The study will focus on the *Panglima Laut* (Sea Commander) system in Aceh; the *Lubuk Larangan* (Large River Underwater Cave) system in North Sumatra; the *Lubuk Larangan* system in west Sumatra; the seasonal fishing system in Riau; the *Lubuk Larangan* system in Jambi; the *Lebak Lebung* (Floodplain Fisheries) system in South Sumatra.

Information on these systems will be collected and collated. Customary rules and norms which are largely unwritten will be codified and summarized. Experiences and learnings from the study will be shared widely. How such systems can be introduced to promote participatory community-based management systems in Indonesian fisheries will be analyzed.

The study will first review and synthesize all relevant literature on Indonesian fisheries relating to traditional fishing rights systems in the six provinces identified. Besides the literature review, several extensive interviews will be conducted during a field survey in the provinces.

Another activity relating to CBFM is the organization of a national workshop on CBFM. It is meant to enable various stakeholders – officials, experts, fishers etc – to learn from CBFM approaches and give direction to a national CBFM movement with the help of stakeholders. The workshop is seen as a first important step to consolidate knowledge and experiences, reflect on the approaches used, evolve strategies and guide stakeholders to future action.

The workshop will be held in co-operation with BOBP and the ADB-assisted Coastal Community Development and Fisheries Resources Management Project.

The workshop will bring stakeholders together, make them aware of CBFM, promote "smart partnerships" among stakeholders, facilitate a common understanding of problems and solution options, and explore strategies to introduce CBFM. The workshop will strive for a consensus, or at least a convergence of views on approaches to implementing CBFM.

The workshop will consist of a two-day "expert consultation" which will discuss topics such as policy, strategies and programmes for CBFM; the socio-economic status of fishing communities; marketing and credit requirements for CBFM; the role of fishermen's organizations in CBFM. There will also be an "open forum" focusing on perspectives from the fisher community.

Seafarming workshops: A workshop on management strategies for sustainable seafarming is to be held in Medan and Sibolga, North Sumatra, 10-14 May, 1999. It will focus on marine fish farming, particularly on sustainable management of cage culture of grouper.

The workshop is meant to build awareness on sustainable seafarming management practices among farmers and government authorities. It will identify and examine current needs and actions to promote sustainable sea farming; and prepare a follow-up strategy.

To be organized jointly by the Government of Indonesia, BOBP, INFOFISH and NACA (Network of Aquaculture Centres in Asia), the workshop will be split into three parts: a two-day workshop in English for fisheries and extension officials; a two-day workshop in Bahasa Indonesia for local farmers; a one-day field trip to seafarming sites around Sjbolga and Tapian Nauli Bay.

Learnings from the BOBP

The learnings from the BOBP's Third Phase (1995-1999) are to be documented by a Consultant Team in co-operation with key stakeholders, member-government representatives, and BOBP's Programme Coordinator and staff.

Since the 20 year old Programme is due to end soon, it is necessary in the interest

Typical scene in Chinnamuttom, fishing village of Kanniyakumari district, Tamil Nadu

of fisheries development and management to extract its lessons and learnings and document them. Such documentation would sustain and give direction to similar efforts in future. What is planned is not an evaluation – which would compare objectives and expected outcomes with real outputs and outcomes. Methodologies, and means to attain objectives, will be assessed; and strategies and tactics that work will be identified.

The Consultant Team will assess the Programme within the framework of the political context, the legal and regulatory regimes, the administrative and organizational cultures, the perceptions and attitudes of stakeholders, and the nature of the problems addressed. The team will

- Review BOBP's past and current activities, the approaches and methodologies used, the outcomes of pilot activities, and their impacts in the participating countries. The lessons learnt should highlight both positive and negative aspects as guides to be considered for similar future activities.
- Study existing documentation, hold discussions with fisheries staff and key stakeholders, and other agencies concerned with BOBP.
- Visit pilot locations in member-countries and hold in-depth discussions with staffof government agencies and decision-makers.
- Identify and document the Programme's learnings, and discuss them with FAO and BOBP staff, and at a regional meeting of member-country representatives.
- Submit the report of learnings to the FAO and BOBP.

The Consultant team will carry out the task over a period of three months, travelling within the region. The Team's work will begin in June 1999.

Maldives - Study **on traditional** management **of reef** resources

The Ministry of Fisheries, Agriculture and Marine Resources (MOFAMR) has initiated a study supported by BOBP to better understand traditional forms of management of reefresources. The study, headed by Mr. Maizan Hassan Maniku, Director General of Fisheries R & D, hopes to look into archival materials and government documents in the Maldives, interview elderly island dwellers and fishers and document their oral history. Neighbouring countries, such as India and Sri Lanka, which have had long historical and trade relations with the Maldives, will be visited to meet experts and study archival materials. The study hopes to learn from the past and give direction to institutional and legal arrangements for integrated reef resources management at island and atoll level.

Meanwhile, the implementation of the IRRM recommendations is goingon with visits to the target atolls by MOFAMR staff. In Meemu Atoll, with the support ofthe AtollChief, a Community Learning Centre is being established to encourage fishers and reef users to meet regularly, share information, and to work towards better management. BOBP is providing a variety of audio-visual and communications equipment to equip the centre.

A key activity in the Maldives during 1999 will be a National Worksb.op, tentatively in October 1999, which will bring together senior representatives of all concerned ministries and representatives of all reef resource stakeholders, to review IRRM actions taken since 1995, whrn the National Workshop on IRRM showed the way with a series ofrecommendations. It is hoped that the workshop, having reviewed experience to date will chart out directions for the future and propose recommendations, which will guide the work into the new millennium.

India – Diversifying fisheries in Kanniya Kumari and Chennai

In Tamil Nadu, the stakeholder meeting and the district-level heads of department meeting in Kanniya Kumari District in November 1998 enabled BOBP and its counterparts, the Department of Fisheries and the Coastal Peace and Development Committee, to carefully review two studies that BOBP had supported. The first study,. led by Mr. Rene Verduijn, APO Resources Economist, surveyed all the coastal communities with a view to determine the needs of the coastal people in terms of basic infrastructure and social amenities. The second study, led by Ms. Barbara Bierhuizen, APO, GIS, studied the fishing intensity and interaction between different fisheries in the district. The first study was discussed at the heads of department meeting, presided over by the Minister of Fisheries.

The Government of Tamil Nadu is considering looking into the findings of the study at the state level to facilitate co-operation across departments to provide help to coastal fishers. The study on fishing intensity and interaction clearly illustrated in the words of the local fishers the serious problems confronting the fisheries of the district. The CPDC and the Department of Fisheries are seriously considering the findings and it is hoped that out of the discussions will emerge some concrete fisheries management actions. One of the highlights of the visit was a play put up by a local NGO group, *Nanjil Natham,* with support from BOBP. The play very dramatically raised the concerns and problems of local fishing communities, and in the context of the Code of Conduct for Responsible Fisheries suggested the way out. BOBP hopes to support *Nanjil Natham* to take the play to coastal villages and schools to get everyone to start thinking about the Code of Conduct for Responsible Fisheries. The Catholic Church and the local communities will share costs with BOBP.

Meanwhile, the Government of Tamil Nadu has taken an important step and has translated the Code of Conduct for Responsible Fisheries into Tamil. This will make it possible for the stakeholders to learn about the Code and to evolve from it directions and guidelines for their own future. The Hon. Chief Minister of the State of Tamil Nadu, Mr. M. Karunanidhi, has contributed a foreword to the Code and the Department is hoping that the Chief Minister will take time from his busy schedule to officially release the document.

In response to the fisheries problems faced by fishers BOBP had assisted the Department of Fisheries to evolve a proposal for diversification of fisheries in Kanniya Kumari and Chennai Districts. The Rs. 10 million proposal hopes to demonstrate the economic and technical viability of boats like trawlers going offshore to use more eco-friendly gears such as troll lines, gill nets and lines. This would not only reduce the fisheries effort in the crowded inshore areas but also reduce the use of destructive gears while tapping offshore waters for increased incomes. The proposal awaits clearance and support from the Government of India. Meanwhile, the Department of Fisheries in Tamil Nadu has already earmarked funds for the establishment of two more artificial reefs in Kanniya Kumari District, to provide habitats for fish and convenient line fishing opportunities to *kattumarani* fisherfolk.

Marine Parks in Malaysia charge entry fees

Visitors to marine parks and reserves in Malaysia now pay "conservation charges" of RM 5 per adult and RM 2.5 per child or pensioner.

These charges have been levied on visitors to the Pulau Payar Marine Park, Kedah, from January 1, and at the Pulau Redang park in Terengganu effective March 1, said Director General of Fisheries Datuk Mohd Mazian Jusoh. Visitors to the Pahang marine park in Pulau Tioman and Johore's at Mersing will pay such charges effective June 1.

Entry fee ticket for parks

"Collection of such charges is aimed at promoting a marine resource management concept involving the public as owner and user," Datuk Mazlan said. The public ought to be more directly involved in marine resource managemént and conservation programmes at the country's marine parks and reserves, he added.

At Pulau Payar, a sum of RM 39,362 was collected from visitors in January 1999, and RM 34,797 in February. More than 16,600 people visited the park during these two months. Thus the "conservation charge" has not kept visitors away.

Mazlan Jusoh said these charges would ease the burden on the government in developing, managing and conserving 40 islands nationwide, gazetted as marine parks and reserves. The charges would be deposited in the Malaysian Marine Parks and Marine Reserves Trust Fund for reinvestment mainly in conservation, research and educational programmes to benefit the public, he said.

The Government has allocated RM 36.3 million under Malaysia's Sixth and Seventh Plans to erect structures like jetties and landing pontoons for marine park centres, besides a few more million toward workers' salaries and allowances.

Marine Parks Of Malaysia:

A Management Tool For Fisheries Resources

by Kevin W.P. Hiew *

The establishment of Marine Parks is an excellent way to conserve the marine resources in the surrounding waters, such as coral reefs, and to protect bio-diversity. Five marine parks were set up in five states of Malaysia in 1985. This article sets out the objectives and likely benefits of these parks, and the activities the parks seek to encourage and discourage.

1. Background information

In 1983, the Government of Malaysia directed the Department of Fisheries to take over the responsibility of establishing and managing Marine Parks in Malaysia. The Department immediately started research to identify coral reef areas all over peninsular MalaysIa, so that they would be designated as Marine Parks.

2. Interim measures and establishment of marine parks

An interim measure was taken as early as 1983. The waters stretching 8 km from the shore surrounding Pulau Redang in the State of Terengganu became a Fisheries Prohibited Area **(FPA). In** *1985,* waters stretching 3 km from the shore and surrounding 22 islands in the states of Kedah, Terengganu, Pahang and Johor were declared as FPA under the Fisheries Act, 1963.

The Fisheries Act, 1985, was enacted by Parliament the same year. It included provisions concerning Marine Parks (Division IX Sections *41-45).*

Finally in 1994, after much study, research and deliberation, waters stretching two nautical miles from the shore, surrounding 38 islands in the States of Kedah, Terengganu, Pahang, Johor and the Federal Territory of. Labuan, were declared as Marine Parks Malaysia, under the Fisheries Act, 1985. Between 1983 and 1994, these waters were managed administratively as protected waters (FPA), though they had not legally been declared as marine parks. In 1998, waters off two more islands in the state of Terengganu were declared as marine parks.

3. What is a marine park?

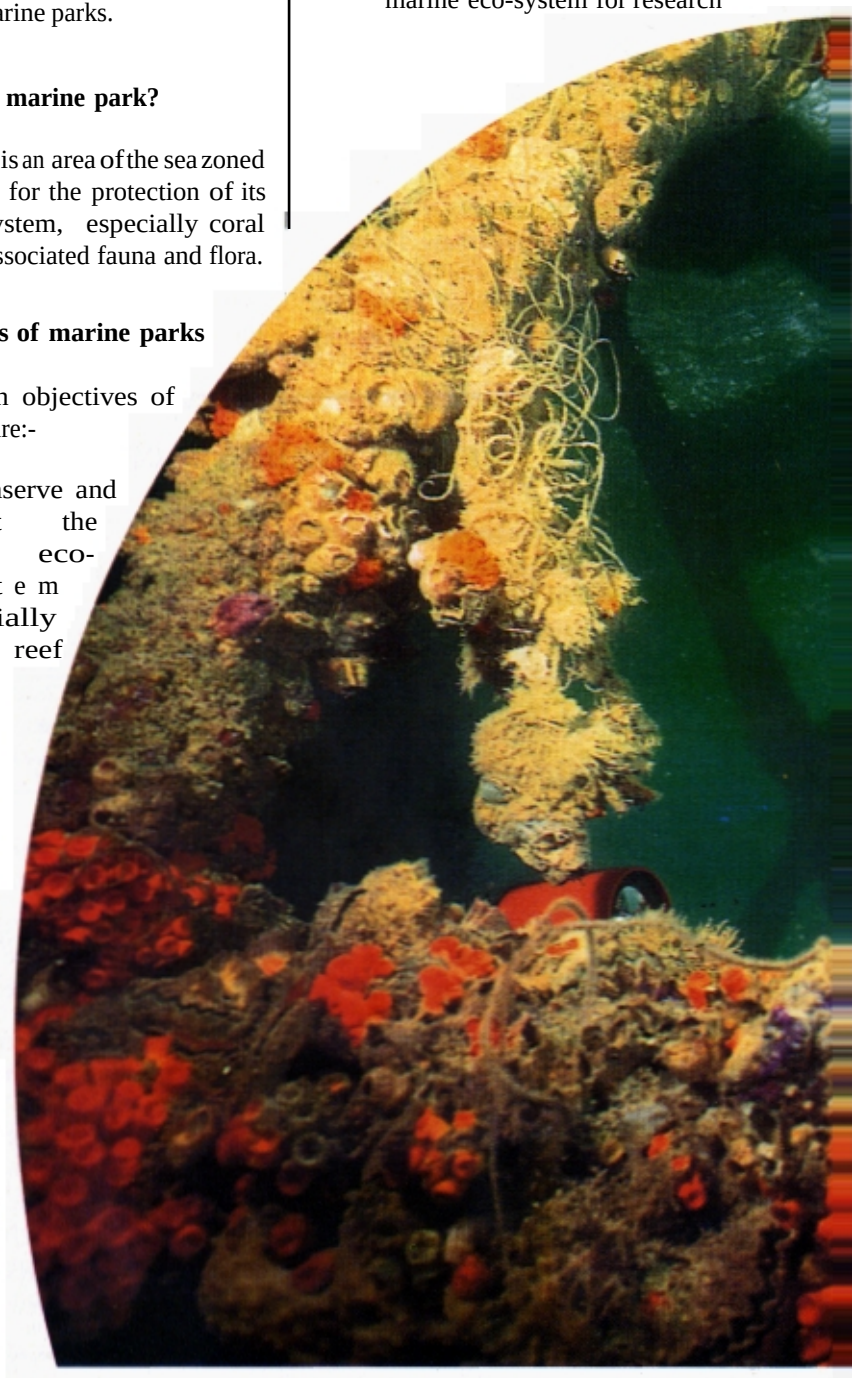
A Marine Park is an area of the sea zoned as a sanctuary for the protection of its marine eco-system, especially coral reefs and its associated fauna and flora.

4. Objectives of marine parks

The two main objectives of marine parks are:-

4.1 To conserve and protect the marine eco-system especially coral reef areas, in order to ensure sustainable usage of the fisheries resources in the coastal waters.

4.2 To protect and manage the natural marine eco-system for research



* *Head, Marine Parks Section, Department of Fisheries, Malaysia*

on biodiversity, educational purposes and sustainable development of recreational! eco-tourism activities.

5. Benefits of marine parks

The following are the potential benefits from marine parks:-

5.1 Fisheries resources in the marine park areas are managed, and biodiversity conserved.

5.2 Scientists get encouragement and opportunity to carry out research on biodiversity, pharmaceutical needs, etc.

5.3 The marine resources are conserved and protected, especially the coral reefs which are the main attractions for visitors to Marine Parks.

5.4 Resources (such as turtles) that are over-exploited and face extinction, will be rejuvenated.

5.5 Better educational and recreational opportunities.

6. Marine park centres

The waters surrounding 40 islands in five states are grouped into five Marine Parks for better administration and management. They are:-

6.1 Pulau Payar Marine Park, Kedah – with four islands

6.2 Pulau Redang Marine Park in Terengganu – with 11 islands

6.3 Pulau Tioman Marine Park in Pahang – with nine islands

6.4 Mersing Marine Park in Johor – with 13 islands

6.5 Labuan Marine Park in W.P. Labuan – with three islands

Each marine park has a small centre for administration, management and enforcement in the park areas. Intormation on tile Marine Park is available for visitors in the from of posters, charts, slides, videos. The centers are also used as focal points for marine environmental education for the young and the general public, also as research bases. The Pulau Redang and Pulau Tioman centers have laboratories with facilities for rangers and scientists.

One sub-center at Pulau Tinggi (Johor) is under construction, one more in Pulau Perhentian (Terengganu) is being planned. These sub-centers will also serve as focal points for the administration and management of the marine parks around them. More sub-centers are planned to enable better administration and management of the marine parks.

7. **Activities which are encouraged**

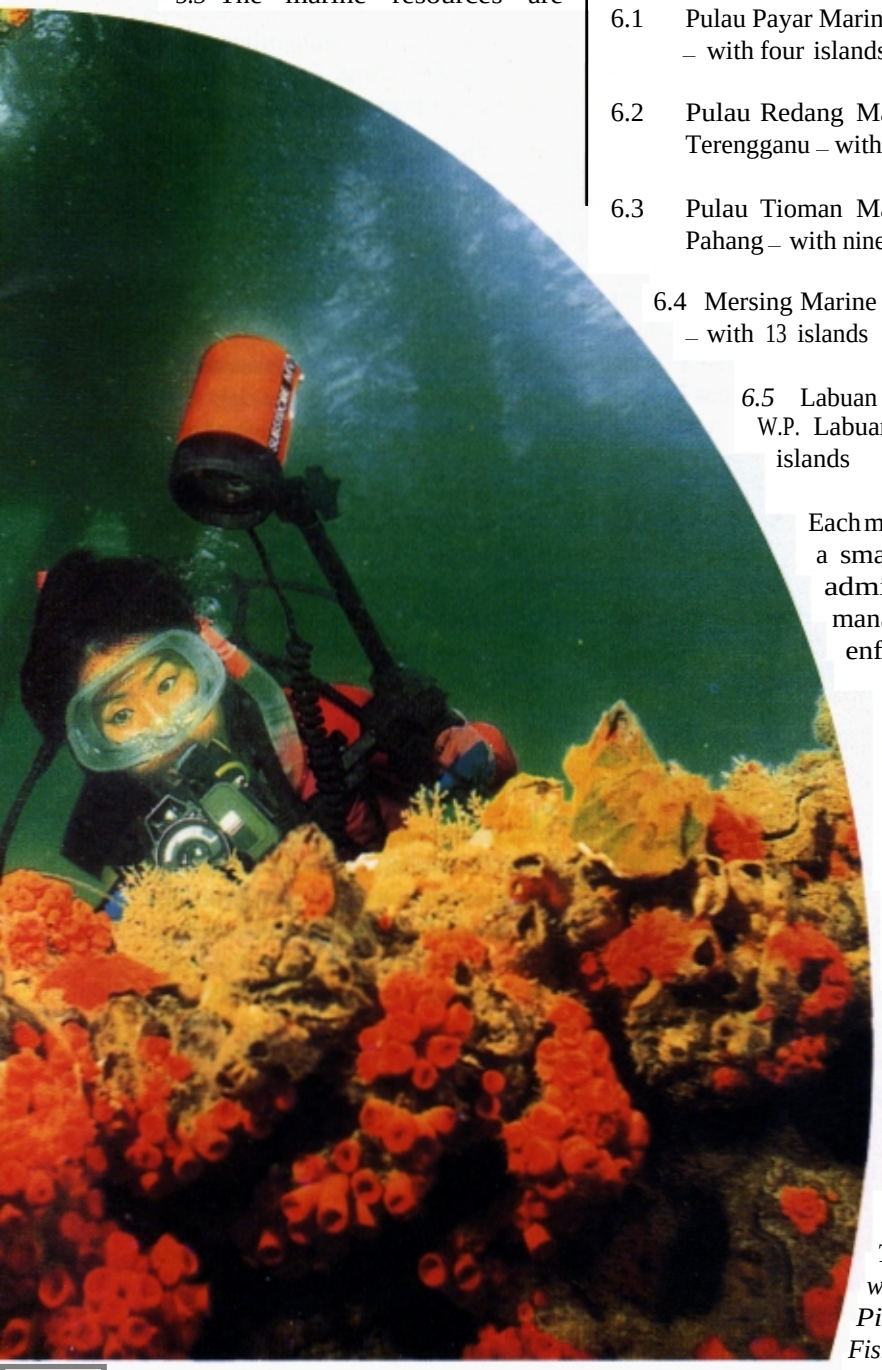
Activities that do not harm the coral reefs and the environment are allowed and encouraged. These activities will expose participants to the beauty of the underwater environment and thus increase their awareness and knowledge of the marine environment. It isbelieved that whoever is knowledgeable about the marine environmentwould care for it and help to conserve and protect it. Activities allowed include scuba diving, snorkeling, underwater photography, swimming, fish feeding (controlled and limited), sailing!canoeing (non-motorised boating) and jungle tracting.

8. **Prohibited activities**

Activities which are harmful and destructive to the coral reef and the marine eco-system are prohibited under the Fisheries Act 1985 (Section 43). Some of the prohibited activities: fishing and killing of fish, fishing, collecting of corals, shells and other marine living organisms., collecting of sand, dead corals and shells, littering and polluting, anchoring of boats directly on the reef.

9. Management

9.1 Under Section 4lA - 4lB of the Fisheries Act 1985 (amended in



The luxuriant growth of corals around a shipwreck in waters off the Labuan Marine Park attract a scuba-diver. Pic: Capt Sim Yong Wah, Courtesy : Department of Fisheries, Malaysia

1993), a National Advisory Council for Marine Parks and Marine Reserves was established.

9.2 This Council is chaired by the Secretary General of the Ministry of Agriculture. Its members arerepresentatives from environmental and business NGOs, lOcal universities, and a commercial firm, besides Federal and State Government Officers.

9.3 The functions ofthe Council are:-

– to determine guidelines for implementation at the national level with respect to protection, conservation, utilization, control, management and progress of the marine park and marine reserve areas;

– to coordinate development of any area of a marine park or marine reserve with the Federal Government and any corporate body; and

– to give technical advice to the State Government about any development project on any island which is situated in a marine park or marine reserve area.

9.4 Because of the peculiar circumstances in Malaysia, where land matter is under the jurisdiction of the State Government, ensuring that development on the islands does not jeopardize the marine eco-system is an important issue. Every state that has marine parks has been told to form its own committee to advise the State Government on matters that may impact on the marine environment. It is hoped that in this way, development projects on the islands would be properly planned and managed.

9.5 The Department of Fisheries, Malaysia (a federal agency), manages and administers all the Marine Parks on the basis of broad policy guidelines set out by the Council.

9.6 Monitoring and enforcement work within the parkarea is done by marine park rangers with the help of the Enforcement Unit of the Department of Fisheries. Besides enforcing the laws, the park also do education and awareness work, and take care of general maintenance and administration of the parks.

9.7 Research work in the parks is done mostly by the research arm of the Department of Fisheries with the help of the park rangers. Scientists from local and foreign universities, as well as NGOs, are also encouraged to cany out their research work in the parks.

Green turtle rests in the reefs off Pulau Redang
Pic: Capt Sim Yong Wah. Courtesy : Department of Fisheries, Malaysia

10. Summary

10.1 The main purpose in establishing Marine Parks in Malaysia is to conserve and protect the corals and the fish and other living aquatic fauna and flora in the area's marine environment.

10.2 The most important ceo-system in the Marine Park areas is the coral reef. However, mangrove and mud-flat eco-systems are,also important. In certain areas there are sea-grasses as well.

10.3 It is believed that about 40% of the commercial fish caught in the coastal waters (30 nautical miles and below) of Malaysia originate from or make use of coral reefs. Socorals, with their abundance of fauna and flora, must be conserved and protected. Otherwise, a large proportion of the fisheries resources may be lost.

10.4 Protection andconservation ofthe mangrove swamp, the mud-flats and the sea-grasses is important because they contribute to the fisheries resources in coastal waters. It is believed that the dwindling of fisheries resources in Malaysia is mainly due to the destruction of these habitats.

10.5 Over-fishing and the use of destructive methods of fishing are beyond doubt also responsible for the decline in fisheries resources in the coastal waters.

10.6 Conservation of these habitats is therefore crucial for the national economy, both to provide fish for nutrition and increase tourism revenues.

Management of marine protected areas and marine parks: Regional workshop to be held in Malaysia

A four-day regional workshop on the management of marine parks (MP) and marine protected areas (MPA) is to be held from 21 September, 1999, at Pulau Redang Marine Park, Terengganu, Malaysia. It will be conducted by the Department of Fisheries, Malaysia, with support from the BOBP and the FAO.

A prospectus to the workshop points out that the marine ecosystem and the environment are a rich biological treasure house. Their functions and services are worth US $20 trillion annually, according to a GESAMP* estimate. The ecosystem provides the feeding, breeding, spawning and growing conditions for marine organisms such as fish; it makes available raw materials for a host of scientific, industrial and medicinal products; it is a magnificent recreational playground, that sustains a rich tourist industry. Further, the coasts protect the land from storm surges and erosion.

But this valuable ecosystem is under severe attack. It suffers from uncontrolled pollution and destruction of vital habitats on account of urban, residential and industrial encroachment and land degradation.

Purpose and Objectives

The proposed workshop on MPAs and MPs is part of BOBP's effort to strengthen the capacities of member countries to manage and conserve their fisheries and other aquatic resources. It will collate, compare notes and share information on MPAs and MPs. It will discuss what works and does not work in the management of such resources.

The workshop will show that MPA and MP can be an attractive alternative to conventional approaches to fisheries management which call for expensive enforcement and patrolling to ensure compliance. MPA and MP can either cover large areas (e.g. the 350,000 km^2 Great Barrier Reef Marine Park) or a small area (like the uninhabited group of four small islands in Pulau Payar Marine Park in Malaysia). MPA and MP can also be transboundary in nature. Such transboundary MPA and MP hold the key to sustainable marine resource management in future. However, the Malaysian workshop will focus mainly on small-area MPA and MP.

The Workshop's objectives:

- provide an overview of the scientific and technical considerations and the institutional context behind the setting up and use of MPA and MP for fisheries and aquatic resources management.
- provide the legal and institutional framework for the management strategy of MPA and MP.
- evaluate the social and economic prospects of MPA and MP for developing countries, with special emphasis on BOBP countries;
- evaluate and further adapt available guidelines on establishing MPA and MP, particularly in developing countries.

The workshop will be especially useful for senior policy-makers and planners; representatives from industry, notably fisheries and coastal and marine tourism; NGOs and regional! international bodies who are interested in MPA or MP. It will help them to establish and use MPA and MP as a possible tool to bring together disparate efforts in managing marine fisheries and aquatic resources and their habitats around an "easy-to-relate to" visible land mass or water body.

Topics for Discussion

- Concept, Principles, Format and Framework of MPA and MP as Alternative Tool in Managing Fisheries and Aquatic Resources
- **Purpose,** Use, Level of Protection of MPA and MP
- Policy, Legislation, Boundaries and Zoning for MPA and MP
- Benefits and Costs and Valuation of MPA and MP in Managing Marine Eco-systems
- Monitoring and Management of MPA and MP
- Training and R&D Needs for MPA and MP
- Experiences and Practices of National MPA and MP
- Managing Transboundary MPA and MP

Key resource persons for the workshop will be drawn from the Great Barrier Reef Marine Park Authority, the Australian Institute of Marine Science, universities and other institutions with expertise on MPA and MP.

A nominal registration fee will be collected from participants to cover the cost of workshop materials, a dinner reception and a study tour of Pulau Redang Marine Park (PRMP). For further information, please write to Department of Fisheries, ..Malaysia, Wisma Tani, Jalan Sultan Salahuddin, 50628 Kuala Lumpur, Malaysia. Attn: Mr Kevin Hiew. E-mail: khwpOl@dof.moa.my. Telefax: 60 3 2910305, telephone: 60 3 2980523

You may also write to FAO Bay of Bengal Programme, Dr Kee-Chai Chong, 91 St. Mary's Road, Abhiramapuram, Chennai 600 018, India. Phones: 91-44-4936294, 4936096. Fax: 91-44-4936000 E-mail: bobpkcc@md2.vsnl.net.in or bobp@ satyam.net.in

* *Joint Group of Experts on Scientific Aspects of Global Environmental Protection.*

Community-Based Fishery Management: An Alternative Approach in Malaysia

by Kamaruzaman Hj. Salim, Department of Fisheries, Malaysia

Malaysia has introduced community-based fishery management (CBFM), impressed by its success in Japan and other countries. In some cases, the government merely legalizes arrangements that already exist. The author discusses Malaysia 's experiences with CBFM, and outlines the pre-requisites for its success.

1. Introduction

Many mature fisheries in the world currently face the problem of resource depletion. This is largely due to overfishing. Crude symptoms of overfishing include an increasing proportion of trash fish landings, complete disappearance of certain commercial species, and shrinking sizes of fish caught (Lam and Pathansali, 1977, Ibrahim, 1987). Thus, the challenge before fisheries managers is to come up with an effective management scheme for sustainable fisheries development and management.

From the individual fisherman's viewpoint, fish that he does not catch will eventually be harvested by someone else. Hence, it is logical for him to catch as much fish as possible and maximize his profit rather than being a sucker (Kamaruzaman, 1997). If all fishermen think on the same lines, the total fishing effort will grow and exceed the Maximum Sustainable Yield (MSY) threshold. Thus, the fishery resource will be eventually depleted. Hence, the challenge for fisheries managers is to motivate individual fishermen to protect their jointly owned fishery resources.

The CBFM approach is designed to encourage stakeholder participation in managing the fisheries, in co-operation with the government. The latter will function as a facilitator in bridging any gaps that the stakeholders fail to resolve. Hence, the essence of CBFM is to promote smart partnerships between all parties concerned with fisheries management. This will lead to greater co-operation between stakeholders, strengthen management efficiency and reduce the government's burden in managing the fisheries, because the cost of management will be shared with other stakeholders.

2. Fishery Industry's Contribution

The fisheries industry in Malaysia plays an important role in the national economy and contributes significantly towards providing animal protein food, employment opportunities and foreign exchange income. Fish constitutes about 60 per cent of the national animal protein intake, with an annual per capita consumption of about 39.5 kg (Malaysia, 1985). The demand for fish is expected to increase from an annual consumption of 630,000 metric tons in 1995 to about 1,600,000 metric tons by the year 2010. In 1996, the total fish production was estimated at 1,240,000 metric tons valued at about RM 3.80 billion (Malaysia, 1997). It accounted for about 1.6 per cent of the Gross Domestic Product (GDP). The fisheries industry employed about 1.3 per cent of the country's total effective labour force.

3. Current Fisheries Management Measures

The development and management objective of the fisheries in Malaysia is to increase the social benefits which, in the long term, must include conservation (Royce, 1987). In order to achieve these objectives, the Government of Malaysia (GOM) has formulated a number of management measures which have been implemented through its legal and institutional framework.

The Fisheries Act, 1963, was the first comprehensive legal' fraiiiework to manage the fisheries industry in Malaysia. This Act was formulated to integrate and strengthen all management measures related to marine and inland fisheries; to protect the natural aquatic resources; to protect the interest of fishermen as well as other stakeholders; to ensure a more equitable allocation of resources; and to back administrative activities to reduce conflicts among the fishing communities. As the industry grew and developed, more and more new activities which were not covered by the Act needed to be controlled and managed. Hence, the Act was subsequently repealed and replaced by the Fisheries Act, 1985.

Malaysia has always enforced a licensing system to implement the principle of limited entry into fisheries. Anybody who wants to carry out fishing is required by law to have a fishing licence. Hence, a fishing licence is a right to fish. Fishing without a valid licence is an offence under the Fisheries Act. This licensing system has created a well recognized group of people who share a common interest in fishery resources.

Several terms and conditions are attached to a fishing licence. These stipulate how, when and where a fishing activity can be carried out. All the measures aim to control the expansion of aggregate fishing effort in the fisheries. However, the effectiveness of these management measures depends on acceptance by the stakeholders and support from them – especially the fishermen. In the absence of such support, any management measure is doomed to fail because fishermen are ingenious and are able to

circumvent most management measures (Anderson, 1986). This will make monitoring and enforcement ineffective or very costly.

4. Search for an Alternative Management Approach

Many scholars have argued that fisheries resources will be over-exploited in an open-access scenario (Gordon, 1954; Scott, 1955). Hence, some form of fisheries management must be put into place. There has been increasing concern about the escalating cost of fisheries management over the years, especially costs relating to fisheries enforcement. For example, the percentage of enforcement expenditure to total fisheries development expenditure in the Third Malaysian Plan was about 5 per cent. However this percentage has increased to about 22 and 24 per cent respectively in the Sixth and the Seventh Malaysian Plans.

The increasing cost of fisheries management has made the government search for an effective and cost- saving management approach. Further, the Malaysian government is undertaking to restructure government agencies and make them more efficient and cost-effective. Thus, the possibility of improving the effectiveness of monitoring and enforcement activities by increasing personnel is limited.

in order to manage the fishery industry effectively, fisheries managers require complete information about fisheries biological parameters as well as the characteristics and the behaviour of fishermen. It is impossible for the government to gather such vast and varied information because information-gathering activities are both costly and time-consuming. Without complete information, however, the fisheries managers will not be able to take correct management decisions. Hence, a new approach to information gathering on a cost-sharing basis between the government and the fishermen needs to be found.

One way to obtain more complete information is to tap the wealth of information available locally within a fishing community. Blending this local information with scientific data will make management measures more meaningful and easier to implement. Hence, community-based fishery management holds the answers to current management issues. It offers an alternative for better fisheries management.

5. Community-Based Fishery Management: Some Experiences

The Government of Malaysia is keen to implement CBFM on the basis of the experiences and the successful implementation of CBFM in countries like Japan as well as some other fisheries in Turkey, Pacific Islands, Newfoundlands etc. However, the structure and the method of implementation of the CBFM that Malaysia may introduce might be different because the underlying

An effective control mechanism of 'reward and punishment' is needed to make CBFM work.

parameters as well as the socio-econornic factors of Malaysian fisheries are different and unique. Hence, a different approach to implementation is needed to ensure its success.

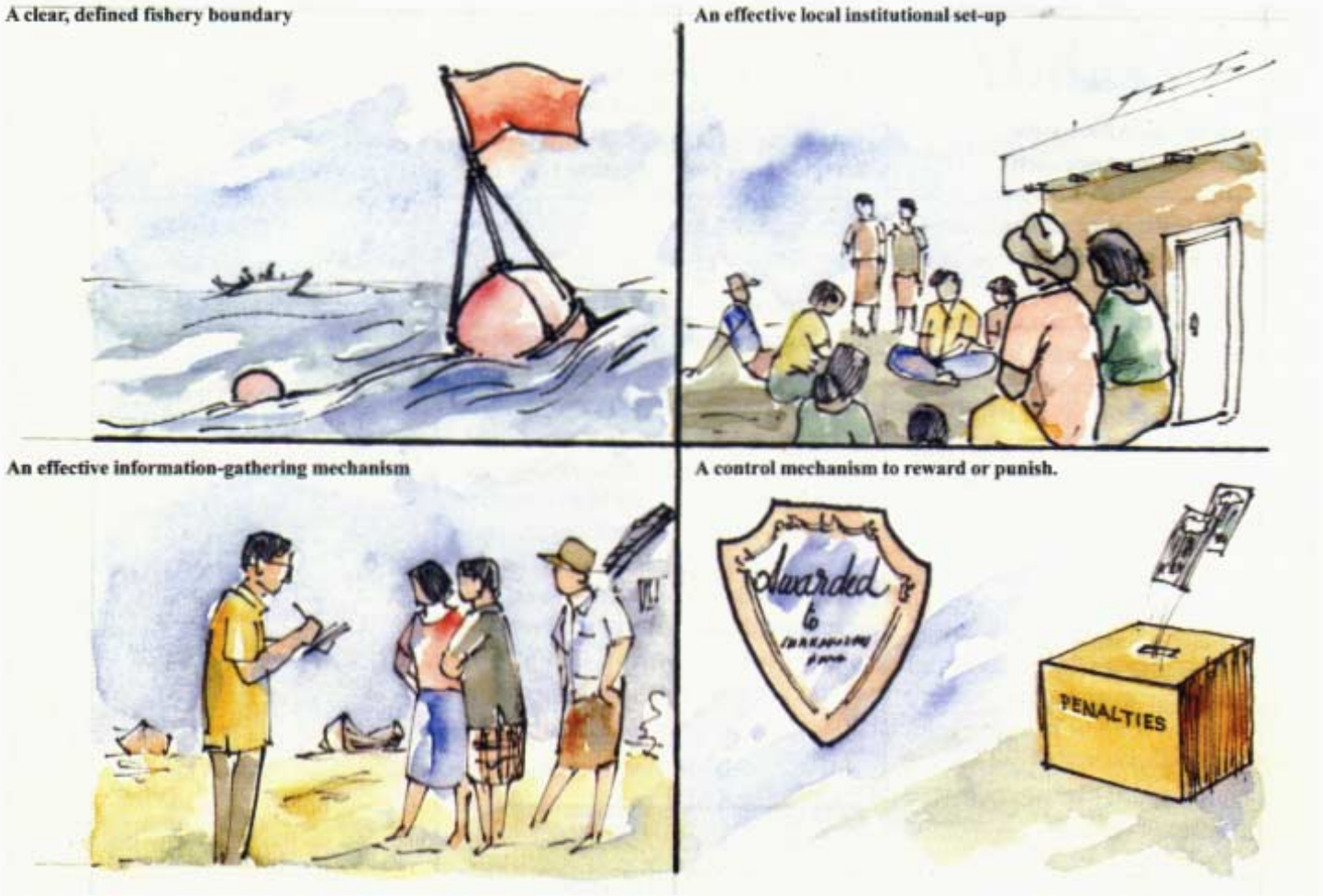
In Malaysia, some form of co-operation or sharing of responsibilities between stakeholders of fisheries already prevails in some localities. For example, smart partnership relationships have existed between fisheries stakeholders in Kukup, a small fishing village in Johor, for more than a decade. The various stakeholders basically agreed among themselves to compartmentalize their limited available fishing area. Fish farmers are allowed to keep their floating cages in the Kukup Straits. Bag net fishermen will continue to fish in their traditional fishing area between the northern Kukup Straits and Sungai Penerok, while trawlers and other fishermen are required to fish in other agreed areas as stipulated in the fishing licence.

On the basis of their mutual agreements, the government only needs to endorse and legalize these agreements and enforce them. It is found that all stakeholders live in harmony and work closely with one another. All parties have a strong interest to guard and protect their common fishing ground, especially from the intrusion of trawlers from Other areas. It is found that fishing conflicts on fishing grounds in this area are minimal. If any arises, the stakeholders will resolve the conflict by themselves through negotiations. As a result, enforcement activity required to manage this fishery is minimal. This is because all stakeholders have arrived at a common understanding to protect the common fishing area.

As they often work together, this situation has promoted networks among the stakeholders. This leads to economic co-operation for mutual benefit. For example, trash fish caught by the trawlers was sold to fish farmers to feed fish in the floating cages. This gives trawlers assured buyers for trash fish; the fish farmers on the other hand get a quality feed locally at low cost.

It is also found that the rate of compliance with government rules and regulations is high. This is because these rules have already. been agreed to by all parties concerned. They have understood the potential benefit of complying withthese rules and regulations. For example, they know they have to co-operate to restrict their activities so as to prevent resource depletion. As a result, the number of floating cages and bag-net operators has remained almost constant for more than a decade. The trend of bag-net landings indicates that the shrimp resources have been harvested on a sustainable basis. The smart partnership in Kukup fisheries is sustained because all stakeholders in the fishery are able to work together. Through their local community committee, they are able to sit together to discuss common problems faced in the community. All stakeholders are invited to give their opinion. The role of government is to lead discussions and provide technical information as well. At the end of a series of discussions, an agreement is arrived at. Sometimes, these agreements are re-enforced by the legal system. The concept of smart partnership,

Pre-requisites for community-based fisheries management



Malaysia for Sustainable Fisheries via Code of Conduct

The Code of Conduct for Responsible Fisheries "has become the single most important guiding principle for sustainable fisheries manauement "says Datuk Amar Dr Sulaiman Daud, Agriculture Minister of Malaysia. He has urged all States to adhere to the code.

He told the Ministerial meeting on the Implementation of the Code of Conduct for Responsible Fisheries, held in Rome from March 10 to 11, 1999 that Malaysia hopes to achieve long-term sustainable development and exploitation of its fisheries resources with proper implementation of the Code.

Dr Sulaiman said that Malaysia recognized the need to reduce excess fishing capacity. Without this step, existing fisheries resources could not be sustained. He also said that the cost of monitoring, control and surveillance of pirate fishing vessels was enormous for developing countries. Therefore Malaysia fully subscribed to moves to impose effective control on such vessels.

The Minister said that present fisheries regulations in Malaysia had addressed several articles of the Code. The Ministry had also formulated Guidelines for Aquaculture and Codes of Practice for Shrimp Farming and Marine Finfish Farming in order to achieve sustainable aquaculture development.

About eco-labelling, Dr Sulaiman said that most developing countries would be apprehensive about it, because of the restrictive, biased and unfair standards that would probably be imposed. "Different groups implementing eco-labelling could come up with different standards, and this would create havoc in the fish trade." He added that few developing countries could comply with these varying standards.

If eco-labelling was implemented, there should be common and transparent guidelines to avoid conflict, he said.

"We therefore urge the FAO, being the most competent body in fisheries, to undertake the task of developing complete and transparent guidelines for the eco-labelling of fish and fishery products," he said.

The Minister congratulated the FAO for providing guidance and technical assistance for sustainable development of world fisheries. He urged the FAO to accord greater emphasis on technical and, financial assistance for aquaculture development.

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such as in Kukup fisheries, has several advantages and can be implemented. It reduces management cost on the part of the government, minimizes fishing conflicts, and promotes sustainable fisheries development and management.

6. Pre-Requisites for Community-Based Fishery Management

CBFM is designed to manage both the fishery resources and the fishermen. This is because there is a direct relationship between the resource condition and what the fishermen do. If the fishermen fish excessively, fishery resources will eventually be depleted. Hence, to manage the fishermen effectively, Clowson (1972) pointed out "If people are to be managed or at least influenced in their direct use of natural resources, then resource managers will have to know much more about people, their motivation, their sensitivities and their responses to various stimuli".

Several pre-requisites must be fulfilled to implement community-based fisheries management. These are:

(i) It requires a clear defined fishery boundary.

Without a clear defined boundary, people do not know to what extent the fishery is to be managed and for whom. The boundary can be in the form of:

- Definite location or area;
- Type and number of stakeholders; and
- Type of fisheries and fisheries resources to be managed.

Under the current fisheries licensing system, nobody is allowed to fish without a valid fishing licence. There are several conditions attached to the fishing licence. One of the conditions relates to the fishing area. Fishermen from one district or state are allowed to fish only in their respective zone in the territorial waters of that particular district or state. Fishermen from other districts or states are prohibited from fishing in this area. This condition gives a certain group of fishermen the ownership title to a fishing area. As a result, members of the group can expect that the benefits of protecting their fishing area will accrue to them, and promote sustainable collective actions among members. However, the existing boundary is rather limited. It can be broadened to cover other stakeholders.

(ii) It must have an effective local institutional set-up.

This institutional set-up is required to promote greater participation among various stakeholders. This body can be either a local or government-sponsored association, but it must be able to promote, coordinate and harmonize its members' perceptions and goals. In order to achieve this objective, it requires an influential and effective leader with clear vision, backed by full grassroots support.

(iii) It requires an effective information gathering mechanism.

Fisheries managers require full and complete information in order to manage the fisheries on a sustainable basis. The necessary information, however, is usually in the form of bits and pieces. It becomes expensive and time-consuming to gather this information. Hence, an effective mechanism is needed to collect all necessary information, especially data. Furthermore, this mechanism must be able to disseminate information to stakeholders so that all stakeholders can access or obtain the same information. This will enhance co-operation among the stakeholders and promote a smart partnership.

Smart partnership (between fishermen, the community and the government) reduces the government's management cost, minimizes fishing conflicts, and promotes sustainable fisheries development and management

(iv) It requires some form of control mechanism to reward or punish.

A control mechanism is needed to ensure a long-lasting partnership between all stakeholders in the fishery. Without an effective reward and punishment mechanism, it is expected that some members in the group may try to maximize private benefits; this may jeopardize community activities. A reward and punishment mechanism will prevent or minimize the probability of "individualistic" activities, and promote collective effort by the members (Kamaruzaman, 1997).

7. The Community-Based Fisheries Management Plan

CBFM is implemented in phases or stages as follows:

(i) The promotional stage:

This phase focuses on information-gathering about CBFM. The strengths and weaknesses of CBFM are analyzed, so are current fisheries management practices. On the basis of the analysis, CBFM concepts are identified. The information is then disseminated to relevant government officials, especially the fisheries officials at all levels. Later, various seminars and forums are conducted to enhance the understanding of CBFM among stakeholders and to explain their individual roles in the implementation of CBFM. Malaysia is currently at this stage.

(ii) The Implementation Stages:

During the implementation stages, several activities have to be carried out. First, the government has to identify the development programmes that could promote collective activities by all or a majority of the stakeholders. This is important, because success in CBFM depends on getting the stakeholders to work together, thus creating a sense of co-ownership to that programme or project.

Some examples of CBFM development projects are (i) the community fish aggregating device (CFAD) (ii) the public stocking activities (iii) the artificial reefs (iv) the community freshwater cage farming, and many others. The above projects can be easily carried out on a community basis as their benefits go to everybody in that community.

For example, the development of the CFAD will directly benefit the fish purse-

seiners, hook and line fishermen and other traditional fishermen. As these groups of fishermen will reap the benefits, it would be wise to organize them to work collectively in building the CFAD. The government could introduce a modern type of CFAD, using strong artificial material, to replace conventional FAD made from coconut leaves which cannot last very long. In this way the government would be promoting modern fishing technology, and at the same time encouraging co-operative work within the fishing community.

In order to implement this project, the government needs to identify the potential recipients as well as their locations. This second step of implementation is vital in order to ensure the success of the project. Without identifying the site and recipient, it is difficult to organize collective or community work. This is because who works with whom will determine whom the project will benefit. It is desirable that the site and type of fishery to be selected have some similar features so that stakeholders will find it easy to co-operate and arrive at a common decision.

The next step is to encourage and convince target groups to participate collectively in the CBFM project. Government officials would have to explain the advantages of the CFAD and demonstrate to the purse-seiners, hook and line fishermen and other traditional fishermen the benefits they would derive in terms of dollars and cents. If they are convinced, they will take up the project, but the government officials must persuade them to work collectively. The cost of the project could be shared by the fishermen. To ensure smooth implementation, the government officials should act as facilitators and coordinate the implementation of this project. In order to gain the complete respect of fishermen, the government should provide all necessary information as well as extend some financial assistance to the project. This financial assistance can be sourced from the R&D and extension programmes. The same approach applies to the other projects.

When the CBFM projects have been implemented throughout the country and have been widely accepted, the government will formally adopt them as the national fishery management approach. The government will have to monitor and closely supervise the process of implementation, and ensure that national interests are in line with all stakeholders' interests. At the same time, the government will take all necessary measures, especially legal measures, to conform to the needs of CBFM.

8. Conclusions

Community-based fisheries management has several advantages and may be used as an alternative to the conventional centralized fisheries management system. The CBFM allows all stakeholders greater participation in the decision-making process, hence it creates a more transparent management system. It will also enhance compliance, because the stakeholders will harbour a feeling of "ownership" concerning all decisions. In other words, all stakeholders will be able to internalize the external cost of using the common fisheries resources. A more effective fisheries management will result, as all stakeholders will voluntarily comply with rules that they had themselves agreed to. At the same time, the government's burden in managing the industry will be reduced.

As a result of community-based management measures, the number of floating cages and bagnet operators in the Kukup Straits of Malaysia has remained almost constant for a decade.

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Building Legitimacy for Smart Partnerships in Fisheries Management

by Sevaly Sen*

The author describes five forms of fisheries "co-management" in which responsibility for resource management is shared between the government and different user groups. She argues that the "co-management" process ought to be considered legitimate by those who authorize it, those who design and implement it, and those who are affected by it. Compliance with the new management regime will then improve.

Introduction

Fisheries in many parts of the world are under pressure or in a crisis. Many of the management problems in fisheries have been attributed to the remoteness of government from the people and the activities it wishes to regulate — a situation that has been described as the "moral distance" of government. 'This has five causes:

- Government often lacks — and fails to acquire — knowledge of the specificity of the fisheries to be managed;
- Government often applies or presupposes values that conflict with, or are insensitive to, those involved in the fishery;
- Management regulations that do not take into account local conditions, may seem crude, inflexible or inappropriate for these conditions:
- Government receptiveness to feedback about the consequences of the management regime may be limited.
- User or stakeholder participation in the management system may be weak.

Co-management, a partnership between government and resource users, is being put forward as a system that may help close this moral distance of government. It is supposed to do so through greater participation of resource users in the management process, resulting in improved fisheries management — both in terms of resource conservation and compliance.

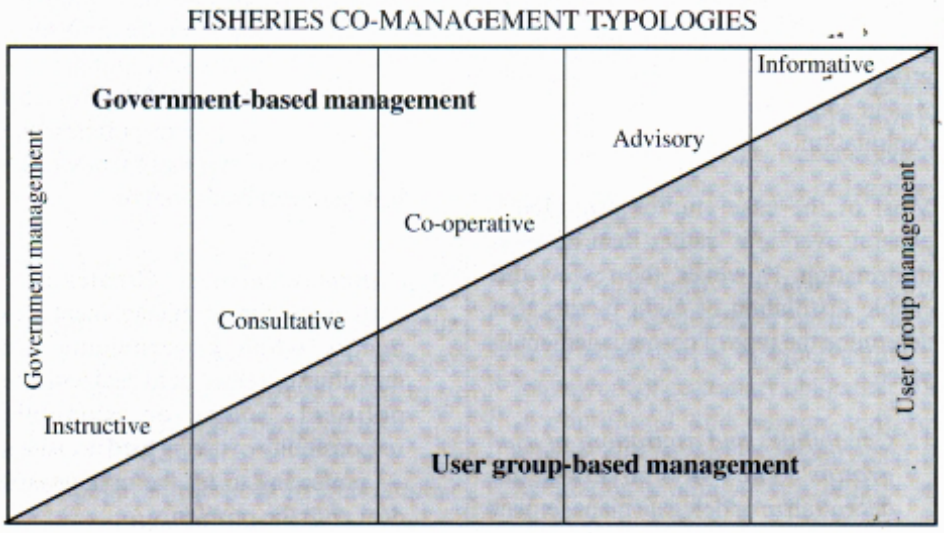
This paper argues that merely establishing a co-management regime is not sufficient to achieve the dual goals of resource conservation and compliance with management rules. What is also necessary is the establishment of legitimate co-management regimes — those that receive general support, endorsement and authorization.

Co-management

Community-based management, co-management and co-operative management are some of the many terms used to describe management systems that involve the participation of both user and state in fisheries management. Although these terms are often used interchangeably in this paper, fisheries co-management is defined as an arrangement where responsibility for resource management is shared between government and user groups.[2] These partnerships incorporate a wide range of possible arrangements, and need not only be "community-based" with associations of spatially or geographically defined communities and small-scale fisheries. For simplicity, fisheries co-management arrangements can be classified into five broad types according to the role government and resource users play. This is illustrated in Figure 1.[3]

(a) Under an *instructive* co-management arrangement, there is only a minimal exchange of information between government and resource users. This type of co-management regime differs from centralised management only in the sense that mechanisms exist for a dialogue with resource users. But the process itself tends to be one of government informing resource users about the decisions they plan to take.

(b) Under a *consultative* form of co-management, mechanisms exist by which the government consults with resource users; but all decisions are taken by government.



* The author presented this paper at the workshop on "Smart partnerships for sustainability in the fishing industry," held in Penang, November 1997. She was at that time with the Institute of Fisheries Management and Coastal Community Development, North Sea Centre, Denmark.

(c) In a *co-operative* system of co-management, government and resource users function as equal partners in decision-making.

(d) *Advisory* co-management is where resource users advise government of decisions to be taken, and government endorses these decisions.

(e) Finally, *informative* co-management is where government has delegated decision-making authority to user groups who are responsible for informing government of these decisions.

Co-management is not a static process. Over time, a particular fishery may be co-managed in different ways. For example, it could start with the consultative form and end with advisory or informative co-management.

Co-management experiences

As part of the IFMIICLARM Fisheries Co-management Research Project, a literature review[4] was carried out which covered 22 case studies on different co-management arrangements in five regions: Africa, Asia, Europe, North America and the Pacific. The case studies included artisanal, semi-industrial and industrial fisheries in both freshwater and marine habitats. In practically all of the cases, the main rationale for introducing a co-management arrangement was that the fishery was nearing over-exploitation or was already over-exploited. Co-management here was a form of crisis management, seen as a way of imposing stewardship over fish resources. In other cases, co- management was implemented in order to prevent or resolve conflicts among user-groups or between user groups and government. Sometimes this was in addition to the problem of over-exploitation.

Most of the case studies provided a general overview rather than detailed information. However, the review did enable distillation of eight factors that determine the type of co-management in place.

1. *Capabilities and aspirations of user groups.* The way governments decentralize or delegate management authority has an effect on the type of co-management. Although the aim of government might be co-operative co-managenient, this can be achieved only if resource users are also willing to take on shared responsibilities and are capable of doing so.

Co-operative, advisory and informative co-management occurred in situations where user groups were able and willing to take up the responsibility. Unorganized or poorly represented user groups, low levels of education, lack of empowerment – such factors hindered a more equal participation in the decision-making process. The review indicated that developing countries trying to initiate co-management may be working with communities where there is no existing organization of user groups, so that these have to be introduced. Thus, the co-management arrangement is likely to be instructive or consultative, until user groups are organised and capable of participating more equally in the management process. Although existing organisations of user groups are not a pre-requisite to co-managementperse, the nature of user group organisations does play an important role in determining the type of co-management regime.

2. *Top-down or bottom-up approaches.* The type of approach used in the co-management process influences the type and nature of user group participation in decision-making. It is more likely that there will be instructional or consultative co-management with top-down approaches, and advisory or informative co-management with bottom-up approaches. Where governments actively pursue co-management as part of their overall fisheries development policies, the type of co-management tends to be instructive or consultative.

3. *Difficult decisions.* Greater user participation in co-management also occurs when governments are unwilling or reluctant to deal with the political, social or economic responsibility of taking hard decisions – preferring to let the user groups deal with the problems.

4. *Management tasks.* **The type of** co-management arrangement implemented depends on the management tasks to be undertaken. There is evidence that the more specific the tasks are (harvesting and market regulation), the lower the level of decisions taken. Very little information was available on the policy formulation process, but there are some indications that where this does take place, co-management tends to be instructive or consultative. This observation is supported in general co-management literature.5

5. *Stages in the management process.* **In general, information from the** literature review indicates that co-management arrangements, whatever the type, occur during implementation and only to a minor extent in planning. There is no clear evidence from the case studies of user participation in evaluation. However, in some cases, the implementation process is being continually evaluated by government and user groups.

6. *Boundaries.* The importance of boundaries in fisheries co-management has been thoroughly discussed in the literature.6 These discussions indicate that the more clearly defined the boundaries, the greater the role of resource users in the decision-making process. However, the boundaries issue is very complex, as in any fishery there are many boundaries (physical, social, technical, economic, political) and there is often a combination of boundaries that determines (who, where and how) the type of co-management arrangement.

7. *Homogeneity! heterogeneity of user groups.* Where user groups were homogenous – functionally, territorially or socio-culturally – they helped group cohesion. Socio-cultural homogeneity was also important for collaboration between user groups. Where there was socio-cultural heterogeneity in multi-user group situations, co- management was more difficult and government had to take a more dominant role in decision- making.

8. *Political culture and social norms.* The political culture and the social norms of the country and society also affect the type of co-management arrangement. Societies not familiar with political empowerment may find it difficult to participate on an equal basis with government. The political (modern and traditional) structure in the country may also exclude certain types of co-management arrangements and encourage others.

Co-management and considerations of legitimacy

While the factors identified in the preceding section clearly affect the type of co- management arrangement in place, there is a growing awareness that legitimacy may also have an effect on the type of co-management arrangement and its effectiveness. In many countries, co-management is a relatively new concept. There is often a belief that once a co-management system is set up, management problems facing the fishery will be reduced. Emphasis has been placed on establishing the institutional set-up – identifying the stakeholders; organizing meetings; encouraging the formation of user group associations; sensitizing government officials to the concept – rather than debating or deliberating on whether the co-management arrangement is legitimate.

This section discusses the factors that may affect the legitimacy of any particular arrangement. It is argued that a co-management system is more likely to be successful (and be complied with) if the decision-making process is considered legitimate by those directly making the decisions, by those directly and indirectly affected by the decisions (i.e. those that endorse the decisions) and by those in higher positions of authority (i.e. those that authorize the decisions). The following section will then explore how these aspects of legitimacy may affect the type of co-management arrangement.

In its broadest sense, legitimacy refers to the belief that a norm or normative system governs or should govern one's actions.[7] It is assumed that management systems will be more stable and enduring if they can be characterised as legitimate. Because they are considered legitimate by all those involved in the fishery, they will be able to induce compliance.[8] Thus, legitimacy is the connection between authority and consent.

Consequently, it is argued that a system can be made more legitimate if those that are expected to obey also contribute to the decision-making process because such a system is more likely to reflect their norms. Closely related to this are ideas of participation and empowerment. User participation and empowerment enable restraint over government authority and make possible significant control over the resource.

There are three aspects to legitimacy, all of which are closely inter-related:

- the legitimacy of the management system itself (including information);
- the legitimacy of the organisations/ associations involved and
- the legitimacy of the people within those organisations.

In addition (and to make things even more complicated), the legitimacy of each of those three aspects has to be assessed from three different perspectives:

- those directly involved in the decision-making;
- those directly affected by the decisions (endorsement) and;
- others who are more powerful or influential than the organisation (authorisation).

In examining the multi-dimensional aspects of legitimacy, the type of questions which should be investigated is best illustrated by an example. If it is assumed that a co-operative co-. management regime is managing a particular fishery, there is likely to be some form of organisation (committee, association, board etc.) which has representatives of both resource users and government, making decisions on how the fishery should be managed. To assess whether such a co-management regime is legitimate, Table 1 outlines some of the questions which would need to be asked from all three perspectives.

Although the questions are quite similar, it is important to stress that the answers might be very different, according to the collective perspective of the three groups of people (the actors, the endorsers and the authorizers). Thus, a management system which may be considered legitimate by those who are directly participating and being affected by it, may not be believed to be legitimate from those in positions of greater authority, such as the central government. A lack of legitimacy perceived by one of three groups increases the risk that the system might fail in the long term.

Closely related to legitimacy is the concept of external and internal transparency.

Collective perspectives will be greatly affected by the level of transparency of decision-making processes and the methods used to select decision-makers. For example, if it is not transparent to endorsers why particular decision-makers (in terms of their position) are participating in the process, they may doubt the legitimacy of the organization itself. If it is not transparent to endorsers representative of the group they are meant to represent, then this will affect their perspective of legitimacy of both the organization and the people involved.

Legitimacy and Co-management Typologies

Determining the variables which influence the three aspects and the three perspectives of legitimacy can also be closely linked to the factors that determine the type of co- management arrangement. Knowledge of socio-economic variables within a fishery, especially the types of authority considered legitimate, will not only help to determine the type of co-management regime which is more appropriate when co-management is introduced, but also influence the general direction of co-management initiatives. Weber suggested that there were three types of legitimate authority[9]:

(1) *Traditional authority* where compliance is a matter of personal loyalty to an elder, parent or chief within the framework of customary obligation. This is communal and person-centered, relying on custom, reciprocity and the integration of family, work, religion and locality.

Table 1 FACTORS AND PERSPECTIVES OF LEGITIMACY

FACTORS	PERSPECTIVES	
	DECISION-MAKERS (E.G. CO-MANAGEMENT BOARD)	PEOPLE AFFECTED BY DECISIONS (E.G. FISHERS, TRADERS)
MANAGEMENT SYSTEM	Does each decision-maker consider that the management system reflects his own belief system of what is right?	Do they believe that it is a workable, fair, realistic and effective system?
INSTITUTIONAL ARRANGEMENTS	Do they believe that the arrangements are best suited to carry out the management functions?	Do they believe that their interests were taken into account? Do they believe that the institutional set-up is capable/competent to carry out the management task?
PERSONS WITHIN THE CO-MANAGEMENT ORGANISATION	Do they believe other decision-makers are both representative and competent to carry out their tasks?	Do they believe that the decision-makers represent their interests? Do they believe that they are competent to take decisions?

(2) *Charismatic authority,* where authority derives from personal qualities or achievements rather than social position. Charismatic leaders often hold traditional roles or legally constituted offices. Consent is emotion-driven and directly focused on the leader.

(3) *Rational authority,* where compliance relates to the system and not to particular persons. This kind of authority requires explicitness, coherence, predictability and impersonality. Consent to this authority arises from belief in the correctness of the rules and the formal system, rather than the sanctity of the social order.

In many fisheries co-management arrangements, evidence of all three types of authority exists. One of the oft-cited strengths of traditional marine resource management systems is the control and authority of traditional elders. One of the weaknesses of some co-management arrangements has been the reliance on one or two charismatic leaders. This becomes a matter of concern when the leaders have no natural successors.

However, in an ideal world, co-management arrangements should be based on rational authority; traditional and charismatic authorities carry with them the dangers of arbitrary, non-representative rule. This would also be consistent with the global trend towards the promotion of participatory democracy in all spheres of economic life. With a rational authority model, the arrangement is likely to be co-operative.

While this may be the ultimate aim of a co-management arrangement — from the perspective of some actors or endorsers of the co-management arrangement — legitimization may come from traditional or charismatic authority. In these situations, authorizers may find only an instructive or consultative co-management arrangement acceptable because they are unwilling to delegate decision-making powers in cases of conflicts concerning who has legitimate authority.

People who are promoting co-management must not assume that participatory democracy will necessarily be regarded as legitimate by everyone involved in the co-management process — especially if those believed to have legitimate authority are excluded from the process.

Therefore, in order to build and strengthen legitimacy of a co-management arrangement, it is critically important to determine, through the collection of attitudinal information:

- The factors which determine the type and nature of legitimate authority from the collective perspectives of the actors, the endorsers and the authorizers;
- The areas where there are conflicts and commonalties of legitimate authority (traditional, charismatic and rational). Where conflicts exist about which authorities are legitimate, no form of co-management may be possible. Each group will question or harbour doubts about the other's legitimacy.
- The ways in which traditional and charismatic authority can be used to promote rational authority. Recognition that these authorities can be co-opted into the co-management process rather than excluded may bring greater legitimacy to the co-management process.

Conclusions

Co-management encompasses a wide range of possible partnership arrangements between government and resource users. Often, the incentive for government entering into co-management arrangements has been the failure of state-run management schemes to prevent resource over-exploitation or prevent conflicts within the fishery or between fisheries. Development and promotion of co-management

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arrangements with resource users is considered to be a way by which negotiated solutions for fisheries management can be achieved, involving sharing of knowledge, mutual understanding of problems and joint formulation of solutions.

A number of factors have been identified which affect the type of co-management regime which can be usefully applied in situations where co-management is being considered as a new management option. In a fishery with clearly identified boundaries and a cohesive group of resource users willing and able to take on management tasks, co-management is likely to have greater user participation than a fishery with diverse resource users who are unwilling to take on responsibility for management.

However, the potential for improved fisheries management through co-management arrangements cannot be realised by simply establishing (usually through a top-down approach) a co-management "institution" characterized by one of the five typologies. This paper argues that it is also necessary to ensure that the co-management process is considered legitimate by those who design and implement it, those who are directly involved and those who authorize it. Compliance with the regime will then improve. In addition, identifying the factors which affect legitimacy, and identifying in particular the three types of legitimate authority (traditional, charismatic, rational), will assist in identifying the most appropriate type of co-management arrangement.

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Towards sustainable management of the Straits of Malacca

A wide range of topics concerning sustainable management of the Straits of Malacca — oceanography and hydrography, marine ecology, marine pollution, fisheries and aquaculture, integrated coastal management, tourism, marine archaeology, shipping and transportation, security, economic and financial mechanisms, policy-making — will be discussed at a conference in Malacca (100 km south of Kuala Lumpur) from 19 to 22 April, 1999. The conference is concerned with policy, technical and financial options relating to sustainable management of the Straits of Malacca.

The conference will be sponsored by the GEF/UNDP/IMO Regional Programme for Prevention and Management of Marine Pollution in the East Asian Seas, the Islamic Education, Scientific and Cultural Organization (ISESCO), the Japan International Co-operation Agency (JICA) and the British Council.

Organizers and co-organizers of the conference include the Malacca Straits Research and Development Centre (MASDEC), the Faculty of Science and Environmental Studies (FSAS), Universiti Putra Malaysia (UPM), the GEF/UNDPIIMO regional programme referred to above, the Malaysian Fisheries Society, the Maritime Institute of Malaysia (MIMA), the Department of Environment, Malaysia, the Hydrography Directorate, the Royal Malaysian Navy, the Department of Fisheries, Malaysia, the Department of Museums and Antiquity, Malaysia.

The conference organizers describe the Straits of Malacca as "one of the oldest and busiest shipping lanes in the world" which serves "as a primary conduit for the movement of cargo and human traffic between the Indo-European region and the rest of Asia and Australia". The Straits is also an important fishing ground which contributes substantially to fish landings in **the** littoral states of Indonesia, Singapore and Malaysia and provides direct employment to thousands of artisanal and commercial fishermen.

The conference aims to provide a forum for stakeholders from government, industry, the private sectOr and academia towards sharing information, addressing common concerns and evaluating future options. Through the conference, stakeholders will be able to

- Assess lessons learned and technological gaps to be filled concerning management of the Malacca Straits
- Identify opportunities for improved administrative and institutional arrangements for sustainable management
- Develop a consensus on future policies, strategies and mechanisms to ensure sustainable development and management of living and-non-living resources of the Straits

Conference speakers include Dato Mazlan Jusoh, Director-General of the Department of Fisheries, Malaysia; Dr Aprilani Soegiarto, Indonesian Institute **of Sciences: Prof. Chia Lin Sien, National** University of Singapore; Dato Abu Baker Jaffer, **CEO of Asma Sdn.Bhd.,** Prof. Thomas Grigalunus, University of Rhode Island; Dr Chua Thia Eng of the **IMO; Dr Mark Valencia, East-West** Centre, Hawaii.

Using GIS to Manage Fisheries

Barbara Bierhuizen and Rathin Roy

The authors explain the meaning, relevance and possible application of geographical information systems to the management of fisheries.

Fisheries as *if* Geography Mattered

If you are looking for conflicts, the place to go is Kanniyakumari District in the state of Tamil Nadu, India. The fishers of Kanniyakumari living in 44 coastal villages seem to have every imaginable type of conflict amongst them. Last year BOBP conducted a study there using the knowledge of the fishers, The basic question asked was "Who fishes where for what, when, and how?" The information collected relating to the types of fishing craft, fishing gears, location of fishing operations, time of fishing and the species caught was fed into a computerized geographical information system (GIS), which put together the various kinds of spatial information to generate maps of the coast, which very dramatically showed how many fishers were fishing in the same area (an indication of how crowded the fishery was) and which fisheries were interacting with each other (either targeting the same species or using gears and crafts that physically impair each other or worse destroy each other). (Figure 1)

When the maps were shown to the fishers at a stakeholder meeting, the group realized what they had known all along but had never openly articulated: there were just too many fishers fishing in a small area and often stepping on each others' nets, as it were! Catches were declining due to increasing fishing effort and there were ample reasons for fishers to get upset with each other! The conflicts at sea spilled on to the shore and took on many forms. The bottom line was that their earnings were being affected. In other words their livelihood security was eroding. What was even more interesting was that seeing the maps, the fishers began to think through their problems and solutions and came up with ideas, which would have done any fishery manager proud. They felt that the fishing intensity had to be reduced in the inshore area to give the fish stocks a chance to reproduce and recuperate. So either they had to go offshore or come on land and do things other than fishing. The way was clear, thanks to the happy coming together of geographic analysis of fisheries, modern day computing power and powerful GIS software, which not only facilitates analysis but visualizes the analysis, helping everyone to better grasp complexity.

Let us consider another scenario, Coastal aquaculture (read as shrimp farming) is booming around the Bay of Bengal, and Sri Lanka is no exception. The world's unending appetite ,for shrimps and the high prices people are willing to pay makes shrimp culture •quite lucrative. So naturally everyone wants to get into it. Aquaculture, normally a benign biological activity, can lead to problems if not done properly, and especially if practised in sensitive and inappropriate locations. These problems not only affect the surrounding environment but also the culture itself by creating opportunities for disease. Sri Lanka had had some problems, and while they were still at the early stages of the development of shrimp culture in the country, wanted to avoid what seemed a problematic future. With the help of the FAO, the Ministry of Fisheries and Aquatic Resources Development undertook a project to identify suitable sites for coastal aquaculture where the activity, properly managed, could prosper without harming itself and the surrounding environment. The key was GIS. Maps of coastal areas were overlaid with a variety of attributes such as soil types, water quality, availability of saline water, altitude and topography (for drainage), the nearest source of electricity, market access, biodiversity issues, other (conflicting) land uses in the area, social acceptance (by local communities) and the overall economic situation in the area. All these factors, while they determine the ecological and economic feasibility of coastal aquaculture, unfortunately are not of equal importance. So the experts in the project weighted them differently so that their real impacts would be felt in the analysis. The result was a clear, very colorful, map of the coastal regions that indicated by priority, which were the best (and safest) locations to practise shrimp culture, a very simple and very real help for policy makers, and administrators. The logic of the analysis and its visual output also mkes it transparent for all. It sure beats the process of trying to digest vast amounts of tables and graphs and endless calculations which are the stuff of such complex issues.

One last case before we get into what GIS is all about and how it can help fisheries management. Consider the Maldives, a chain of almost 1,000 islands scattered on the Indian Ocean. The coral reefs which surround and in fact form the very foundation of the

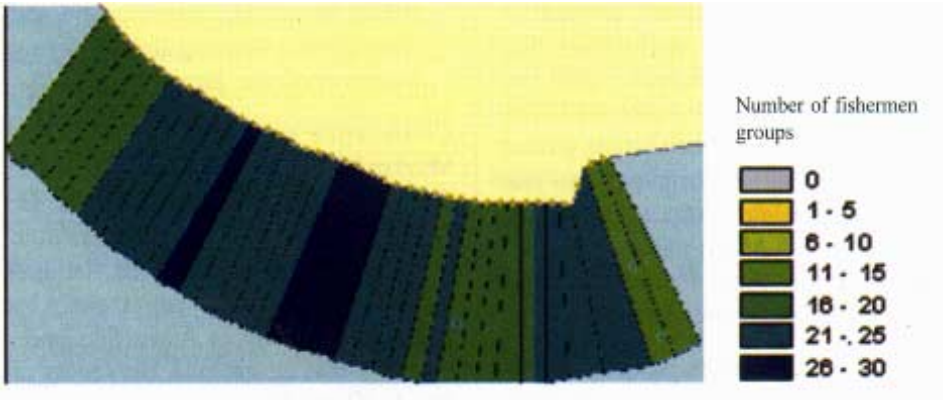

Fig. 1. Fishing areas of kattumaram, vallam and boat fishermen groups fishing for shrimp, off Kanniyakumari district, Tamil Nadu.

islands, are very important to the people of Maldives. Coral reefs provide food and livelihood, construction materials and in a very physical sense are the people's only protection from the vagaries of the ocean. Understandably, the government and the people of Maldives are extremely concerned about their reefs. The Ministry of Fisheries, Agriculture and Marine Resources has set in motion an integrated reef resources management programme. To manage reefs it is necessary to know where they are, what's in them, how they are being used and how these uses are affecting the reefs. Fishers in four atolls have already started collecting information on reef use and plotting them by hand into maps. The maps show the locations of live bait fishing, reef fishing, sea cucumber fishing, sea turtle breeding areas, sea bird roosting areas, coral mining, sand mining, suggested marine reserves, safari boat anchoring spots, and where fishing operations interact with tourism (such as in dive areas). The maps are the repository of the indigenous knowledge of the fishers and island dwellers. They bring alive visually the collective memory and knowledge of the people for all to see and consider in better managing the reefs. This is the beginning of GIS. But GIS can do a lot more in the Maldives. With satellite imagery GIS can be used to rapidly map the reefs and the islands and extract valuable information about them. Other information gathered by scientists and by people can be plugged into the maps to get a comprehensive picture of the reefs. Trends can be studied over time. Satellite-based remote sensing costs a lot but when compared to collecting all this information by people physically visiting all these locations (assuming it is possible to do so) it actually turns out to be cost effective. In the hands of policy makers and decision makers GIS can be a powerful tool and the Maldives has set about incorporating GIS into their system in earnest.

Readers of the *Bay of Bengal News* do not need to be told about marine fisheries and coastal aquaculture and the crisis they face in our region. Coastal fisheries face a variety of problems such as over exploitation of resources, uses of destructive gears that in particular affect juveniles or destroy habitats, pollution from land and sea, degradation of coastal habitats, resource allocation disagreements and conflicts. These problems vary enormously in their scale and more importantly often have effects in locations distant from where they actually occur. What may not be so obvious to our readers, as the case studies highlight, is that all these problems faced by coastal fisheries have a spatial or location-related dimension. Or, to put it in other words the root of these problems lie in spatial inequity, spatial uncertainty and spatial differentiation. Worse, in an overall sense, present attempts at managing coastal fisheries do not seem to be performing very well. Given that so many of the problems encountered by fisheries have a geographical element it would make sense to take geography or space into consideration and this may alleviate some of the problems. And this is where mapping or the more current concept of Geographical Information Systems (GIS) can play a role.

What is GIS?

GIS is basically a computerized version of 'mapping' or cartography. Making maps is at least as old as the Babylonians, who recorded land ownership by drawing boundaries of parcels on clay tablets. The Mongolians painted the plans of their towns on their walls and the Romans used paper maps to promote the growth of commerce in their rapidly expanding empire. The Marshall Islanders made navigational charts with sticks for prevailing winds and wave patterns and shells for islands (ESRI, 1996).

During the 15-17th centuries more sophisticated maps were generated by seafaring countries when they started to roam the seas with their ships for trade (and good old fashioned colonial expansion). There was a clear need for good maps so that captains could navigate their ships around dangerous rocks towards their newly established settlements overseas. Nations had maps of their territories to ensure that these were defended from enemies. Aside from the purpose of navigation (either on land or at sea), maps (of a more thematic nature) are increasingly being used for policy-making and planning by combining different sets of geographical information. Today, maps are used in every sector of development: by industry, agriculture, urban planning, health, education, environmental protection, natural resources management and tourism.

Drawing maps and keeping them current has always been a time-consuming and costly affair. But not any more. With the introduction of computers, map-making has become a lot easier and faster. Software companies have emerged that specialize in producing special software to store geographical or spatial data. Such programmes are capable of not only storing geographical data, but also of entering, retrieving, editing and analyzing it. In fact, data do not even have to be geographical; geographical data, tables, figures and texts can all be merged and interconnected through these GIS software.

GIS is a fancy name for a concept that has been around for a few thousand years. In fact most of us use geographical information systems without even knowing that we are doing it. In our day-to-day life we make 'calculations' of our movements. Suppose we need to visit a number of shops in our city. We draw a mental map of the city and figure out mentally how we can move about the city most effectively so that we are not wasting time, energy or petrol (if using a vehicle). In our minds, we not only look for the shortest route, we also examine whether we are likely to encounter traffic jams, closed bridges, road blocks or one-way streets. In this case our mental GIS generates the best routing for our shopping trip, on the basis of the criteria we have selected.

In the example, there may be several other factors (such as the cost of the products, whether we find the shopkeepers friendly, whether the products are fresh and so on) that determine the shopping route that we choose. These can make our asstssment of different options very complicated and we may need more computing power, which is why computers have become so useful in GIS. The example does however illustrate the basic analytical concepts of a GIS. A computerized GIS usually has much more detailed information, incorporates more factors and can make a more objective decision based on selected criteria. A GIS system helps us to answer questions such as the ones given below, which can be crucial to decision making:

1. Whatisat...?
2. How big/long/important! dangerous is...?
3. How do I get from..../to...?
4. Where is...?
5. What has changed since...?
6. What spatial patterns exist...?
7. Whatif...?

The first question seeks information on what exists at a particular location. The second question requires measuring the size of an area or the distance between two points. The third question calculates the best route, such as given in the example. The fourth question is a simple spatial analysis to find a location where specified conditions are met, e.g. how many bookshops are found within 2 km from where I am. The fifth question calculates changes in time. For the sixth question we need to perform a more complicated spatial analysis. And the last question requires you to make a model of the present situation so that you can assess a different scenario if you change certain factors.

A very useful and powerful aspect of GIS is its ability to overlay information to analyze relationships between people, activities and the environment. If you begin with a base map of a coastal zone you can add a transparent sheet on top which has fishing areas marked out to scale. The next overlay could be of fishing villages and where they fish – which would indicate possible interactive fisheries and crowding. An overlay of pollution sources and how the pollutants disperse would indicate which fisheries and fisherfolk would be affected. So on and so forth. With a computerized GIS the sky is the limit to the number of overlays. For example, last year after the devastating floods in Bangladesh the flood rehabilitation effort was considerably speeded up by using GIS to overlay the map of the inundated area over the aquaculture map to determine where the maximum damage occurred to aquaculture farms.

GIS as a Tool for Fisheries Management

Fisheries management and GIS are vast fields of inquiry and a short article can hardly do justice to the task. We would strongly recommend two documents of the FAO to those interested in pursuing the subject further:

Meaden, G. J. and Kapetsky, J. M. ((1991) *Geographical information systems and remote sensing in inland fisheries and aquaculture,* FAO Fisheries Technical Paper No. 318, FAO, Rome.

Meaden, G. J. and Thang Do Chi ((1996) *Geographic Information Systems: Applications to marine fisheries,* FAO Fisheries Technical Paper No. *356,* FAO, Rome.

GIS with the right data can help fisheries managers to take decisions with the best scientific information on hand. It enables them to analyze relationships between fishers, fishing gears, fish species, catch and effort data, locations of fishing operations, factors that affect fish resources and habitats such as pollution and markets. More importantly, by converting large quantities and varieties of data into easy-to-read-and-interpret maps, GIS helps in visualizing problems and better understanding them. This can be very useful in involving stakeholders – such as political leaders, fishers and traders – in management.

Getting into GIS

Now that we have seen the possibilities of using GIS in coastal fisheries management, you may well be tempted to try it. The question is how does one go about it? Unfortunately, in spite of amazing advances of technology, setting up a GIS is not very easy. It requires money, time and data. There is nothing magical about GIS; its output is as good as its input. In other words the old adage of Garbage In, Garbage Out applies to GIS. The biggest stumbling block to GIS is the availability of good data. A good, accurate base map is just the beginning. Everything is built upon the base map. The additional information which we ultimately want to show on the map, such as the areas of conflict or the critical fish habitats, result in a so-called thematic map. It is amazing how difficult it is to find good base maps.

Another difficulty in setting up a GIS is the different formats in which data come. If your survey on bottom types has given you data for every 100 meters, it would not be correct to use that data if your final map has distinct areas smaller than 10 meters. in size. The accuracy (or significance) of the data used cannot be less than the accuracy of the final map. Similarly the scale of the geographical information that is used for a study should not be greater (less detailed) than the scale of the resulting map.

If it is possible to find reliable data sources and base maps, it is possible to set up a GIS with reasonable ease. One has to buy a computer, install the software, get a good colour printer, perhaps a digitizer, and you're in business. The GIS provides the framework – the database – in which all the information can be stored and edited. One should expect a sophisticated system to be evolved overnight. Things take time but the results often justify the wait.

Analysis using GIS is as good as the analytical model being used and the criteria fed into the system to facilitate weightage of different factors. In a computerized GIS, the designer has to prioritize the factors and define the weights of each factor. This has to be in tune with the purpose of the study, e.g. what is defined as a suitable aquaculture site, or what are the abiotic and biotic factors for a suitable fish habitat of groupers? This requires expertise and experience, both of which can be acquired, though not without any difficulty.

To conclude, given the spatial nature of fisheries problems, it seems vital that analysis of fisheries and fisheries management problems bring in the geographical dimension. With computers and software, using GIS is within the realm of possibility, and provides a surprisingly powerful toø1 to help make fisheries managenjent decisions. GIS is only a tool and is only as good as the data put into it and the quality of the analysis. If you are not using data, and particularly spatial data in your decision making today, then the chances are that a GIS will not be very useful. If you are, GIS could help you do a lot more with much less effort. Finally, GIS is not just an analytical tool but also a tool to help visualize complex inter-relationships, and encourage stakeholders of all types to get involved in managing their fisheries.

Economic Value of "Marine Ecotourism" in the Maldives

By Au Waheed

Don 't kill marine wild life food; it is more valuable alive than dead, says the author. For example, shark ecotourism — which you promote by encouraging tourist divers who want to see sharks — can generate more revenue for the Ma/dives than shark capture fishery. Besides, ecotourism helps to conserve and expand natural resources.

With over 1200 islands, Maldives offers visitors an overwhelming variety of historical, cultural, and natural attractions. Although the islands are small, the marine territory of this archipelago covers about 90,000 square kilometres. Tourists enjoys the rich biodiversity, the clear waters and the abundant, varied marine life.

Tourism began in 1972, with two resorts that offered visitors 280 beds. The industry has expanded rapidly over the past 20 years and is now the largest in the country. Within the tourism sector, scuba diving is the main attraction. In 1996, a total of 338,733 tourists visited Maldives: some 56 per cent of them undertook scuba diving (Waheed, 1998). Cost per dive averages about US$33 including the boat cost. The cost varies between operators and depends largely on the type of holiday package the tourist divers are pursuing and the time of the year they visit.

The total revenue generated from tourism may help decisions on whether to aggressively pursue a policy of conservation or exploitation of wild resources. The reefs are rich in biodiversity and boast a variety of marine creatures and corals that are of interest to divers. The major marine life in Maldives that attracts divers consists of sharks, manta rays and turtles. Estimates of the number of dives made annually, as well as tourist survey results, show that the viewing value of sharks is about US$6 million per annum. The figure was derived simply by asking a hypothetical question about how much the divers were willing to pay to see more sharks. The same survey concluded that manta rays have a viewing value of US$7 million per year, and turtles US$4 million. This value is expected to increase as the tourism of Maldives grows. The survey also indicates that the viewing value of reef shark may be 10 times the entire export value of all shark products. Thus it could be argued that non-extractive exploitation of the reef resource is economically more productive than extractive exploitation. To put it differently, tourism can earn more foreign exchange for the Maldives than fishing can.

Estimates show that the combined viewing value of marine wild animals exceeds US$19 million. In addition, scuba diving alone generated in excess of US$41 million in 1996. This represents average net earnings for each resort of approximately US$0.56 million per year. Ecotourism is the fastest growing segment of the world tourism industry and is dependent on the natural environment (Hawkins, 1995). Ecotounsm, on the other hand, can help to conserve biodiversity. If there is a decline in marine wildlife, Maldives would attract far fewer ecotravellers.

Maldives can be readily marketed as an excellent venue for ecotourists. A dynamic wildlife tourist industry can lead to relatively high returns, provided the protected areas of the Maldives are properly managed and exploitation is not pursued indiscriminately.

The most significant threats to the protected areas of Maldives are illegal fishing and coral mining on or near the protected reefs. Ecotourism can generate adequate funds in the form of fee collection from divers. It is estimated that about US$0.9 million can be raised annually by introducing an environmental charge of one dollar per dive per day from each diver. These funds could then be utilised for research, education and park management. Part of the funds could also be used for community development of reserve areas and for carrying out biological and market research on alternative options for fishermen whose lives are affected by the protected areas.

This article is based on a BSc thesis prepared by the author, who is a scientist with the Marine Research Centre of the Ministry of Fisheries, Agriculture and Marine Resources, Government of the Republic of Maldives.

Tourism can generate greater revenues than fishing, says the author.

Shark as tourist attraction

Shark as gourmet's choice

Mission to Explore Possible Successor to BOBP

The BOBP has been funded at different times during the past 20 years by Sweden, Denmark and Japan, also by a variety of agencies (DFID, UNDP, AGFUND, IMO, UNFPA) and by member-countries. The latter have appreciated the Programme's efforts and have on several occasions expressed the need for its presence beyond 1999, when the Programme comes to an end as an externally-funded project.

There is no other regional organization that can facilitate and enable sustainable development and management of small-scale fisheries. This need is particularly acute given that a very large proportion of fisheries in the region is small-scale in nature, providing livelihood to millions of fishers and their dependents as well as valuable and affordable animal protein to the poor people of the region. A successor to BOBP would build on the networks already set up, and catalyze action not possible with national effort alone. Transboundary co-operation in tackling geo-spatial problems across national waters is today recognized as one approach to solve the problems of growing environmental degradation and impairment of marine resources.

Some member countries — particularly, Sri Lanka, India, the Maldives and Bangladesh — have taken the lead to promote a regional organization for the Bay of Bengal. This is partly because while Southeast Asia has several regional organizations such as SEAFDEC, INFOFISH, NACA and ICLARM, South Asia has none. These countries have pointed out that there is a need to learn from the experiences of regional organizations such as NACA and INFOFISH, which began as FAO-assisted efforts and evolved over the years to become regional inter-governmental agencies. While NACA and INOFISH are primarily funded by member countries, they are now beginning to attract donor funds because of their exemplary performance and cost-effectiveness. These inter-governmental organisations are run by staff seconded or deputed from member countries.

Given that member countries already contribute annually to the BOBP, it is felt that this government cash contribution can be built upon and carried forward, and with some limited assistance in the early phase, the member countries could take full responsibility in time for an inter-governmental regional organization. In this respect, the proposed FAO/GEF Bay of Bengal Large Marine Ecosystem project could provide some limited support necessary to nurture such an inter-governmental institution.

To further the views of all member countries, and to give direction and further momentum to the idea, the FAO is interested in mounting a high-level mission to visit the countries of the Bay of Bengal region. It will hold discussions with governments and fisheries agencies to come up with ideas and strategies, including an action plan on how best the countries could address their sustainable fisheries development and management needs and concerns through the formation of an inter-governmental regional organization.

It is therefore proposed that a team of three consultants will undertake a Mission to hold discussions with national fisheries agencies and Ministries incharge of fisheries, finance and economic planning in all seven member-countries of BOBP, also with FAO, BOBP and regional organizations such as NACA, INFOFISH, SEAFDEC and ICLARM. The team will function under the general supervision of the Chief of Operations of the FAO's Regional Office for Asia and the Pacific in Bangkok, and the FAO HQ in Rome, and in close co-operation with BOBP staff and counterpart staff from member-countries.

The Mission will ascertain the needs and concerns of sustainable fisheries development and management in the Bay of Bengal region, and the interest and commitment of member countries towards evolving a regional organization to facilitate and enable sustainable fisheries development and management in the wake of BOBP's closure. It will develop a broad mandate and specific terms of reference for such an inter-governmental organization, and propose institutional and financial mechanisms for the sustainable functioning of such an organization.

The Mission's task will take approximately two months. Its final report should be available for presentation and discussion at the 24th Meeting of the Advisory Committee of the BOBP, scheduled for September/ October 1999.

BAY OF BENGAL NEWS

Bay of Bengal News is a quarterly publication of the Bay of Bengal Programme (BOBP), a regional multi-agency fisheries programme which covers seven countries around the Bay of Bengal – Bangladesh, India, Indonesia, Malaysia, Maldives, Sri Lanka and Thailand. The programme plays a catalytic and consultative role: it develops, demonstrates and promotes new methodologies, techniques, technologies or ideas to help improve the conditions of small-scale fisherfolk communities in the member countries. The BOBP is sponsored by the governments of Denmark and Japan, and by member governments in the Bay of Bengal region. The main executing agency is the FAO (Food and Agriculture Organization of the United Nations)

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