

# **REPORT OF THE WORKSHOP ON SMART PARTNERSHIPS FOR SUSTAINABILITY IN THE FISHING INDUSTRY**

**26-28 November, 1997  
Penang, Malaysia**

**BAY OF BENGAL PROGRAMME**

**BOBP/REP/81**

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**REPORT OF THE WORKSHOP ON SMART PARTNERSHIPS  
FOR SUSTAINABILITY IN THE FISHING INDUSTRY**

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Edited by Kee-Chai Chong  
and S.R. Madhu

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**BAY OF BENGAL PROGRAMME  
Chennai, India  
1999**

This document contains the report of a Workshop on “Smart Partnerships for Sustainability in the Fishing Industry.” It was held in Penang, Malaysia, on 26-27 November, 1997, and was organised jointly by the Institute On Governance, Canada, and the FAO’s Bay of Bengal Programme, with support from the Maritime Institute of Malaysia (MIMA), the Department of Fisheries, Malaysia (DOFM), and the Canadian International Development Agency (CIDA).

This report contains the papers presented by workshop participants including the keynote address and the presentations of “country experiences” from South Asia and Southeast Asia.

The Bay of Bengal Programme is a multi-agency regional fisheries programme which covers seven countries around the Bay of Bengal – Bangladesh, India, Malaysia, Maldives, Indonesia, Sri Lanka, Thailand. The Programme plays a catalytic and consultative role in developing coastal fisheries management in the Bay of Bengal to help improve the conditions of small-scale fisher-folk in member-countries.

The BOBP is sponsored by the Governments of Denmark and Japan. The executing agency is the FAO (Food and Agriculture Organization of the United Nations.)

## Foreword

“Partnership” is key word in development today. The world is too complex, and problems too complicated, for individual talent or cerebral genius to tackle. At the global level, problems are not merely multi-national, they are multi-disciplinary, multi-sectora! and multi-professional. But even at the national and local levels, almost any problem, major or minor, requires a partnership of some kind, the bringing together of people from different backgrounds and aptitudes and skills. In fact, “Any person who is not part of the solution is part of the problem” (to quote Lucy Richards in “Living Ethics”).

This is very true of fisheries management. To be grasped in its entirety, even the problem of over-production in fisheries and the depletion of fishery and marine resources - let alone the solution - needs to be discussed together by all stakeholders in fisheries, so that they are aware of the magnitude of the crisis and the need for urgent solutions.

The workshop on “Smart Partnerships for Sustainability in the Fishing Industry,” held in Penang, Malaysia, in November 1997, was in this context very timely. Leading decision-makers in fisheries from various countries were exposed to the whys, whats and how of smart partnerships. There were useful inputs from Canada and Australia concerning some successful experiences of smart partnerships. One would have liked to hear about more success stories, but perhaps there aren’t too many yet. One hopes that a similar workshop held five years hence can focus entirely on success stories!

I hope that this workshop report makes a small constructive contribution to the literature on the subject, and that it facilitates more smart partnerships.

**Kee-Chai Chong**

Programme Coordinator, BOBP/FAO

30 September, 1999.

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## 1. WORKSHOP PROSPECTUS

### Context

Around the world, the people who depend on fish for their livelihood -- whether they be villagers feeding their families on their daily catch, government officials, or CEOs of large fish processing industries — are looking for better ways to ensure the sustainability of the fish stocks off their shores.

What is the most effective way to protect fishery resources? Who should be involved in the regulatory process? What is the role of government in developing and enforcing regulations? How can fishing associations and fishing industries ensure that their interests are protected? In what cultural, economic and political contexts can self-regulation work?

There are no clear answers to these questions — no perfect models to follow. Each country must develop regulatory systems and processes best suited to their unique circumstances. However, there are some valuable experiences and lessons in community-based management which might be of interest to those who are searching for new approaches. Community consultations and inputs are all-important and all-pervasive in such an approach.

### Objectives

*Smart Partnerships for Sustainability in the Fishing Industry* is a seminar organised through a partnership between the Institute On Governance (IOG), and the FAO's Bay of Bengal Programme (BOBP) with support from the Maritime Institute of Malaysia (MIMA), the Department of Fisheries, Malaysia (DOFM), and the Canadian International Development Agency (CODA) . The primary goal is to share lessons and experiences on the regulatory processes in the fishing sector.

The objectives of the seminar are to:

- understand the global forces shaping changes in the regulatory process in the fishing sector;
- . learn about innovative approaches to self-regulation which have been implemented in other countries;
- . understand the factors contributing to the successes and failures of self-regulation in different social, economic and political contexts;
- explore how participants might enhance the effectiveness of their own regulatory processes through enhanced private-public sector partnerships.

### Who Should Participate

Countries which have been invited to participate in the seminar include: Australia, Bangladesh, Canada, Denmark, India, Indonesia, Malaysia, Maldives, Philippines, Sri Lanka and Thailand. From each country representatives are invited from the government and the fishing community.

### Approach

The seminar will be designed to encourage open exchanges and learning. The approach of the seminar will be highly interactive and participatory. Participants will be encouraged to seek insights which will be most useful to them in their own contexts.

## 2. WORKSHOP SUMMARY

### “SMART PARTNERSHIPS” – THE MESSAGE FROM PENANG

**By Karin Borzel (Institute On Governance) and Kee-Chai CHONG (BOBP)**

(Based on an article in *Bay of Bengal News*, June 1998)

*Sustaining the fisheries resource and alleviating poverty among fisherfolk – these are ambitious goals. Achieving them is possible only through “smart partnerships” among different types of stakeholders – such as the government, the fisherfolk community, the scientists, the private sector: This was the theme of a workshop in Penang, Malaysia*

“The Pearl of the Orient” – beautiful Penang, Malaysia – was the venue for a three-day workshop on “Smart Partnerships For Sustainability in the Fishing Industry” which was held from 26 to 28 November, 1997. It was organised jointly by the BOBP and the Institute On Governance (IOG, Canada), with support from the Department of Fisheries, Malaysia (DOFM), the Maritime Institute of Malaysia (MIMA), and the Canadian international Development Agency (CIDA).

The workshop’s objectives were

- . to provide an understanding of the global forces that shape changes in the regulatory processes in the fishing industry;
- . to share information about innovative approaches to self-regulation which have been implemented in different countries;
- . to provide an understanding of the factors behind the successes and failures of self-regulation in different social, economic and political settings; and
- . to explore how the participants might enhance the effectiveness of their own national regulatory processes through enhanced private-public sector partnerships.

The 50-odd workshop participants came from both developed and developing countries. There were plenary presentations from Dr Masamichi Hotta (Japan), Mr. Richard Cashin (Canada), Mr. Patrick Appleton and Mr. Peter Finglas (Australia), Ms. Sevaly Sen (Denmark) and Dr Kee-Chai CHONG (BOBP). Country experiences were reported from Malaysia, Philippines, Thailand, India, Indonesia, Maldives, Bangladesh and Sri Lanka.

Each presentation was followed by discussion. Together, they provided insights into the successes and failures of fisheries management, and yielded suggestions for more successful practices. Community-Based Management (CBM), highlighted throughout the seminar, was seen as a key factor behind the sustainability of fishing industries, whether national or global.

In his opening address, the Director-General of Fisheries, Malaysia, Dato’ Mohd Mazlan bin Jusoh, said that fisheries resources were getting depleted because of overfishing, over-capitalization and technological overkill, habitat degradation and pollution. This grim scenario was being re-enacted around the globe. Without the support and participation of stakeholders in a smart partnership, fisheries management programmes were bound to fail. Resource users should take active part in working out strategies and programmes for fisheries resource management.

“Each and every stakeholder can exert himself and make an impact on fisheries management,” Dato Mazlan observed

In his keynote address on “International experiences in community-based fisheries management – successes and pitfalls,” Dr Masamichi Hotta said that when fishermen themselves help design management, a high rate of compliance can be expected. There will be no need for external enforcement of regulations; consequently the enforcement will be both effective and cost-effective. “Further, in a close-knit fishing community, social sanctions are far more effective than legal sanctions.”

Dr Hotta outlined certain key factors in the design of CBFM – devolution of management authority to the community; establishment of territorial boundaries; and incentives to fishermen to set up management systems.

About devolution, Dr Hotta said that fostering viable community-level organisations is the first step in CBFM. Even where such organizations exist, they cannot immediately assume CBFM responsibilities in the absence of any experience or expertise in CBFM. This is a gradual process. Where fisheries management authority is delegated to fishermen, care should be taken to ensure a fairly equitable sharing and distribution of benefits among fishermen.

Establishment of territorial boundaries in the area adjacent to a fishing community is a basic element in CBFM. This is done, for example, in the traditional fisheries systems of Japan, the Philippines, Indonesia, Sri Lanka, Papua New Guinea, Fiji. The merit of demarcating waters for the exclusive use of fishermen is that they then have incentives to establish self-regulating systems, because they own a wealth-producing property. Development of co-operative marketing is one such incentive. It would strengthen the bargaining power of fishermen.

Dr Hotta provided some examples from Japan’s rich experience in CBFM. He said that coastal fisheries in Japan are managed by some 1,200 fisheries co-operative societies. Each co-operative has its own by-laws within the framework of national fisheries laws and fisheries co-operative laws. Access to territorial waters is limited to members of co-operatives. They establish regulations concerning boats, gears, seasons, areas, mesh sizes, marketing of fish etc.

Fisheries research institutes in Japan play a very constructive role in fisheries management by alerting fishermen about the state of resources. Smaller-sized fish, falling fish prices, lower incomes from fishing, greater fishing competition – all these are warning signals that research institutes look out for.

Coastal fisheries in Japan is classified into three types from the management standpoint – reef fisheries, mobile-species capture fisheries and aquaculture. Management methods for the three types differ.

Judging from the workshop’s discussions and the proposed follow-up activities, the workshop was a great success. Information and experiences were shared. Participants returned home convinced that the battle to create a sustainable industry does have its warriors. In the words of Mr. Richard Cashin of Canada, “There is no single solution. There is no single lesson”. The process of sharing and learning, through seminars such as this, enables a search for solutions that everyone can adapt everywhere to further the cause of sustainability. Participants agreed that opportunities for meaningful partnerships among the diverse groups of stakeholders are endless.



Here are glimpses into a few papers presented at the workshop.

Ms Sevaly Sen, from the Institute of Fisheries Management, spoke of the “moral distance” of government from its people as partly responsible for the continuing ineffectiveness of government’s top-down approach to fisheries management. Because of this “moral distance,” the fishing community does not fully appreciate management efforts introduced (or rather imposed) by the government. Likewise, government does not fully understand the local conditions of the fishing community it wishes to regulate. Ms Sen said the concept of fisheries “co-management” encompasses a wide range of partnerships between the government and stakeholder resource users, especially in the process of consensus solutions.

Dr Kee-Chai Chong spoke on “Sustainability of Fisheries: Global Challenges for the Future”. He focused on three factors that have caused environmental degradation and resource depletion: overpopulation, consumption excesses, and abusive use of technology.

He said the needs of an increasing population can be met if the idea of sustainable development and management of fisheries is promoted. “Without management, there is no way supply can meet demand.”

Decrying consumption excesses, Dr.Chong said that human irresponsibility has exacted a heavy toll from fisheries. He said “Mother Nature has been bearing a large part of the costs. It will no longer subsidise irresponsible consumption and production”. Management was needed to moderate “undesirable human impact” and regulate it.

Technology can be used positively, but the current power- hungry attitude makes it a tool of destruction. Fisheries planners do not help either because they keep projecting higher and higher per capita fish consumption in their 5-year national development plans. These automatically translate into pressures for the production unit to find ways to increase production based on the planners projections. Today, the per capita consumption of fish in Japan is already 65 kg/capita/year. In Hong Kong, Taiwan, Singapore and Malaysia, it varies from 40 to 55 kg/capita/year while in Indonesia and Thailand, it is only about 20-25 kg/capita/year. For India, Bangladesh, Sri Lanka it is still way below 10 kg/capita/year. With ever increasing projections made by fisheries planners, is it any wonder that our fisheries are continuously under severe and heavy fishing pressures. World trade in fish has surged to over US\$ 50 billion a year.

Dr. Chong said that management “revolves round the effort to help the natural resource ecosystem and the environment to cope with increased uses”. This type of management can best be done through “smart partnerships” or, the forging of partnerships between different stakeholders in the entire marketing chain (government, fisherfolk, market intermediaries, chefs/cooks, consumers, etc) so that the interests of all stakeholders can be considered. The government continues to play an important role in smart partnerships, by maintaining order and resolving political and legal disputes.

Community-Based Management (CBM), Dr Chong said, confers on people limited rights or ownership of their fisheries system and promotes positive changes by altering socio-cultural attitudes and practices that relate to fisheries management. He identified three basic steps for the success of CBMs. First, a consensus must be arrived at through public hearings on what is at stake for all concerned. Once this consensus is established, the style and type of management to be implemented must suit the needs of the communities. Finally, education. Educating the public through practices such as ecolabelling and realistic cost estimation based on the valuation of natural resources will create informed consumers and producers who will take personal responsibility for fisheries management.

Dr. Chong said that government-centralised management intervention in fisheries is on its way out as it is cost-inefficient and relatively ineffective. Further, governments are downsizing. “Reduced government support for sustainable management of fisheries has created the need for new funding mechanisms” for management. Such mechanisms must be worked out quickly if fisheries is to be managed.

“Giving citizens pride of place and putting them at the centre-stage of management, with government managers watching from the sidelines, will go a long way toward promoting community management of local fisheries”.

In Queensland, Australia, several tiers of government bear the responsibility for fisheries management. Some light on the system was shed by two guest speakers from Queensland: Mr Patrick Appleton of the Queensland Fisheries Management Authority (QFMA), and Mr Peter Finglas, of the Queensland Department of Primary Industry (QDPI).

Mr. Appleton said that QFMA drives appropriate management, use, development, and protection of fisheries resources. It liaises with other state governments, statutory authorities and local governments and promotes co-operation at all levels for strategic planning and effective day-to-day management of fisheries.

He said that Queensland fisheries have met substantive challenges over the past 3-4 years. The management of Queensland’s fisheries has moved away from a technocratic model of management, because of dissatisfaction on the part of key stakeholders. Besides, increased population, changes to commercial and recreational fishing and pressure from traditional fisheries are impacting the capacity of the environment to sustain fishing.

As “custodians” of fisheries resources, the government must adapt to these challenges, Mr Appleton said. “In order to ensure the continued sustainability of fisheries and their effective management, all levels of government must co-operate”. Such co-operation meant the need for a different approach to fisheries management that involved equity in decision-making and long-term protection of resources. The new model adopted sets out to protect the public interest in resources, provide a technical basis for management and involve major stakeholders directly in management planning.

In 1994, the Queensland Fisheries Act was established. It sets out clear directions for fisheries management. It further established a new statutory authority, the QFMA. Prior to 1994, the QFMA’s role was unclear. Following the Act, its prime function was to deliver management based on the principles of ecologically sustainable development.

“Management planning requires a co-operative and integrated approach across agencies and user groups”, Mr Appleton said. He further elaborated that “management offers opportunities for integration of information and expertise from across a range of users and disciplines . . .”. He went on to say that, “The aim is to produce a management plan which is user-friendly, is broadly accepted by stakeholders and ensures protection of the state’s fisheries resources as well as access to them.”

For such management to occur, consultation and community involvement are necessary. Two levels of consultation and involvement were created through the Management Advisory Committees (MACs) and Zonal Advisory Committees (ZACs). MACs, Mr. Appleton explained, “are building blocks in the process of developing management plans”. They are the principal sources of planning and advice for authorities. ZACs, on the other hand, provide a forum for regional communities to provide advice on

the diverse range of issues impacting on local fisheries. The principal benefit is that ZACs enable the collection and dissemination of information to the general public.

Creating MACs and ZACs was difficult but rewarding, because they have changed the culture of fisheries management in Queensland in three significant ways. They have generated the feeling that “publicly owned resources need to be shared on a fair and equitable basis”. Second, stakeholders, government and the community have come to realise that fisheries resources are limited and that uncontrolled and irresponsible fishing by any group must not be permitted. Finally, that the role of government agencies is facilitation, negotiation and mediation.

Mr. Appleton was not able to comment on the success or failure of such a process as it is still in the developing stages. New arrangements and processes take time but can create an “ownership attitude”. Further, the Queensland model will only be as successful as the participants allow it to be. The workability of the new arrangements will depend on the support and participation of the users.”

Mr Peter Finglas Of Queensland’s Department of Primary Industry (QDPI), concurred with much of Mr. Appleton’s remarks. He said that QDPI functions as a rural economic development agency that links government and industry in partnership to “increase the profitability of primary industry-based enterprises on a sustainable basis”. Overall, QDPI is responsible for management, use, development and protection of aquaculture, marine plants and fish habitats. However, the fisheries resources are available to all, and the “responsibility for their management and stewardship is a public service shared by government, the resource user and the general community”.

Specifically, the Department of Primary Industries is guided by policies that ensure equitable and consistent decisions which impact fish habitats. A part of this process of policy creation is to include communities in the decision-making process. Mr. Finglas stressed that it is important to “include inputs from the community early on in the process to ensure that decisions are based on available knowledge and that community members are genuinely part of the process”.

Mr. Finglas stressed the importance of community inputs into decision-making. Partnerships between fisheries agencies such as QDPI and the community reduce conflicts, increase information sharing and create a feeling of ownership within the community. Result: they become a part of the solution to the challenges now facing the fishing industry.

### 3. WORKSHOP PROGRAMME

*Wednesday, November 26, 1997*

- 8:00 - 9:00  
Registration
- 9:00 - 10:00  
Opening Ceremony:  
Opening Remarks by BOBP, DOFM,  
IOG.  
Opening Address by the *Director General  
of Fisheries, Malaysia*
- 10:30 - 11:30  
Keynote Address: International  
Experiences in Community-Based  
Fisheries Management: Successes and  
Pitfalls  
*Dr Masamichi Hotta*, Adviser,  
Overseas Consulting Department,  
Tetra Company, Japan
- 11:30 - 12:30  
Sustainability of Fisheries: Global  
Challenges for the Future  
*Dr Kee-Chai Chong*, BOBP
- 2:00 - 3:00  
Building Legitimacy for Smart  
Partnerships  
*Ms Sevaly Sen*,  
Institute of Fisheries Management,  
North Sea Centre, Denmark
- 3:30 - 5:00  
Towards Community-Based  
Management in Inshore Fisheries:  
The Experience in Newfoundland,  
Canada  
*Mr Richard Cashin*,  
Marine Institute International  
Newfoundland, Canada

*Thursday, November 27, 1997*

- 8:30 - 10:00  
The Queensland Fisheries Management  
Model  
*Mr Pat Appleton*  
Management Authority, Queensland  
Fisheries, Australia
- Community Inputs into Fisheries  
Resources Management: Approach of  
the Queensland Department of  
Primary Industries, Australia  
*Mr Peter Finglas*  
Department of Primary Industries,  
Queensland, Australia
- 10:30 - 12:30  
Practical Country Experience from  
Southeast Asia:  
Malaysia  
Indonesia  
Thailand  
Philippines
- 1:30 - 3:30  
Practical Country Experience from  
South Asia:  
India  
Sri Lanka  
Maldives  
Bangladesh
- 4:00 - 5:30  
Panel Discussion and Closing

#### 4. OPENING ADDRESS

**by Dato' Mohd Mazlan Bin Jusoh**  
Director-General of Fisheries Malaysia

{Wednesday, November 26,1997}

It is my great pleasure to welcome you to the Pearl of the Orient for the seminar on “Smart Partnerships for Sustainability in the Fishing Industry”. This seminar is organised through a partnership between the Institute On Governance, Canada, the Department of Fisheries, Malaysia and the Bay of Bengal Programme.

The objectives of the seminar are to understand the global changes in the regulatory process in the fishing sector; to learn about the innovative approach to self-regulation which has been implemented in other countries; to understand factors contributing to the successes and failures of self-regulation in different social, economic and political contexts; to explore how participants might enhance the effectiveness of their own regulatory process through enhanced private-public sector partnership.

Around the world, people depend on fish for their livelihood. Most of them, being villagers feeding their families on their daily catch, are struggling with the problem of dwindling catches. Scientists and government officials too are under pressure to ensure that the fish stocks are sustainable for their national needs.

The fisheries resource is depleting because of overfishing, over-capitalization and technological overkill, habitat degradation and pollution. This grim scenario is being re-enacted more and more often around the globe. The governance of the coastal environment is not only complex, it has become a matter of great concern to governments in recent years because of the lack of stakeholder consultation in enforcing management policies. Without definitive support and the participation of stakeholders in a smart partnership, management programmes are doomed to fail. It is therefore imperative that the stakeholder approach to management be seriously considered. Resource users in partnership with government officials and other stakeholders should be involved in active participation to work out strategies and programmes for the management of fisheries resources.

In fisheries management, everyone in the entire market chain is a stakeholder and has a role in the management process. Each and every stakeholder can exert himself and make an impact on fisheries management. Thus in smart partnership management, a special effort is made to listen to, learn from and take into account local practices and knowledge including their respective beliefs and value systems. Achieving the objectives of smart partnership for fisheries management will mean going through various steps, methods and procedures. A well-managed fishery is the only answer to sustainability. What we are aiming at is to make other users and stakeholders aware of their responsibility and to be more involved in taking care of the fisheries resource for their own long-term well-being.

Sound management programmes for sustainable development and utilization of these resources are needed. The exchange of experiences and of procedures for fisheries management among the countries in the region are timely and necessary so that we may learn from the experiences of our friends elsewhere. I believe that this seminar will promote further co-operation and coordination among countries to establish efficient smart partnerships. I should therefore like to suggest that you take full advantage of the discussion

that follows the presentations of our distinguished speakers. They have a lot of experience in these areas. You will also learn from the efforts that have been made by the various countries in the region to solve the problems that beset their fishing communities and industries. You will gain an overview of the region as a whole and you will be able to compare the difficulties of others with those of your own countries. We have the opportunity to open our minds to explore new ideas. Let us now use this short period of time to listen, learn and digest what is happening, what has been tried and what is new to us. I believe that within the next few days we can come up with a set of recommendations as a foundation for further deliberations.

I should like to thank all of the distinguished resource persons, organisations and nations for giving your valuable time to attend this seminar. I hope that you will have a very pleasant stay in Penang which is one of our most attractive cities. I now take great pleasure in announcing this seminar open.

Thank you, I wish you every success in your deliberations.

## 5. LIST OF PARTICIPANTS

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## 6. KEYNOTE ADDRESS

### INTERNATIONAL EXPERIENCES IN COMMUNITY-BASED FISHERIES MANAGEMENT - SUCCESSES AND PITFALLS

by **Masamichi Hotta**

Management of small-scale fisheries has become very critical during the past decade, and poses an extraordinary challenge both for local communities and governments. Unlike large-scale fisheries, small-scale fisheries at the national level is difficult to manage. Reasons:

- Limiting the effort of small-scale fishermen means lower incomes and fewer job opportunities for them.
- Doing away with the practice of free and open access to fishery resources, and imposing management curbs, often leads to serious economic and social problems for fishing communities. But if the open-access condition remains untouched, resources get depleted, economic returns fall, and community stability is endangered.

An FAO-Japan expert consultation on fisheries management was held in Kobe in 1992. It emphasised the need for bottom-up rather than top-down approaches to manage small-scale fisheries. Since then, numerous studies have been undertaken. There is now widespread acceptance of the concept that sharing of authority between a government and a community is important for effective fishery resource management. This concept is known as community-based fishery management or CBFM. Interest in decentralised management systems is now growing in Malaysia, Philippines, Sri Lanka, Thailand, Indonesia and Viet Nam.

The basic principles of CBFM are participation of fishermen in (a) planning and decision-making on measures to be taken; and (b) implementation, control, surveillance and evaluation of management activities.

Why CBFM? When fishermen themselves help design management, a high rate of compliance can be expected. There will be no need for external enforcement of regulations; consequently, the enforcement will be both effective and cost-effective. Further, in a close-knit fishing community, social sanctions are far more effective than legal sanctions.

Key factors in the design of CBFM are — devolution of management authority to the community; establishment of territorial boundaries; and incentives and motivations to fishermen to set up local management systems.

*Devolution of management authority to the community:* Adequate village-level fishermen's organizations are needed for the purpose. But governments are often handicapped by the dearth of such organisations. Even where such organisations do exist, they cannot immediately assume CBFM responsibilities in the absence of any experience or expertise in CBFM. Acquiring it is a gradual process. Fostering viable community-level organisations is the first step to CBFM.

The community-level organisations entrusted with fisheries management responsibility should be economically and socially viable. Else, fishermen will not trust the organisation. In fact, such organisations

should win fishermen's trust in their competence and capacity even before they get involved with resource management.

When fisheries management authority is delegated to fishermen, care should be taken to ensure a fairly equitable sharing and distribution of benefits among fishermen. "Fishing by rotation" is one way this objective can be achieved — fishing spots are rotated among fishermen so that all of them get to fish in the most fertile areas. A "pooling system" that distributes all fishing earnings in an area equally among fishermen of that area is another method. This is practised in Japan. In Sri Lanka, fishermen return some of their earned money to the community by donating cash or a social facility for the community.

Whether the local community can manage the fishery resource depends partly on government support. Some fishery administrators may be reluctant to relinquish authority and power.

CBFM should be integrated into the national legal framework, because community-based organisations need legal recognition for their decisions to be enforceable. They can regulate the behaviour of local fishermen through informal community sanctions, but they have no control over fishermen from other communities. If they are given legal authority, they will be able to enforce regulations on fishermen outside the community.

*Establishment of territorial boundaries* in the area adjacent to the community is a basic element of CBFM. This is done, for example, in the traditional fisheries systems of Japan the Philippines, Indonesia, Sri Lanka, Papua New Guinea, Solomon, Fiji etc.

The merit of demarcating waters for the exclusive use of fishermen is that it gives fishermen incentives to establish self-regulating systems -they own a wealth-producing property. Compliance is built on trust. Control over resources by fishermen would make a management regime feasible -they will be motivated to preserve their resource.

*Incentives to fisherman to establish local management systems:* Such incentives could be created through collective action in fishing and fish marketing. Development of co-operative marketing would be one such incentive. It would strengthen the bargaining power of fishermen. Co-operative marketing can be combined with management. For example, the local management authority can instruct fishermen on whether fishing should be carried out on that day, after studying market trends for fish. If prices are unfavourable, fishing trips would be cancelled.

In Japan, coastal fisheries resources are managed by some 1,200 fisheries co-operatives throughout the country. Each co-operative has its own by-laws within the framework of national fishery laws and fisheries co-operative laws. This legal system empowers co-operatives to exercise a fishery right or some kind of property right over resources within their jurisdiction. Access to territorial boundaries is limited to members of co-operatives. The co-operatives establish regulations concerning boats, gear, season, area, mesh size, marketing of fish etc.

Could the legal framework for decentralised fisheries management practised in Japan be a model for other countries? Thorough studies are needed to determine the answer. Very careful adaptation to local conditions would be necessary if Japan is indeed taken up as a model.

Fisheries research institutes in Japan play a very constructive role in fisheries management by alerting fishermen about the state of resources. Smaller-sized fish, falling fish prices, lower incomes from fishing, greater fishing competition -all these are warning signals. Fishermen then take up management measures

themselves. In the past, fisheries management was taken up only during a crisis. Nowadays, fishermen are more careful, thanks to support from research institutes.

Coastal fisheries in Japan is classified into three types from the management standpoint-reef fisheries, mobile-species capture fisheries and aquaculture.

Management methods for the three differ, and are classified into five by objectives:

*Discipline and order in fishing grounds:* Management is designed to prevent a mad rush to fertile fishing spots such as artificial reefs. "Fishing by rotation" regulates the type of gear used, the fishing periods and hours, the position of the gear to be set.

- *Management of fishing grounds:* The carrying capacity of a fishing ground is limited. If you introduce more fishing boats, the total output will remain the same, while individual catches will decrease. Therefore the optimum number of fishing vessels is determined, and surplus vessels are transferred to other areas to improve cost-effectiveness.
- *Fish price stabilization:* Fish prices are stabilised by a policy of quotas and effort control. Two days of fishing followed by a non-fishing day is an example.

*Resource conservation:* The use of larger mesh size has not merely helped conserve fish stocks, it has also improved returns by increasing the size of fish and raising the price of fish.

- *Enhancement of fish stocks:* Fish farming and the setting up of artificial reefs can help enhance fish stocks.

The common objective of these measures is to maximize economic returns under a sustainable fishery environment.

In sum, fisheries co-operatives in Japan play a vital role in CBFM. Their characteristics:

- . All members of the co-operative assign sale of fish to the co-operative. This enables the co-op to understand and assess production trends and the status of management effort.
- . Successful co-ops have a committee to ensure smooth coordination among fishermen on management measures. Such committees have helped mediate and monitor views among fishermen and establish a consensus on management action.
- . Without exception, successful co-ops comprise an active study group of young fishermen who help generate new ideas. Practices such as the "pooling system" for catches and "rotation in fishing", now widely prevalent in Japan, were set up by such study groups with the help of fisheries research stations.

A law concerning conservation and management of marine aquatic resources, commonly known as the law of the TAC, came into effect in 1997. Sardine, jack mackerel, mackerel, saury, Alaska pollack and crab are the fish species to which TAC is applied. Continuing efforts will be made to integrate TAC systems into existing fisheries legislation and management mechanisms. The law of the TAC obliges fishermen to report their catches.

Issues to be taken up in future will include (a) application of TAC to Chinese and Korean vessels that operate in the waters around Japan. (b) establishment of a single management authority (c) setting up early catch reporting systems and (d) withdrawal of vessels.

## 7. SUSTAINABILITY OF FISHERIES: GLOBAL CHALLENGES FOR THE FUTURE

by Kee-Chai CHONG

### Background

*Today, we find ourselves in a race against time*

Judith Kildow. 1997

One of the world's most crucial challenges today is how to find the resources to feed its people. The world population is projected to grow to 8 billion by 2020 A.D. and 9 billion by 2030 A.D. -up from the present 5 billion (UNCED 1992). By 2000 A.D., 60 of the world's 80 most populated cities – with populations above four million people each — will be located in developing countries. By 2020 A.D., developing countries will account for 7 of the 8 billion people on this earth; most of them will live in cities (CIRAD 1994).

In contrast to rural areas, which are predominantly centres of production, urban areas are mainly centres of consumption. As rural areas empty out through rural-urban out-migration, who will produce food for the teeming millions in overcrowded cities? The growing shortage of labour in Malaysian fisheries is temporarily overcome by importing fisherfolk from neighbouring Thailand. Can Malaysia reverse this out-migration?

How can we cope with ever-rising demand for fish when the fisheries resources are rapidly shrinking? Markets absorb any seafood that is landed – it is highly exportable. Many developed countries obtain seafood from developing countries, depriving local people, especially the poor, of the animal protein they need for their daily diet.

With people living longer than before, populations soaring and incomes rising, consumption can only go up. Production has dropped below earlier consumption levels, especially in the coastal communities of developing countries such as Bangladesh, India, Philippines and Indonesia. Long used to a relatively secure livelihood from the sea, these communities now find their source of sustenance being threatened. Over-population, over-fishing, fisheries habitat degradation and an over-active seafood export drive are some of the causes for the shortage of fish and the plight of fisherfolk.

The poor today live in a degraded environment whose eco-systems are over-stressed. This is especially true in South Asia, where half of the region's one billion people live below the poverty threshold of US\$250. In this region, as elsewhere in Asia, fish is the main source of animal protein in the people's diet.

The sea is exhaustible, even if many of its resources are self-renewing. As population grows, pressures on the use of coastal resources intensify. Any human use of natural resources impinges on their natural states, which are altered forever. The resource stock gets degraded and depleted, flow of goods and services gets thin. Further, the sheer numbers of people exacerbate such degradation and depletion. If man leaves the sea alone, the sea may be left to its own devices. When man uses it, the sea cannot be left to look after itself. Management is called for to moderate undesirable human impact and regulate its use.

Resource use can be both productive and consumptive. Productive use of resources means that the resource stock can be used over and over again. Consumptive use of resources kills the possibility of re-use. Fisheries, like other natural resources such as water, are being subjected to mindless and consumptive use.

The goods and services produced from fisheries, such as petroleum/gas deposits, and water, are given an economic value at the market place, a price. But this system of pricing is flawed. The market prices do not reflect the products' real value. These prices do not take into consideration the scarcity of the products, their resource and "environmental value".

There is a definite need to change our present system of national accounting. The costs of goods and services of the natural resources and environment should be so computed as to accurately reflect their real value. It is only recently that awareness about the importance of such a system has been aroused.

Our present environmental woes are a direct result of this accounting flaw. The earlier we correct the system of national accounting, the better. Once this is done, the market values of these resources will go up. Consumption will go down as moderation takes over and unnecessary waste is reduced.

Fish in the marketplace are under-priced. Mother Nature has been bearing a large part of the costs. It should no longer do so. Irresponsible consumption and production should not be subsidised.

Fish, in particular high-value preferred species, are getting more and more scarce. Prices are spiraling day by day, even for species which were once shunned (ask any Malaysian homemaker), and fishing grounds and coastal habitats are being destroyed. The lowly *ikan kembong* or mackerel (*Rastrelliger* sp.) sells for RM 12-15/kg or about US\$4-5/kg.

#### Blind faith in technology

Continuing advances in science and technology are supposed to improve the quality of life and welfare of the people by increasing output, cutting cost and minimising the drudgery of manual labour. However, in fisheries the pursuit of technical and economic efficiencies in production has accelerated the depletion and destruction of fisheries resources. In fact, technological excess should rank third, after over-population and over-consumption, as a major cause of resource depletion and environmental degradation.

Everyone is aware of the power of technology (particularly the greedy and indiscriminate use of technology in fisheries-capture and culture) to extract the highest returns in the shortest time possible. The "carrying capacity" of the human species has suffered steady erosion. Technological excess in fisheries and aquaculture reflects this erosion. Result: the carrying capacity of fisheries, of natural resource systems and the environment, has been exceeded.

Governments of fishing nations must desist from adding to the present excess capacity in the industry, both in fishing and seafood processing. They should instead go all out to reduce capacity- by attracting capital away from fishing, by finding alternative employment for fisherfolk, and curbing the fresh entry of fishing boats and fisherfolk as well. This should also be done for seafood processing capacity. In this context, the industry can help the government by not pressurizing the government to attract additional investments to boost fishing and processing capacity. The urgent task is to reduce existing capacity.

Excess capacity in fisheries has many causes. A major cause is the lack of ownership or well-defined property rights concerning the resource. Fisheries is largely perceived as a public or collective good,

available to one and all. The open-access nature of the fisheries does not give fisherfolk any incentive to manage and conserve the fisheries. Another cause is the dearth of alternative income-generating opportunities in rural areas, especially remote coastal areas. Fishing is consequently the employment of last resort for many rural inhabitants. The insatiable demand for seafood is another cause of excess capacity.

So technology continues to be used to exceed the carrying capacity of the fishery resource. The users of the technology seek to maximise output to pay for the high capital investment cost of the technology.

Technology is supposed to be neutral in its application. But the application of technological advances in fisheries has never been questioned. Every advance that comes to the market is blindly accepted and indiscriminately used to increase output without regard to environmental and social costs. These are invariably inflicted on the resources and habitats, and the people, especially those least able to shoulder the costs. The human species must learn to establish a new relationship with Mother Nature.

The first step in managing stressed and over-fished stocks is to reduce effort. The next challenge is to control and reduce fishing power in overall fishing effort. Is a cap on technological advances in fishing needed? Attempts have been made since the dawn of fishing to keep increasing the power of technology in fishing. These range from non-motorised to motorised fishing boats, from simple hook and line to large encircling or sweeping nets, from dependence on the master fisherman's skill and experience in locating fish to advanced electronic devices such as fish finding sonar or echo-sounder, etc.

Conventional textbooks on fisheries management have seldom been questioned. Likewise, hardly any person questions the so-called traditional systems of community-based management of fisheries. There is no denying that community involvement and participation are needed. But resource management cannot be completely participatory. Government ought to be active, to enable and facilitate community actions. Governments are expected to step in when those empowered are not able to resolve their problems among themselves. Law and order are still a vital government function and responsibility.

### **Interdependence and smart partnership**

As the world gets crowded and living space gets more and more scarce, inter-dependence becomes more and more crucial. Isolation isn't possible any more. The fisheries and coastal resources planner and manager ought to recognise this fact. Inter-dependence should be used to forge smart partnerships. New forms of partnership, and new forms of people participation, are also needed.

There is a lot to be gained from co-operation, much to be lost from non-co-operation. In developing a management plan, the government as the key stakeholder must consult and involve all possible stakeholders, especially in working out necessary management processes. This will ensure stakeholder input into the process, and prevent later recrimination by those left out or not represented. By forging alliances and partnerships among all stakeholders, all the interests and stakes are brought together into a forum for open discussion on what is at stake for all, not a particular stakeholder group or vested interest.

Global partnership forged at the 1992 Rio Earth Summit is being translated at the grassroot level. A new beginning in governance by the people through shared responsibility and strategic partnership among all stakeholders holds the key to sustainability of the fishing industry.



But the building of wide-ranging partnerships at all levels of society among different stakeholders is a time-consuming process, as it calls for a division of responsibilities among various stakeholders. This is not an easy task, as the Rio Summit experience has shown so far. Even when a consensus is arrived at, like the one proudly proclaimed at Rio, it does not amount to anything tangible if there is no commitment or political will to implement what had been agreed to.

Developed countries must play a more active role not only in technology transfer and human resources development, but also in fostering smart partnership with developing countries in global resource management and in mitigating transboundary problems affecting the global environment. Partnerships between developed Europe, North America and Australasia on the one hand, and developing Asia, Africa and Latin America on the other, are called for to work out solutions to feed and clothe the world.

### **Stakeholder fisheries management**

There are so many demands on fisheries and coastal resources in the coastal zone, making their management so complex, that without the government intervening as arbitrator, there would be civil strife and chaos. In stakeholder consultation and analysis, the government can actively encourage stakeholders to voice their concerns, state their expectations and demand their dues. It is then easy to dispel erroneous perceptions or clarify matters one by one. This done, a common basis can then be built up for a consensus on what is at stake for all concerned. When a consensus is not possible, negotiation can be attempted. When all else fails, the government should step in.

The next challenge is how to make sense of fisheries management and operationalise the process of management. Managing declining or over-fished or depleted fisheries stocks is complex because of the conflicting need to balance production and conservation. Any management reform in fisheries has to be location-specific and adapt to the circumstances at that location. Management must satisfy the community's needs.

A 1984 survey of fishing in Asia undertaken by the Far Eastern Economic Review observed that "most fishing communities in Asia live on the brink of starvation". It went on to state that "they are largely ignored by their governments or are given low priority in national development plans". Even today, many of them earn very low incomes. There has been little advance in their living standards.

It is neither easy nor fair to ask hungry people to restrain consumption. In land-scarce Asia, production effort has inevitably been directed at intensification -- not only on land but in water too. Fisherfolk without access to land have relied on coastal waters for their sustenance.

Empowerment is one of today's buzzwords. It means decentralisation of government authority to facilitate the vigorous participation of the people — the stakeholders — in activities that concern them. Empowerment can work only if the people are enthusiastic about accepting the responsibility delegated to them. Are the coastal and rural citizenry willing to assume the new responsibility?

Self-governance is fast spreading — as a catchword. Everyone pays lip-service to it. While the government's primacy in matters of state cannot be questioned, its role in natural resource management is increasingly being questioned because of bureaucratic inefficiencies. There have been many failures in resource management, especially in fisheries.

Building local capacity in natural resource management by equipping local communities with the skills and tools to manage the resources in their backyards, is an approach which should be stepped up.

Wherever such local capacity already exists, the communities should be empowered to manage the resources. Self-governance or community-based management does not bypass the role of government but supplements it. Positive socio-cultural attitudes and practices concerning fisheries management should be promoted to strengthen self-governance.

Self-governance does not mean doing away with conventional methods of fisheries management. On the contrary, self-governance does rely on conventional methods and techniques of management but the community of stakeholders plays a bigger role in management than in conventional management. Self-governance could be regarded as an exercise in responsible and responsive individual and collective behaviour in production and consumption. It is stakeholders who determine resource use and management.

### **Consumer power and consumer choice**

Choice is a powerful concept in economics. The judicious exercise of choice in the marketplace can send powerful signals to producers and market intermediaries, as well as to stakeholders. Consumers can help shape the future direction of commerce, trade and industry. If the global environment is deteriorating and the resource base shrinking, it is partly because consumers aren't exercising their power to influence the character of industry. The Earth Island Institute has mounted a public campaign, calling on all consumers to buy only 'Earth Island Certified Turtle-Safe TM Shrimp'. Reason: They found that "over 150,000 sea turtles die in shrimp nets every year". If consumers decide to buy only those shrimp that are caught with turtle-saving nets, they will help protect the turtles. Another example on these lines is dolphin-safe tuna certification.

In southern India, a large fish buyer who controls about 70-80% of the fish supply market, surprised a BOBP-supported stakeholder consultation recently. He said he would gladly co-operate with fisheries officials by not buying endangered species of fish. He added that if he does not buy the fish, fisherfolk will have no reason to catch them. Fisheries management awareness is evidently catching on, even among big players in the market.

### **Ecolabelling**

The practice of ecolabelling – whereby an authorized or respected agency inspects products from an environmental standpoint and allows the products to carry a label indicating the agency's approval – is spreading in the west. Ecolabelling works when fish and other seafood are marketed through an institutionalised distribution and marketing system. In many developing countries, however, fish is sold and distributed by small vendors. The marketing system is traditional, and involves many sellers. Ecolabelling is not expected to catch on in developing countries for some time.

In contrast, an institutionalised marketing system exists in developed countries. In the United Kingdom, supermarkets account for around 60 % of fresh fish and 80 % of frozen fish sales (O'Riordan 1997). It says that these stores, conscious of their public image and their market shares, would welcome the ecolabelling initiative even more than the consumers themselves. Ecolabelling can go a long way towards promoting responsible behaviour, not only by producers but also by consumers. The effect of the Marine Stewardship Council created in 1996 is another example.

Sustainable production can be assured when the production is responsible, consumer-oriented and driven by the pocket of the ultimate consumer.

### **Fisheries management by design**

Fisherfolk must not view management as government interference. However, past government effort at management, being largely top-down in nature, has not been effective. Fisheries management is called for to help human use of resources. Without human use, there would be no need for human intervention. Management revolves around the effort to help the natural resource ecosystem and its environment to cope with increased use.

Fisheries management consists of activities to protect and enhance the habitat and the ecosystem, regulate the use of inputs in catching fish, and regulate the level of output to be landed. Management helps provide the conditions for sustainable production by 'manipulating' the resource habitat and environment. It frequently includes artificial means of resource enhancement. This is to ensure resource use sustainability, that is, the rate of harvest does not exceed the rate of resource regeneration.

Conventional management systems for fisheries have not worked out as expected, because the fisherfolk were drawn into a management system alien to them and imposed on them without their full consent. Governments in many countries are now beginning to mobilise the population in the local community as partners in fisheries management. There are also other systemic weaknesses in fisheries management systems today, which ought to be remedied.

A flexible mix of management approaches, strategies and methods has been found to be more successful than a rigid set of approaches. This is because a rigid system does not provide solutions when the system does not work as planned. The fishing community must be given other options when those tried out earlier did not work out.

Further, fisheries management legislation today does not provide for fisherfolk and other coastal stakeholders to be heard, let alone represented, in management councils when they discuss management measures. This is especially true in many developing countries, where such legislation was formulated when management was still in its infancy and administrative control was concentrated in the hands of the government.

To ensure the success of this new management partnership, governments must re-examine the beliefs, values, perceptions and attitudes of the people towards such a partnership. This is because changes are usually slow to establish and take root. Smart partnering calls for an imaginative combination of different stakes among divergent groups of stakeholders. Their needs should be met through consensus-building and negotiated settlement.

What smart partnership in management does is to customise the fisheries management in the local area according to the conditions, needs and circumstances prevailing in the area. The interests and needs of the local community come first.

Resource management is location-specific and therefore calls for site-specific intervention. But more than this, it has to be flexible. When it is rigidly implemented, the local community has found it difficult to adapt and adjust to new suggestions on fishing practices and other behavioural requirements. They also need flexibility to adjust to changes in stocks, sea and other maritime conditions.

So far, management of fisheries and other coastal resources had applied broad universal tools of management without any adaptation to local conditions. Local managers are better equipped to deal with local management problems.

However, it is being noticed more and more in recent years that fisherfolk who have historically fished in a certain fisheries ground are now keeping other fisherfolk out of their traditional fishing ground. This is in spite of the fact that the latter (who were kept out) have also been fishing for a long time albeit in a different ground **or** fisheries. Today, fishing encroachment is being handled quite differently than in the recent past. Fisherfolk today are more radical and assertive about their rights than before. One group of fisherfolk is able to keep another group out, even though the latter has theoretical open access; this is because fisherfolk of the same type 'bond' together.

This is partly a result of the government's earlier initiative in demarcating different fishing zones for different types of fisherfolk. The government should capitalise on this development. It should take fisheries management even further through participatory community-based management.

### **Making a Beginning and Starting Small**

Fisherfolk must begin to assume responsibility in fisheries management and not leave such responsibility solely in the hands of the government. Recent experiences from Malaysia and Thailand -not to mention Japan, where there is a long tradition of fisherfolk-centred management — are instructive. In both Malaysia and Thailand where a variety of fisheries management measures has been implemented and enforced, the managed fisheries shows positive and strong signs of not only responding to management but actually recovering. Wherever the fisheries resources and their habitats and ecosystems are protected, stocks have recovered.

More recently, Malaysian anchovy fishers have reported that they can now fish for anchovy year round, instead of for just 3-4 months as in earlier years. This is a direct result of the setting up of a fish sanctuary and marine park around Pulau Payar, near Kuala Kedah in the state of Kedah. As the stock biomass begins to increase within the sanctuary, more and bigger fish swim out to join the fisheries outside the 2 nautical mile boundary of the protected area. Thus, the protection provided by the sanctuary not only benefits the fisheries but also the fishers. Not only are their catches increasing but also their incomes, because of the larger sizes of fish. (It would be interesting to recall that fisherfolk around Pulau Payar had misgivings when the latter chain of four islands was declared as marine park/fish sanctuary back in 1989.)

Anchovy fisherfolk off another island, Pangkor, have similarly requested the Department of Fisheries, Malaysia, to establish Pangkor as a fish sanctuary.

In Thailand, fisherfolk in Phang-Nga Bay are encouraged to deposit any gravid female crabs into special community spawning cages. Once the crabs have spawned, the fisherfolk are allowed to remove the spent crabs for sale. Proceeds from the sale boost a community chest for community welfare programmes. Likewise, small-scale fisherfolk in the Bay have been successful in keeping out fish trawlers from the 3000 m nearshore waters which have been allocated to them. With the help of the Royal Thai Department of Fisheries patrol boats, these fisherfolk have used their own boats to police the waters quite effectively. Similar experiences are now reported from the southern coasts of India, around Kerala and Tamil Nadu.

The installation, deployment and use of artificial reefs, and to an extent of durable fish aggregating devices, have shown that when these are administered for fisheries management and not as a fishing gear or tool, they can promote stock recovery. Artificial reefs can be of two or more types — those for which some controlled or regulated fishing is allowed and those that are closed to fishing. Once a convention has been established, rotational fishing among the fisherfolk can be introduced. In Phang-

Nga Bay, Thailand, fisherfolk fishing for 3-4 hours a night using hook and line from an artificial reef deployed within the 3,000 m zone, can net a profit of at least 500 Baht.

The lesson from these experiences is that it is imperative to make a quick start first and demonstrate to fisherfolk what management can achieve. Once the local community can see the results for themselves, they do not need to be convinced. Taking an idea from the drawing board and planting it firmly on the ground is the best way to get started. There is also no need to start in a big way. Once fisherfolk's trust and confidence in the approaches, methods and benefits of management is won, there is no turning back. Management can be strengthened without need for further intervention by the government.

Polunin and Roberts (1993) reported that the standing stock of fisheries resources in the Saba Marine Park and Hol Chan Marine Reserve grew over a period of only four years. In fact, in Saba, fish populations have continued to increase, with further growth in standing stocks of between 60% and 320% between 1991 and 1993. Similarly, in Florida Keys, standing stocks of snappers and grunts increased by 93% and 439 % respectively over a 2-year period (Clark et al 1989 as reported in Roberts 1997) and have continued expanding since the Bohnsack et al study in 1992. Rapid increases have also been demonstrated in Philippines reserves (Alcala 1988, Russ 1991 again as reported in Roberts 1997). In sum, studies to date have shown very rapid response by fish populations to protection in sanctuaries, in as little as five years.

According to Roberts (1997), Dixon et al (1993) estimated that by protecting the rich marine resources of the island, the Bonaire Marine Park contributed US\$ 32 million annually to the island economy through tourist revenues from recreational divers.

When fish stocks are protected from fishing, and their habitats from damage, their biomass increase and expand. Such effects have been thoroughly documented throughout the world and are reviewed in detail elsewhere (Alcala 1988, PDT 1990, Roberts and Polunin 1991, 1993, Dugan and Davis 1993, Bohnsack in press as cited in Roberts 1997).

For example, Polunin and Roberts (1993) found that the standing stock of fishes was 1.9 times greater in the no-fishing zone of the Saba Marine Park in the Netherland Antilles due to larger and more numerous fishes. According to Roberts (1997), marine reserves benefit fishers in two ways, both of which depend on their boundaries 'leaking' from the protected to the non-protected zones. First, more and larger fishes produce many more eggs than exploited populations. The larvae of almost all marine fishes have a dispersal phase during which they drift in open water for a period of days to weeks before changing into juveniles or fish larvae, which will replenish populations in fishing grounds.

Second, juveniles and adults are expected to move across the boundaries of reserves. Higher population densities within reserves suggest that there will be net emigration into fishing grounds. Studies of the Sumilon Island marine reserve in the Philippines showed that catches in the unprotected part of the island rose on account of migration from the reserve (Alcala and Russ 1990 as reported in Roberts 1997). In Barbados, Rakitin (1994 as cited by Roberts 1997) found a gradient of decreasing abundance of fishes from the centre of the marine reserve outwards into unprotected areas, suggesting movement of fishes from reserves to fishing grounds. Roberts (1997) suggests that these movements would compensate for loss of fishing grounds within the reserve. The magnitude of compensation would increase as stocks build up.

### **Bringing Back “Old Values and Beliefs”**

As we approach the next millennium, 21<sup>st</sup> century consumers will rule the marketplace through purchasing power generated by growing affluence. They will be able to influence the development, management and use of whatever natural resources remain. To influence resource allocation and use positively, they should imbibe humankind's time-tested values and beliefs. Modernisation and materialism have destroyed most traditional value systems concerning Mother Nature, individual responsibility and discipline, which used to encourage thrift and restraint, respect for authority, and consideration for fellow beings.

The idea of sustainable development and management of fisheries is currently widely promoted. It is not only overdue, but is critically needed today, more than at any other time in our civilization. The benefits from sustainable development and management are immense, given the rapidly deteriorating environment and the shrinking resources that plague humankind today.

The capacity of local communities to solve their own problems has to be built up urgently. Training in negotiation skills can prepare them to organise themselves to plan and manage their lives. In this respect, governments can help to evolve, promote and demonstrate principles, approaches and practical applications to participatory community-based resource management, especially in a site-specific context. Instilling appropriate values and attitudes towards nature and towards ownership of fisheries resources, fishing and fishing technology, management and sustainability is a first step to achieving sustainability of the fisheries.

### **What is at stake?**

There should be no doubt about the magnitude of the challenges that lie ahead. The picture painted so far shows that the world's fisheries continues to be threatened, though understanding of problems has improved, also knowledge to overcome them. We not only need additional supplies of fish to feed a growing population, we need to moderate seafood consumption by the well-to-do. In some countries, the per capita consumption of fish already exceeds 30 kg/annum; but planners there, by sheer force of habit, project further increases in consumption!

Human beings are a thinking species, having been endowed with brains, but we are slow learners. We have knowingly indulged in consumption excesses. Awareness about the need for responsible behaviour is urgent. The public should be educated about the challenges identified, and enjoined to act individually for the collective good. For sustainability.

### **Reality checks**

Can the world produce enough to ensure that every one of us has access to basic needs without usurping the integrity of the environment?

The fisheries production and supply system has not kept abreast of consumption. An adjustment it must make is to step up management to ensure that supply can meet responsible demand for fish. There is no dearth of legislation to guide conservation and sustainable management of resources. What is problematic is the implementation of such conventions. Political will is often lacking. Funds are a perennial problem. Enforcement capability is another constraint even when funds are not. But it is never too late to begin. In fact, a very good start has been made in many countries during the last decade or so.

### **Who will pay for management and conservation?**

During the pre-colonial period, the responsibility of managing the fisheries rested with the tribal chief or village/community chief. Or the community council of elders. This system of management was jettisoned during colonial rule, when the colonial power took over ownership of all the natural resources. After independence, the same government-driven top-down system of management continued.

The costs of centralised management interventions in fisheries have largely been borne by the governments. But the centralised management system has not produced the expected impact. It has been neither effective nor cost-effective.

In Malaysia, an estimated 30% of the fisheries development budget goes toward enforcing fisheries management. The money spent on this “cat and mouse” system can be put to better use to directly benefit fisherfolk. To improve the road network, for example. To build community learning and earning centres in each fishing village, or better health care facilities.

The government is looking at alternative ways of financing fisheries management. It hopes that the money released from enforcement can be used to promote participatory fisheries management. Stakeholder consultation and analysis are presently under way in selected coastal areas to explore a community-based system of management – under which the community in co-operation with the Department of Fisheries regulates or polices the community. Setting up a community organization to manage local area fisheries is an exercise in social engineering, a process in which Malaysia has ample experience.

With the threat of loss of government support for management of fisheries and coastal resources, alternative funding mechanisms must be quickly be worked out. Funding uncertainties can be overcome by evolving self-financing mechanisms – such as collection of user fees and payment of a cess. Malaysia's experience in collecting a cess. for its rubber-replanting scheme is a useful precedent.

### **Conclusions**

It is obvious that our present economic system promotes development rather than management and conservation. The culture of materialism prevails over the culture of management. The pursuit of material wealth and pleasure should be tempered by awareness building and public education, by trying to instil consideration and respect for others, even by arousing a sense of shame, and a sense of equity.

By inculcating a more caring attitude towards the environment, we can go a long way towards developing a culture of responsible behaviour in consumption and production. We should perhaps start with children.

The prices of goods and services marketed must reflect their environmental and resource scarcity. A serious effort must be made to evolve valuation techniques that take the environmental and resource costs into account. Marketing practices that reflect the “true” price should be developed.

The capacity for self-governance can be developed among citizens by first encouraging small management activities which the fisherfolk can identify with – such as release of fish seeds in open water (open water stock enhancement). Once they see the benefits, they need no further hand-holding. Putting them at the centre-stage of management would be the best way to bring about community management of fisheries.

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## 8. BUILDING LEGITIMACY FOR SMART PARTNERSHIPS: FISHERIES CO-MANAGEMENT AND LEGITIMACY ISSUES

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### 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, and
- . 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 group?*. 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

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**1 Cotterell, R.**, *Laws Community*, Oxford University Press, 1995

**2 Jentoft, S.** Fisheries Co-management: delegating government responsibility to fishermen's organisation. *Marine Policy* Vol. 13, No 2, 1989;

can be classified into five broad types according to the role government and resource users play. This is illustrated in Figure 1.<sup>3</sup>

- (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.
- (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 IFM/ICLARM Fisheries Co-management Research Project, a literature review<sup>4</sup> 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.

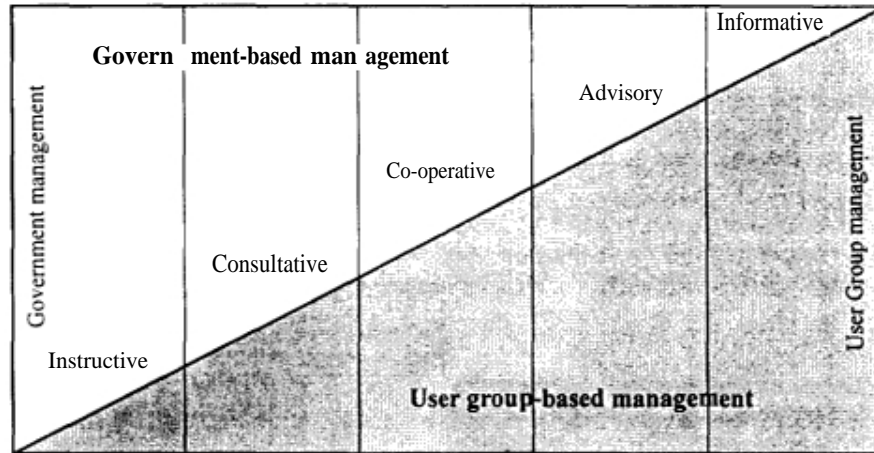
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<sup>3</sup> **Sen, S. and J. Raakjaer Nielsen.** Fisheries Co-management : a comparative analysis. *Marine Policy*, Vol, 20, No 5. 1996,

<sup>4</sup> A more detailed description of the literature review is given in Sen and Raakjaer Nielsen, op cit. Note 3.

## FISHERIES CO-MANAGEMENT TYPOLOGIES



- (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-management, this can be achieved only if resource users are also willing to take on shared responsibilities and are capable of doing so.
- (2) *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 organisation 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-management *per se*, 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) *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.<sup>6</sup> 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; organising 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

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<sup>5</sup> *Op cit* note 2

<sup>6</sup> Istin E. *Governing the Commons: the Evolution of Institutions for Collective Action*, Cambridge University Press, Cambridge, 1990; Pinkerton, *op. cit* note 2.

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. 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. 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 of 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 I 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 authorisers). 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 by 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

Table I FACTORS AND PERSPECTIVES OF LEGITIMACY

| FACTORS                                       | PERSPECTIVES  |   |
|---|---|---|
|   | DECISION-MAKERS<br>E.G. CO-MANAGEMENT<br>BOARD  | PEOPLE AFFECTED BY<br>DECISIONS (E.G. FISHERS,<br>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?<br><br>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?<br><br>Do they believe that they are competent to take decisions?                                     |

particular decision-makers (in terms of their position) are participating in the process, they may doubt the legitimacy of the organisation itself. If it is not transparent to authorisers how certain decision-makers are representative of the group they are meant to represent, this will affect their perspective of legitimacy of both the organisation **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:

- (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-centred, relying on custom, reciprocity and the integration of family, work, religion and locality.
- (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 — legitimisation 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.

## Conclusion

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 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 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.



## 9. TOWARDS COMMUNITY-BASED MANAGEMENT IN THE INSHORE COD FISHERIES: THE NEWFOUNDLAND EXPERIENCE

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It is just 20 years since Canada declared its 200-mile EEZ limit. This launched a period of renewed hope and optimism for people in the coastal communities of Atlantic Canada, but more particularly for the fisherpeople of Newfoundland and Labrador. The Grand Banks of Newfoundland are legendary. The early economic work of Harold Innis is but one of many historic references going back to the 15th century to the waters off Newfoundland and Labrador which teem with codfish.

In the 19th century and till the time of the II World War, Newfoundland and Labrador fishermen fishing cod — with traps, baited hooks and the like, mostly inshore with some schooner/bank fisheries — regularly caught in excess of 200,000 tonnes from the northern cod stock which ranged from the coast of Labrador to the northern Grand Banks. In the early '70s, even with more modern technology, the inshore landings of codfish in that great northern cod stock had dwindled to 40,000 tonnes. In the '60s and '70s factory freezer trawlers from all the major distance-water fleets in Europe reported annual catches of 600,000 - 700,000 tonnes. Now that this resource was to be managed by Canada, you might get some sense of what the 200-mile limit in 1977 meant to the fisherpeople of those coastal communities.

The two other codfish stocks in Newfoundland coastal waters are in NAFO Division 3Ps on the South Coast of Newfoundland and in NAO Division 4RS - the Northeastern Gulf of St. Lawrence. Together these stocks, on average, yielded perhaps a little more than half of the annual catch from the Northern 2J3KL stock.

Foreign fleet too were involved in these two stocks. This activity was largely confined to France, Spain and Portugal. The latter two did not receive any access to these areas after 1977. However, France's presence continues up to the present time. After the boundary settlement, its share of these stocks is now fixed at 15.6 per cent for 3Ps cod and less than 3 per cent for the 4RS3Pn cod TAC.

In the years from 1977 to 1991, the Total Allowable Catch (TAC) of northern cod rose from the 1978 figure of 135,000 tonnes to 266,000 tonnes. Particularly in the early years, Canada prided itself on a superior management programme that established a TAC at less than the maximum sustainable yield for the purposes of permitting regeneration. It is not my intention today to dwell at length on what went wrong, but merely to put today's situation in a recent historical context.

### **The Source of the Problem**

In order to properly understand the scientific, management, access and other issues facing government and industry today, let us first look at what happened with the advent of the 200-mile limit.

Inshore fixed gear landings in the last few years of ICNAF management had declined from a peak of 250,000 tonnes for the northern cod stock to approximately 40,000 tonnes.

Even under ICNAF, in the years immediately preceding the 200-mile limit, quotas had been reduced. In the first year of extended Canadian control, the quota was set at 135,000 tonnes, 35,000 tonnes of which

was still allocated to foreign vessels. Eighty per cent of the remainder was for the fixed gear coastal fishery in that year.

At the same time, a lot of people in government and industry were concerned about Canada's ability to harvest this great resource. A pilot project was initiated to encourage the participation of Canadian deep-sea wetfish trawlers in the northern cod fishery for the first time. Hitherto, the Canadian offshore fleet fished cod only on the Grand Banks, and in the Southern and Western stocks to which I have made reference. Their main fisheries had been on the flatfish and redfish stocks, primarily on the Grand Banks, and off the south and west coasts of Newfoundland.

In other words, faced with the historic record that foreigners had caught more than 600,000 tonnes, and whereas historically Newfoundlanders had achieved an average of only 200,000-250,000 tonnes with fixed gear, there was an assumption that the cod stock, properly managed, would yield such a bountiful resource that harvesting the Total Allowable Catch would be beyond the capacity of traditional inshore fishermen.

The thrust of Canada's case to achieve a 200-mile limit had been based on the interests and the dependency of the population adjacent to the resource — the small boat fishermen in the coastal communities of Newfoundland and Labrador. As Canadian quota management developed in this stock during the late '70s, the allowance for the inshore reached 100,000 tonnes. This increased to 115,000 tonnes in the early '80s, and indeed for a time was guaranteed to be 2/3 per cent of the Total Allowable Catch.

In the succeeding years, as scientific estimates of the biomass increased, increases in quota in this stock were assigned almost exclusively to the growing Canadian offshore sector, while the foreign fleet's participation continued to diminish. Whereas in the early stages of Canadian management, the inshore was given about two-thirds of the quota, the absolute amount remained constant. Therefore the percentage dropped until at one point it fell to 43 per cent of the TAC (115,000 mt out of 266,000 mt).

The use of an inshore allowance is quite a significant difference as far as managing today's fishery is concerned. There was no set quota for the fixed gear fishermen. The assumption was that passive gear fisheries in certain years may exceed their allowance, in other years they would not achieve it. And because Canada and its scientists were confident that we had the leading model for conservative management of the resource, the Government sanctioned the use of an allowance.

Interestingly enough, the allowance in a TAC of 266,000 tonnes just before the collapse of the stock, reached its maximum at 115,000 tonnes. Indeed, the allowance was caught in very few of the years after 1977.

It is significant to note that the analysis conducted by scientists in the evaluation of the stocks and the ultimate establishment of quota was based primarily on their own annual research surveys and the catch rates of deep-sea trawlers. At no time up to the present day have scientists devised a way to assess the stock based on similar data and other factors from the inshore area. Their explanation is that the multiplicity of operations, the variety and passive nature of the gear types and the lack of inshore effort data, makes such an exercise too uncertain. The assumption was that research survey and catch rate data from the offshore component was sufficient for stock assessment to establish a quota for the whole stock area.

Although in the early years of Canadian jurisdiction, there was definite evidence of increasing abundance of cod in inshore waters, by the mid '80s — less than a decade after the implementation of the 200 mile

limit-inshore fishermen, especially in the northern cod area (J3K1), were concluding from their own empirical evidence that the stock was in trouble.

It did not take a rocket scientist to figure out that if you have to double your fishing effort for the same volume, your catch rates are down and the stock is in trouble. The whole scientific and political establishment was impervious to these observations of the fixed gear fishermen. These were the descendants of **those who had** prosecuted the fishery in this manner for over 400 years. They had regularly achieved an average annual catch that approximated the Total Allowable Catch for offshore and inshore areas during the 1980s.

Briefly put, the scientists developed an assessment model, in part based on information which they received from those foreign nations that had harvested the stock with offshore factory freezer trawlers. Their assessments relied exclusively on offshore trawler catches and catch rate data. This data was supplemented with annual survey data from their own research vessels.

In the late '70s and early '80s, there was an appearance of a return of codfish to the traditional northern cod inshore fishery. By the mid-'80s, there was a terrible cleavage between the inshore fishers, more particularly those fishing the northern cod, and the scientific community. The empirical evidence of these inshore harvesters was that the number of nets or days fishing to harvest the same amount of fish had increased considerably. Their own experience with catch rates was at variance with that of the offshore northern cod fishery.

A similar cleavage existed in the western stock, where inshore fixed gear fishermen were unable to catch their quota, while the small, inshore mobile otter trawlers had good catch rates which in effect exceeded their quota.

The annual inshore catches of northern cod never exceeded 115,000 tonnes after 1977. These inshore catches included landings in excess of 500 tonnes in small 10-meter trap boats to a few tonnes in small inshore 6-meter vessels.

The experiences in the other two smaller stocks were slightly different. The South Coast of Newfoundland (NAFO Area 3Ps) historically had both an offshore and inshore fisheries component. For rather complicated reasons, there was some kind of a better *modus vivendi* between the inshore fixed gear and the otter trawl deep-sea fishermen on the South Coast.

The historical average catch in the fixed gear inshore fishery on the South Coast (3 Ps), for the 18 years prior to the extension (**exclusive** of 1975-76) was 24,500 tonnes. Subsequent to the implementation of the 200-mile limit, the inshore catch average was only slightly less (22,500 tonnes). This stock did not have the same dramatic increases or decline in landings. While the inshore catch component of the stock has been under quota, the nature of this fishery — i.e. small boats, a much higher percentage of **hook** and line enterprises, longer seasons — meant that the quota did not impose the same restrictions on normal operation which, as we will discuss later, became a major factor in all offshore fisheries, **as** well as inshore otter trawl fisheries, particularly in the Gulf of St. Lawrence.

In this Gulf of St. Lawrence stock off the West Coast of Newfoundland, the inshore fishery developed quite differently from the other two stocks. About 100 fishing enterprises acquired small otter trawlers which, in the mid '80s had the capacity to catch more than their fleet quota every year. This encouraged them to move to individual quotas, thus giving them greater involvement in the early development of co-management arrangements.

Again, in this fleet, the same problems of mis-reporting and dumping developed. In fact, these problems were much worse if anything with this fleet than with the company-owned fleets. Because this fleet was smaller, more cohesive and more successful, it was then — as it is now — easier to move towards notions of co-management.

So by the late '80s — 1988, '89 and '90 — there was growing concern within the inshore sector, particularly about the state of the northern and western cod stocks.

From 1988 to 1991, the government brought in more stringent measures to control fishing excesses, such as dumping at sea, high grading, etc. Onboard observers were placed on offshore vessels. There is no doubt that the rules of the road had been tightened up. Then came the announcement of a great catastrophe.

### **From Moratorium to Re-opening**

In July of 1992, the northern cod fishery, which had sustained the majority of the coastal communities in Newfoundland and Labrador since the 16th century, and which had fueled the expansion of the European freezer trawler fleet in the '50s and the '60s was closed. Fifteen or more offshore fishing communities, primarily in Newfoundland but also in Nova Scotia, were shut down. Where once they had harvested over 100,000 tonnes annually from that stock, now they had none.

The inshore harvesters who took just under 100,000 tonnes annually, now had none. A year later, cod stocks off the West and South coasts of Newfoundland, which between them had generally produced about half as much codfish as the northern cod stock, were also closed, as well as some smaller cod stocks off the coast of Quebec, New Brunswick and Nova Scotia. In all, more than 40,000 people were directly affected, 75% of them in the provinces of Newfoundland and Labrador.

An ambitious programme of adjustment and income support was undertaken that is still in place. For a large number of people, particularly those dependent on the newly developed Canadian offshore fisheries and those in coastal areas without access to other species, the prospects remain grim.

In the four or five years since the moratoria, some of the shell fisheries, particularly snow crab, have increased dramatically; and recent indications suggest that a much more bountiful stock of shrimp is moving to the waters of Northeastern Newfoundland. Other small groundfish fisheries remain open in the Maritime Provinces, where there are also large and lucrative lobster and crab fisheries.

During this past year there was a glimmer of hope as the southern and western cod stocks off Newfoundland had a limited test fishery. I believe that the encouraging results, particularly in the southern (3Ps) cod stocks, could mean a return to the historic catch levels of those areas in the near future.

The moratorium remains in place on the major northern cod stock, and the scientific information is gloomy. Now, ironically, small boat fishermen in coastal regions are claiming that there is a greater abundance of cod inshore. Certainly, the early indications in the southern and western fisheries are that the optimism of small boat fishermen about the state of these inshore stocks was understated. Where once the scientists were accused of not being cautious enough, they are now accused by inshore small boat operators of the reverse.

A climate of high unemployment, with some people having virtually no hope of returning to the fisheries and others struggling in the shellfish, herring and capelin fisheries, creates a new challenge for the harvester in coastal communities. How do you share these new resources and the old diminished resource

among such a large number of harvesters? To complicate the matter for these coastal people, all of this has occurred in the '90s, when the assumptions of governance are not only being challenged but reshaped.

During this decade, fiscal restraint has been a major preoccupation of governments worldwide. Fiscal restraint in large part drives some notions that, of and by themselves, are worthy of pursuit. An example is co-management, which in Canada is now called the development of co-management arrangements with the object of achieving biologically sustainable and economically viable fisheries.

Recent publications that I have read from the Department of Fisheries and Oceans talk about industry taking on a greater responsibility for managing fisheries and, in particular, for identification and resolution of fisheries management problems.

As we meet here today, the Canadian Council of Professional Fish Harvesters, a national body of harvesters' organisations which had its founding convention only within the last year, is involved with the Department of Fisheries and Oceans in developing an appropriate policy for co-management agreements in multi-species fisheries.

The extent to which the notion of co-management is embraced, varies from region to region and from fishery to fishery. Those who are more apprehensive tend to be the ones who have been most adversely affected by the collapse of the groundfish stocks and are licensed for resources that are currently over-subscribed.

All of this, to some of these people, is part of a plot to get them out of the fishery. There has been a major downloading of government costs on the primary producer — dramatic increases in licence fees and in the cost of dockside monitoring programmes; observers at sea; the preparation, execution and administration of Conservation Harvesting Plans — good ideas, some will say. But many fishermen remain skeptical, believing this is as much about downloading of costs as anything else.

The government is also open to criticism that government patronage of the fishery remains; that there is still a command and control mentality. In short, there are many real as well as imagined obstacles to the whole idea of partnerships and co-management.

Prior to the moratoria, and in the years subsequent to the 200-mile limit, the Canadian deep-sea and foreign components of the northern cod fishery, indeed of all stocks, were controlled by an annual catch limit. This Total Allowable Catch (TAC) included a provision for an estimated inshore catch, which was not placed under a strict quota. This was called the "inshore allowance". In the TAC that rose to 266,000 tonnes in the late '80s, the inshore allowance was approximately 15,000 tonnes.

As a consequence of not having a strict quota, the fixed gear fishermen who pursued this fishery were not under the same constraints as fishermen who operated in quota fisheries or fishermen who had individual quotas. Therefore, in the inshore fishery, there was no incentive for mis-reporting (cheating). By the early 1980s, the offshore fishery, and even the small West Coast otter trawl fishery, had enterprise or individual quotas.

There is a great deal of evidence that those with individual quotas initially were the ones who abused the privilege of fishing through dumping, high grading, and mis-reporting. They are perceived not without some justification - as a major villain in the demise of the cod fisheries.

There were probably 8,000 to 9,000 enterprises with access to the inshore fishery. These included very small enterprises that were either marginal or part-time, and substantial enterprises. Before the moratorium

there was no real conflict. In the fixed gear fishery, there was no perceived threat to the stock by the so-called “Olympian race to the fish”. In quota fisheries such as offshore, the well-documented negatives of this Olympian race to the fish —overloading, dumping\discarding,, excessive catches, poor quality — were the reasons that these highly technologically advanced fisheries were placed on individual or enterprise quotas.

Simply put, these same pressures did not exist in the small boat inshore sector on the part of fishermen, the government, the scientists or the fish managers.

Ultimately, by the mid-'80s, through political pressure from fishermen, the government began to re-examine the science, and new, more stringent control measures were imposed on the offshore sector and on the mobile gear inshore sector. These measures included compulsory onboard observers on all offshore trawlers. About 100 of them had access to all Atlantic Coast groundfish fisheries and were now catching, in addition to other species, in excess of 100,000 tonnes of northern cod.

During that period, prior to the moratorium, some of the management measures that are now essential in all fisheries were really not applicable to any of the Newfoundland fixed gear inshore fisheries. What do I mean by this?

Well, both the deep-sea sector and the inshore mobile gear sector in all these fisheries were subject to a fleet quota. In the early eighties, this one overall fleet quota led the deep-sea sector to engage in what has been referred to the “Olympian race to the fish”. This led to dumping, poor quality practices, and problems with overloading of vessels.

Good, intelligent management led to the introduction of enterprise allocations in the offshore fisheries and individual quotas in the inshore mobile gear sector.

This did allow them to better plan and better manage the fishery, to do a lot of good things to reduce the cost of catching and producing the fish and to improve the quality of the end product.

However, it also created other problems. When you have your own individual quotas, there are opportunities — or at least temptations — for you to cheat, e.g., to dump/highgrade, to misreport, and so on. Ultimately this led to stricter rules, such as dockside monitoring and placement of at-sea observers.

None of these conditions applied to the inshore fishery for the simple reason that there was no fixed quota for the major stock and, for reasons discussed elsewhere, they were not a factor in the other two stocks. The inshore cod fishery uses three main gear types (traps, gill-nets and baited hooks). The cod trap is the main inshore cod gear. It is a passive gear. Landings from cod traps can vary greatly from year to year and region to region. Cod trap fishermen in a given year, in a period of just six weeks, might land 500 or 600 tonnes. The next year they may only land half of that. Because they were not on a fixed quota, there were no incentives for them to engage in the abuses mentioned earlier. Likewise, they did not have to make the same kind of operational decisions that they will have to make in the fishery of the future.

Let me give you an example. Many of the thousands of licence holders who had access to the fishery, were quite marginal or part-time. Overall, the Olympian race to the fish was not really a factor because in any given year they could have caught much more fish if it was available because there was no quota to worry about.

I mention this because the fishery of the future will be different. The same people who had no real constraints in the past are now, in any reopening or newly emerging fisheries, faced with a whole new set of problems and issues that I will come to later,

Since the groundfish moratoria of 1992 and 1993, the Department of Fisheries and Oceans has introduced certain aspects of co-management. One such case on which the Fishing Industry Renewal Board has worked is the development of Conservation Harvesting Plans. These are now in effect in varying degrees, in most fisheries in Atlantic Canada.

Since 1992 there have been significant annual increases in crab and shrimp quotas in Newfoundland waters. All of these fisheries are managed by Conservation Harvesting Plans (CHPs) which are prepared and submitted by licence holders. The CHPs deal with such management issues and requirements as:-

sharing/allocating the allowable catch

gear sizes or limits

open and closed seasons

trip/daily/weekly catch limits

catch monitoring arrangements

There is an area of great concern about effective co-management and partnership arrangements for inshore cod fisheries. In some respects this is an obstacle. Fixed gear harvesters who traditionally fished under an adequate quota or an allowance were not concerned with the adverse effects of the Olympian style fishery.

It is particularly difficult for harvesters in the under 35 foot vessel class. Approximately 80 % of the core licence holders in the Newfoundland region operate fixed gear vessels under 35 feet and historically, in effect, had an open cod fishery unhampered by a quota.

In the past few years, the first steps towards co-management in these fisheries have been in the development of Conservation Harvesting Plans by the licence holders themselves. Let me give you an example of what transpired in 1997 in one such instance.

As I have mentioned, on the south coast of Newfoundland, small boat fishermen historically landed between 2 1,000 - 25,000 tonnes of cod, virtually year in and year out. In 1997, that fishery was allocated a quota share of approximately 6,800 tonnes. There are three basic gear types used in that fishery: baited hooks or line trawls, gill-nets and cod traps.

The Fishing Industry Renewal Board was charged with the responsibility of working with the fishermen to assist them in developing a harvesting plan. This involved new sharing arrangements and a potentially new division of quota. Where once we had one quota we now had to subdivide it. Why?

### **Solutions and Approaches to the Current Challenge**

Historically, cod traps, which are used only in the eastern area of the south coast, caught 18.4 per cent of the total inshore landings on average over the last 10 fishing years. That could vary somewhat up or down from year to year. The cod-trap fishery in this one area takes place in two different parts at two

different times of the season. The historical catch in this cod-trap fishery was about 4,100 tonnes, which would have been caught over a six-week period at the maximum.

If **we had** opened the fishery as it was closed (with one global quota **and** no gear limits), it was quite conceivable that a relatively small number of successful cod-trap operators could have quickly taken over 75 per cent of the whole quota available for 1997 before others had any real fishing opportunity.

To make matters worse, the fishermen in that area of 3Ps felt that their fishery should never have been closed; and indeed the ultimate result of the limited fishery supported that. The fishermen examined a number of fishery management options. These included sub-dividing the quota into 10 different area shares. Statistical information was available for the whole of the 3Ps NAFO zone for catches by all gear types. That data was also divided into 10 smaller statistical sections.

The fishermen had the option to divide the quota into 10 areas based on historical average catches, and to further divide on the basis of the average historic catch for each of the three gear types in those areas. Of course, there was also the option of individual quotas for each licence holder. The problem with applying individual quotas was that 75 % of the inshore catch has been by vessels under 35 feet (11 meters), but there is no statistical information on individual vessel catches for that fleet segment.

In addition, there were many licensed fishermen whose primary fishery in that area was lobster, but had little history in groundfish. How could we achieve an equitable individual sharing arrangement in those circumstances?

If all fishermen were to share equally, this would be a bonanza for the marginal groundfish fishermen who mostly fished lobster, and a severe penalty for those who had maximised their opportunities in the cod fishery without the constraints of quota in the past.

Ultimately, the fishermen agreed to sub-divide the overall quota and created two Conservation Harvesting Plans — one for the eastern area and one for the western area of 3Ps. The CHP for the eastern area was the more complex, because that is where the trap fishery was prosecuted. In that area the CHP included sub-allocations by gear type which were further divided into monthly period quotas. The western area went with one quota for all gear types but used seasonal sub-quotas to spread fishing effort over time and space.

The CPHs for each area contained weekly catch limits, gear limits and separate allocations for by-catch fisheries only. All of these measures were designed and agreed to by fishermen to allow the greatest possible access to the available quota over the maximum time, area and number of licence holders.

### **Where to From Here?**

The manner in which the catch quota was distributed in the 3Ps test fishery of 1997 gives a clear illustration of some of the very serious problems confronting harvesters in the era of co-management. Indeed, if there were no co-management, these problems would confront resource managers from the Department of Fisheries and Oceans.

At one time, the management regime for fixed gear effectively allowed these managers to fish their full effort with very little interference through the fishing year. With current quota levels, much stricter



controls of dockside monitoring (where every pound of fish is actually counted), and random at-sea observers, particularly on larger vessels, tremendous changes are occurring in fishing patterns and causing distortions in the distribution of catches compared to previous levels.

The biggest factor influencing this right now is the reduced level of annual quota. If we return to historical levels of quota, which are almost four times last year's catch, this would even out. Even if we were to achieve that in the near future, improvement in fishing technology coupled with improved and mandatory catch monitoring would probably continue to cause certain kinds of distortions. All of these developments become a very serious impediment to fishermen in making their decisions in a co-management context.

A particular issue in this regard is the possibility of introducing individual licence holder quotas. Many inshore fishermen see advantages to themselves from such a system of management. However, there is a tremendous fear that IQs might be imposed on an equal share basis because of lack of individual catch records and the fact that a majority of marginal groundfish licence holders would benefit from such an approach.

There is statistical information for vessels over 35 feet that would allow that fleet segment to identify their historical share of the quota resource. They have catch records to base individual shares on their past history, say, over the past ten years, and agree to adopt individual quotas. The mathematics of this is fairly simple. Unfortunately, this fleet grouping represents a small portion of both the total catch and the total number of fishermen.

There is an added complication in that some fishermen in 30-34 ft. vessels are just as productive as those in 35-40 ft. vessels. This makes the use of individual shares appear unfair to those who fish side by side with others who could enjoy the individual benefits of such an approach simply because government data systems recorded individual catch information for larger vessels only.

Until this data problem can be solved fishermen are now seeking and examining alternative methods to share the resource in less competitive ways to reduce the race to the fish and protect the historical shares of the productive fishermen.

For the purposes of this discussion, I would like to look at the South Coast of Newfoundland cod fishery, which is NAFO Division 3Ps. We have catch data broken down by statistical sections, which show the historic average catch by fishermen in each section by gear type. Now we also have the results of the 1997 test fishery, which clearly shows a distortion in resource access compared to the past.

One of the options that was suggested to fishermen when preparing their Conservation Harvesting Plans for 1997 was to sub-divide the inshore quota into 10 statistical areas. Then the fishermen in each area would have, collectively, the average share of the quota, which the harvesters from that area had caught over the last 10 years. They would be able to fish anywhere in the stock area, but their quota would be established by their home section's historic record.

The failure to do that has exacerbated the distortions. Indeed, had they done that, there may well have been distortions in individual results, but I do not think these would have been as dramatic as is now the case. Not having opted this way in 1997 will make it harder for fishermen to come to an agreement on this question in the future.

In recent years, a new, single, simple solution has arisen to the problem of over-capacity in various fisheries. It has emerged as the cure-all to the so-called irrational behaviour first explained by Scott

Gordon's application of the theory of common property usage to commercial fisheries, and is now in vogue. This solution advocates the introduction of Individual Transferable Quotas. It is espoused as the ultimate in self-regulation, and will lead to a proper rationalisation of the fishery.

Like all single, simple solutions, its claimed virtues are to be viewed with a great deal of caution. That is not to say that in certain circumstances and within certain parameters, the notion of individual transferable sharing arrangements can indeed be useful and acceptable.

It is not my intention today to go into a detailed analysis of this concept. Throughout my life's experience, academically and in work, I have always been fascinated by those who espouse single solutions and have from time to time delighted in attacking the simplicity of some of their notions. Certainly there are a lot of problems in implementing individual transferable quotas. A lot of adverse effects are apparent to critics.

Quite aside from the windfall to the first generation of quota holders and the subsequent increased capitalisation that flows from transferability, a host of practical arguments challenges the universal application of ITQ/IQs. One basic problem which small inshore fishers face today is that their fisheries lack a proper data base on which to calculate and allocate individual shares.

The experience in Newfoundland with Individual Transferable Quotas is that they have really been in place only in two fisheries-the offshore trawler fishery (this is the fishery where many abuses identified are due in part to the nature of the individual quotas), and the small otter trawl fishery, which had similar abuses. There is also a deep-rooted suspicion among the fixed gear fishermen that these quotas are really an attempt to create greater corporate control and eliminate them from the fishery.

In the Newfoundland experience, one of the things that often bemused those who watched the advocates of the Individual Transferable Quotas, was their oft-stated phrase: "Well this wouldn't apply to vessels under 35 feet.

" In actual fact, as we look at the history of the cod stocks we have talked about today, and if one accepts the premise that historic effort is the main basis for individual quotas, then collectively the harvesters in vessels under 35 feet will continue to receive the largest share of the catch".

The problem in the Newfoundland inshore fishery is that we do not have individual catch data for vessels under 35 feet. So while collectively their share of the catch was greater than for vessels over 35 feet, we also know that 30 % of them actually caught 80 % of the fish. The real struggle and challenge in moving towards some new, smaller, quota-sharing arrangement that will allow for greater local control is overcoming the problems created by lack of individual data.

That is why we are pursuing the division of the quotas into smaller allocations based on area, gear type and vessel size. For example, in 3Ps we once had a single quota for the entire inshore fishery. But as we move towards new management regimes with greater local control, one of the instruments may be to sub-divide one single quota into several local area quotas or many individual licensee quotas. This approach could include rules for transferability within the group, both on gear type and local area basis.

This will go a long way to moving us towards a more effective co-management regime. A paranoia and fear exist among small boat owners when they listen to some of the high-priced academics or experts who advocate Individual Transferable Quotas and point to large corporate models. These things create a view among small boat fishermen that this is really a large corporate grab for the resource.

So the challenge is to take fisheries management to the local level with smaller, easier-to-manage quota sharings. This approach will provide us a way to attack and dissect this problem and move to a management regime that is less intrusive and more in keeping with the assumptions of governance of our day. It will result in a more deregulated fishery, more determined by commercial forces, but also more controlled by local resident fishermen.

### **Recent Developments**

Actually the Government of Canada is now taking steps to encourage and formalise the undertaking of these types of new management arrangements. The Federal Department of Fisheries and Oceans accepts several forms of co-management agreements with fishermen's organisations or groups.

The most simple form is the one I described for the 3Ps inshore cod fishery. This is the case where fishermen prepare their own Conservation Harvesting Plan and agree to enter into a universal dockside monitoring arrangement with a third party organization. In this case, no formal signed document is necessary. When the dockside monitoring arrangements are in place the Department will open the fishery against the CHP prepared by fishermen.

In other more advanced co-management cases, fishermen's groups are willing to pay for special additional enforcement, fisheries science or data collection services. The Department will enter into formal signed Special Project Agreements (SPAs) for the fishery in question. These agreements include all the provisions of the standard CHP as well as the terms and conditions under which the additional Special Project services will be carried out and paid for. Some of these may be carried out by the Department directly or by third parties mutually agreed to.

At present, the Department is endeavouring to implement more and more of these approaches through the use of multi-year integrated fisheries management plans. These include the fishermen's CHPs, the Special Project Agreements and the fishery enforcement, licence sanctions, and stock conservation measures that will apply for the duration of the management plan.

All this provides an increased measure of stability on which such fisheries will operate for several years in a row. It also avoids rehashing all the various management issues every year.

These approaches to more sophisticated and comprehensive co-management arrangements are more easily embraced and implemented in the lucrative fisheries, usually with fewer participants. For example, in the offshore scallop fishery, two-thirds of this quota is held by the three largest Atlantic Canadian fish companies, with only a handful of additional participants.

In 1997 the Department of Fisheries and Oceans entered into an Integrated Fisheries Management Plan for snow crab in the Southern Gulf of St. Lawrence. The five-year plan includes a quota-sharing formula, which allows some temporary access that could result in an increase in the number of participants in any given year.

However, there is a threshold, a combination of volume and price, that will trigger this participation by additional fishers. Conversely, if that combination of price and volume declines below an agreed minimum, the fishery reverts to the original 130 participants. The vessels in this fishery are over 45 feet, many of them are 50-foot vessels.

A similar arrangement exists in another area of the Southern Gulf involving crab fishermen along the West Coast of Cape Breton Island. This snow crab fishery in what is known as Area 19 was the first in Atlantic Canada, to adopt Individual Quotas as a management tool.

From an initial six licences, the fishery expanded over time by reducing boat quotas and increasing the number of inshore licences. By 1992 the number of licensed fishers involved in the fishery had reached 74. Due to significant price increases, heavy pressure mounted to increase the number of participants. Initial attempts by government to resolve this issue were rejected.

Eventually the snow crab fishermen's association in the area came up with a sharing proposal, which would reduce their trap allocations and their Individual Quotas from 50,000 pounds to 43,000 pounds. They suggested that a portion of this reduction go towards conservation, and the remainder be used to increase the number of participants by 37. These new participants would have a significantly lower quota.

The incentive for historic participants in this fishery was long-term security. Of course, there are still licensed fishers in the area who feel they should have access to this resource, but that matter is now settled, at least for the term of this agreement.

However, at the present time there is no legal basis for the Minister of Fisheries and Oceans to commit to guaranteed access to fisheries quotas to select groups for more than one year at a time. This creates a certain lack of security on the part of licence holders who are agreeing to make financial contributions to the management of "their fishery" without a full guarantee that the Minister will be permitted to deliver on government's commitment to resource access.

Steps are now under way to correct this deficiency in the Canadian Fisheries Act. Amendments will soon be introduced in the House of Commons to provide the Minister with necessary powers to enter into full-fledged legal partnering agreements with fishermen's groups to really share in fishery management function. In the meantime, the Fishing Industry Renewal Board is continuing the initiatives it started in 1997 to move the inshore cod fisheries away from global competitive fishing to more locality-based fishermen designed management arrangements.

The next phase of this activity will be to address the distortions that occurred in the 1997 fishery and moved the process further along so that as the quota increases community groupings can be in more control and increase their benefits from the resource.

Earlier on, I made reference to the Canadian Council of Professional Fish Harvesters, an umbrella organisation, which includes fishers' organizations in British Columbia, Quebec, the Maritime provinces and Newfoundland.

It is only in Newfoundland that virtually all of the fishers are members of a single organisation. Elsewhere, particularly in Nova Scotia, there are a multiplicity of organisations based on community and gear type. In the past, membership in these types of organisations has fluctuated.

The new challenges facing fish harvesters today are influencing them in all areas to embrace some form of organisation. The Canadian Council of Professional Fish Harvesters will seek to find some common ground on some of these important issues and assist the provincial organisations in their moving forward.

In Newfoundland, the work of the Fishing Industry Renewal Board and the Department of Fisheries and Oceans is facilitated by the existence of such a large and significant organisation, which has committees elected on a community, regional and provincial basis, as well as committees based on gear type.

The consequences of new fiscal restraint and the demands on fishers by government for greater participation in the management of the fishery has placed additional pressures—financial and otherwise—on the fishers themselves and their organisations.

The ultimate success in the development of new approaches for the fishery of the future will best lie in a clearer and more defined basis for this new relationship between fishers, their organisations and the government.

## 10. THE QUEENSLAND FISHERIES: MANAGEMENT MODEL

**By Patrick Appleton**

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### 1. EXECUTIVE SUMMARY

Arrangements for the management of Queensland's fisheries have seen substantial change during the last 3-4 years. There is increasing demand on the State's fisheries resources from commercial, recreational and traditional users. Developments in river catchments and on the coastal zone are also impacting on the capacity of the environment to sustain fisheries.

New fisheries legislation was introduced late in 1994, bringing with it a clear emphasis on ecologically sustainable development principles as well as new institutional arrangements for decision-making. The processes leading to decisions on resource management are based on principles that require consultation, involvement of stakeholders, statutory management plans and accountability.

The success of the new arrangements depends, in large measure, on the preparedness of all the people who will be concerned with decision-making to seek outcomes based on longer-term sustainability of the resource.

### 2. THE CHALLENGES FOR QUEENSLAND'S FISHERIES

During the late 1970s and 1980s expectations steadily rose about what Queensland fisheries resources could provide. This expectation was maintained in the early 1990s with escalating demand on fishery resources from commercial, recreational and traditional fishing sectors.

Other changes were also occurring. The development of river catchments and coastal zone areas due to housing, tourism and agricultural projects also impacted on the capacity of the environment to sustain fisheries.

The impact of these developments and changes has meant that the pressure on Queensland's fisheries resources has increased significantly and will continue to do so. Perhaps more importantly, the complexity of the problems facing the Government as a custodian of these public resources has increased substantially. The most crucial problem facing the Government is the question of access among competing stakeholder groups. The Government faces the challenge of

- maintaining a viable economic and commercial sector with emerging opportunities;
- . accommodating a growing recreational fishing sector as an important part of many people's lifestyles; and
- . facilitating tourism growth, much of which concerns the coastal environment while ensuring the sustainability of the resource.

Given the changes that have occurred over the last couple of decades, the key challenges facing fisheries managers in Queensland in the foreseeable future are:

- stock assessment and life cycle information for key species;
- . catch-effort information, especially for recreational fishing;
- . assessment of the state of Queensland's freshwater fisheries;
- . identification and protection of critical habitat areas;
- . management of unused (latent) effort;
- . capturing new market and value-adding opportunities;
- . determining equitable access between various stakeholders;
- . incorporating aspirations of indigenous people into allocation of fisheries resources; and
- . community understanding of fisheries management measures.

All of these challenges to the Government and to fishery managers involve the presence of stakeholder groups, either individually or collectively.

Until the early 1990s, the preferred method of managing fisheries in Queensland was what could be called the technocratic model. The technocratic model was essentially based on the view that fishery scientists and managers knew what was best for the fishery, and made recommendations to the Government with very little consultation with key stakeholders and no consultation with the community. There was some consultation with the commercial sector but little or no consultation with the recreational or indigenous fishing sectors. Liaison and discussion with other natural resource management agencies with an interest in fisheries was also very poor.

By the early 1990s, the recreational fishing sector had become more vocal in its dissatisfaction with the way fisheries management was being conducted, particularly in the way it perceived that commercial fishing was being given preferential treatment. In December 1992, the Deputy Premier of Queensland, who was not the Minister for Fisheries but was a keen recreational fisher, was given approval by the Government to conduct a State Government Inquiry into Recreational Fishing. This event, along with the changing policy position of a number of other State governments, and the Commonwealth government, in managing natural resources under ecological sustainable development principles, precipitated a complete new direction for the way fisheries would be managed in Queensland.

The Inquiry, which was conducted by a Committee comprising 15 members, in addition to the Deputy Premier who chaired the Committee, contained only one commercial fisher. This imbalance was perceived by the commercial fishing sector as a huge threat to their position in fisheries and they fought against the Inquiry from the beginning. The recreational sector argued that the composition was fair because the Committee was charged with reviewing recreational fishing. The reality was somewhere in between the two positions. As both sectors target the same species generally, it was impossible to review recreational fishing without making observations on commercial fishing. What the inquiry did achieve, however, was to increase substantially the profile and hence, both technical and political debate on the future management of an important natural resource.

### 3. THE QUEENSLAND CONTEXT

Along the 3,500 km coastline of Queensland and throughout its inland waterways, fishing has a strong cultural significance. This culture has a history that goes back thousands of years, to the indigenous

aboriginal fishers, and extends to the European settlement of Australia 200 years ago. Most coastal communities in Queensland, particularly north of the densely populated south-east corner based around the city of Brisbane, contain commercial fishers. They contribute not only to the economic viability of their community, but also to the social fabric and culture of each community. Recreational fishing is also one of the most popular activities in these communities, with enthusiasm and commitment to fishing activities rivalling all other social and cultural interests.

Though Queensland is a large State, the last 15 years have seen the concept of unlimited frontiers and remoteness as a source of protection for natural resources change rapidly. This change is due mainly to population growth which is currently 2.5 per cent per annum. Queensland's population is expected to increase from the current level of 3 million to 4 million by 2010. Most of Queensland's population is situated in the coastal zone, with the Gold Coast, Sunshine Coast and Cairns regions growing rapidly with increases in population of 70 per cent, 50 per cent and 100 per cent respectively over the last 15 years.

In Queensland, there are currently about 2,000 primary commercial fishing boat licences. Aquaculture operations also continue to expand. These sectors support large industries based on provision of equipment to catch, process and store seafood as well as the distribution and sale of the product. The total harvest and production of commercial fisheries in Queensland during the 1995-96 financial year was about 29,000 tonnes of seafood estimated at \$A228 m.

Population increases have generated not only an increased demand for seafood but also an increase in recreational fishing effort. Greater numbers of participants with improved access and mobility have resulted in increased recreational fishing effort in the coastal zone, as well as in inland waters, at a rate not seen previously. It is estimated that there are currently about 900,000 recreational fishers in Queensland who fish at least on an annual basis. Parts of Queensland which were until recently the preserve of a small number of commercial or indigenous fishers are now being accessed by a growing number of recreational fishers.

Tourism is one of the most significant and fastest growing sectors of the State's economy, generating \$A7500m in revenue and providing employment for 50,000 persons or 10 per cent of the State's workforce. Fishing-related tourism, particularly through the activities of charter boat operators and fishing guides, is undergoing rapid growth and in the future may rival the economic importance of providing locally captured seafood for consumption by tourists.

In Queensland, there are several tiers of government which have responsibilities for fisheries management. In order to ensure the continued sustainability of fisheries and their effective management, it is necessary for all levels of government and authorities to co-operate. The Federal Government of Australia has legislative responsibility for fisheries resources in most offshore waters inside the 200-mile Exclusive Economic Zone and for several species that cross jurisdictional boundaries. There are also fisheries which are managed on the basis of Joint Authorities by arrangement between the Federal Government and the State of Queensland. In undertaking their legislative responsibilities, some Federal Government agencies such as the Great Barrier Reef Marine Park Authority which has responsibility for managing the Great Barrier Reef, may impact on the management of fisheries, though it is not their primary area of responsibility.

At the State level, the two agencies responsible for the management of fisheries in Queensland waters are the Queensland Fisheries Management Authority (QFMA) and the Queensland Department of Primary



Industries (QDPI). The QFMA's primary function is to ensure the appropriate management, use, development, and protection of fisheries resources. The QFMA currently is in the process of formulating Management Plans aimed at achieving this function. The QDPI is responsible for the management, use, development and protection of aquaculture, marine plants and fish habitats. It is responsible also for fishways and for the management, control and, where possible, elimination of diseased fisheries resources. There is a high degree of co-operation between the QFMA and the QDPI. Both organisations also liaise with other State government agencies and Statutory Authorities which have interests and responsibilities in aquatic and coastal environments.

At the level of local Government, co-operation between the QFMA, local authorities and the QDPI is required on a regular basis. Local authorities, for instance, often have control over access to foreshore areas or platforms where recreational and commercial fishing occurs. Thus, co-operation amongst all levels of government is essential for strategic planning and day-to-day management.

Major stakeholders are represented on Management Advisory Committees (MACs), which provide advice to the management agency (QFMA on State-wide fisheries issues, and Zonal Advisory Committees (ZACs) which provide advice to QFMA on regional fisheries issues).

Major stakeholders involved in decision-making processes include representatives of the commercial fishing industry (Queensland Commercial Fishermen's Organisation), recreational fishing interests (Sunfish), indigenous and traditional fishing interests, conservationists, scientists, enforcement officers and managers. Non-government representatives are generally motivated by self-interest. There is, however, greater acknowledgement that all stakeholders are interested in the sustainable use and continued existence of fisheries resources. The consensus reached is often not in the best interests of any single interest group, but is a compromise in the best interest of the resource or sustainability of the fishery. All of these interest groups have representation on ZACs and MACs and provide input into management decisions and formulation of management plans. Prior to the implementation of management plans, the public has the opportunity to comment on the suitability of the management plan and its objectives, via responses to discussion papers and draft management plans which are released for public comment.

#### 4. APPROACHES TO DEALING WITH THE CHALLENGES

As indicated above, the management of fisheries in institutional and participational standpoints is quite complex. The need for changes to respond to these circumstances and emerging issues was evident to many in the stakeholder groups, management and government.

The catalyst for hastening the process was provided by the State Government Inquiry into Recreational Fishing. Many people in the commercial sector were concerned that such an inquiry would not pay sufficient regard to their interests in terms of access arrangements. However, in hindsight, it is now recognised that the process of the Inquiry motivated all stakeholders to focus on the status of fisheries resources. This highlighted the need to modernise arrangements based on clear policies and principles to meet the challenges of today.

It was obvious that a different approach was required which could provide longer-term protection for the resource and equity in decision-making. One option was to adopt a more technocratic approach and dictate outcomes in strict accordance with known scientific evidence. Another possibility was to take a path where management of the resource would be determined on the basis of which stakeholder group could muster the most support, and hope that this coincided with the best social and economic outcome.

The model adopted, which incorporates elements of these extremes, was designed to set clear direction to protect the public interest in the resources, to provide a technical basis for management and to involve major stakeholders directly in the development of management planning.

Following the State Government Inquiry in August 1993, the Minister for Primary Industries released a discussion paper on fisheries policy and legislation entitled "Fisheries: Managing for the Future". The purpose of this paper was to identify the principles, policies and strategies which would underpin new legislative and consultative mechanisms.

The outcome of this public process was an agreement that any new legislation and management arrangements should be based on several fundamental principles:

- (i) Given the limited knowledge base, there is a need for a precautionary approach to fisheries resource management.
- (ii) Management arrangements must have the flexibility to respond rapidly to changing circumstances.
- (iii) Management arrangements must be simple and easily understood.
- (iv) Management arrangements should be minimal in their impact on people while ensuring protection of the resource.
- (v) Arrangements must involve stakeholders in decision-making.
- (vi) Broader community values must be considered in management decisions.

These principles are laudable statements in their own right but the challenge was how to put them into practice.

#### **Queensland Fisheries Act 1994**

The Queensland Fisheries Act 1994 is described as enabling legislation which sets the broad objectives of fisheries management as well as the determining mechanisms to achieve these objectives. The Act sets out clear directions, including key institutional responsibilities, while allowing for flexibility in developing management arrangements and processes to deal with circumstances for individual fisheries. Its passage through Parliament is noteworthy for the broad cross-sectional support it received. It was well supported also by the various fishing sectors.

The objectives of the Queensland Fisheries Act 1994 are:

- (i) to ensure that fisheries resources are used in an ecologically sustainable way;
- (ii) to achieve the optimum community, economic and other benefits obtainable from fisheries resources; and
- (iii) to ensure that access to fisheries resources is fair.

The following institutional arrangements were established to deliver these new initiatives:

- (i) the establishment of the Queensland Fisheries Management Authority to manage and protect fisheries resources in c&operation with the Queensland Department of Primary Industries; and
- (ii) provision for the Department of Primary Industries to manage the protection of fish habitat and prevention, control and eradication of disease in fish as well the management of aquaculture.

goals set by the Government. The success of fisheries management plans in achieving objectives will depend on their being developed in association with other natural resource management strategies.

Preparation of a draft plan for a fishery and reasonable community consultation are fundamental components of the process. To this end, the inputs of the MACs are of fundamental importance.

### **Consultation and Community Involvement via MACs and ZACs**

Much thought and consideration was given to the best method of achieving management arrangements which would be broadly accepted and integrate the aspirations of stakeholders and the broader community. A clear finding of the State Government Inquiry into Recreational Fishing was that stakeholders were frustrated with what was perceived as the 'closed shop' nature of fisheries management. The Queensland Government has a strong policy of seeking community consultation and openness in decision-making, particularly when it relates to management of public resources.

In response to this and building on the experience of arrangements implemented at the Commonwealth Government level, it was decided to establish two levels of consultation and involvement in fisheries management, viz. Management Advisory Committees (MACs) and Zonal Advisory Committees (ZACs). Each has different, although at times overlapping, tasks to advise the QFMA in the development of management arrangements.

### **Management Advisory Committees (MACs)**

The MACs are essential building blocks in the process of developing management plans. MACs are the principal source of planning and advice to the Authority. They advise on appropriate management, use, development and protection of fisheries resources. They recommend development, implementation, performance review and amendment of management plans for each of Queensland's fisheries. They prioritise research, monitoring, surveillance and enforcement for these stocks and finally, they provide a forum for discussion of management matters amongst all significant stakeholders.

There are currently six MACs:

- <sup>1</sup> TRAWLMAC
- <sup>1</sup> REEFMAC
- <sup>1</sup> SUBTROPICAL FINFISH MAC
- TROPICAL FINFISH MAC
- <sup>1</sup> FRESHWATER MAC
- CRABMAC

Membership of the MACs varies, depending, on the circumstances. However, all major users are represented (commercial, recreational, charter operators, indigenous), as well as key scientists and representatives of government authorities involved in natural resource management and primary production. A Senior Resource Manager from the QFMA is also a member of each specific MAC. Each MAC usually comprises 12- 15 members.

The Chairperson is independent and has responsibility for keeping the planning process on track as well as reporting to the QFMA on behalf of the MAC. These people should have a high standing in the

community. Current MAC Chairs include a University Professor, a former Australian Cabinet Minister and a Commissioner for the Environment. It is extremely important that the Chairperson possesses good leadership skills, fairness and a reasonable knowledge of fisheries resources, if the operation of the MAC is to be successful.

The Board of the QFMA is not bound by the advice from a MAC on matters within its charter. However, the Board should advise the MAC on how it has diverged from its advice and explain the reasons why. Experience has shown that divergence does not happen very often. However, it is the QFMA which has the legal responsibility for developing and implementing management arrangements and it cannot negotiate away its fundamental responsibility to manage fisheries resources in keeping with its charter under the legislation.

Similarly, being independent advisers to the Board, fishery managers are not bound by the outcomes of the MACs consultation. However, fishery managers will be required to inform the MAC of their disagreement and have their view recorded in the minutes of the MAC meeting prior to bringing it to the notice of the Board. Clearly, the role of fishery managers is changing, with expertise in fisheries management needing to be complemented by consultative and negotiational skills.

### **Zonal Advisory Committees (ZACs)**

ZACs have a broader role than the MACs. The purpose of the ZACs is to provide a forum for regional communities to provide advice on the diverse range of issues impacting on local fisheries. Membership of ZACs is not restricted to key user groups although they should be key participants. One condition of membership is that appointees must be able to show they have a network for reporting to and consulting with a section of the community.

ZACs are a valuable source of local advice to QFMA, reflecting the decentralised nature of fishing activities in the State. After receiving formal reports from the ZAC, the QFMA refers them to the relevant MAC for consideration or it may act on the advice directly.

Ten ZACs have been established throughout Queensland and their membership typically comprises between 12 and 23 persons.

One of the principal benefits of ZACs is their capacity for gathering information on fisheries management needs and disseminating information to the broader public. Despite the strong grassroots interest in fisheries at a community level in Queensland, the understanding of the state of resources and rationale for management is poor. ZACs are providing a direct mechanism for dealing with this problem by providing this information to the community.

The establishment of MACs and ZACs was preceded by the development of a policy paper on MACs, ZACs and management plans. There was a large amount of consultation with a range of stakeholder groups on these initiatives, particularly the ZACs. The commercial sector was not very supportive of the establishment of ZACs because it felt that the opposition to commercial fishing (particularly netting in rivers and creeks) by recreational and other community groups would be the main topics for discussion at ZAC meetings. This concern has proven to be correct. However the commercial fishers on the ZAC have been able to present their point of view and, in many cases, the issue is settled in the ZAC.

The number of representatives on MACs from each of the stakeholder groups was the subject of much discussion, with commercial and recreational sectors arguing consistently for equal representation. This did occur with those MACs dealing with fisheries in which both sectors target the same fisheries resources to a significant level.

One of the major difficulties in establishing MACs and ZACs was convincing the various fishing sectors that the new management planning process was a better process than the one that existed previously, and was one in which all of them could contribute positively to the sustainability of the fishery resource. They were asked to participate in the new process by being involved in negotiation and mediation and to accept the decisions forged from that process. At this comparatively early stage of the new management planning process, there is some doubt as to whether all sectors are comfortable or mature enough to stay within the process. Some may still decide to go directly to government to lobby for their own self-interest.

The high level of consultation with key stakeholder groups, and the ability to give the public an opportunity to respond to published discussion papers and draft management plans, gives the QFMA and its management planning process a level of legitimacy and transparency in the eyes of government and community members alike. This process will not necessarily stop stakeholder groups from trying to promote their vested interests to government, but it provides governments with real alternatives to resource management allocation or sustainability issues.

The development and implementation of any new system generates uncertainty and causes anxiety to many people. The initiatives developed and implemented, including the new legislation, have all been undertaken with the involvement of the leaders of each of the stakeholder groups. A considerable amount of energy and resources went into educating and informing rank and file members of stakeholder groups and members of the general community about the new management process and its objectives.

## 5. OUTCOMES

The management planning or community-based management process has changed the culture of fisheries management in Queensland. It has occurred in a number of important ways.

Firstly, the community and stakeholders are gradually developing an attitude that publicly owned resources need to be shared on a fair and equitable basis. This attitude derives from the concept that the resources are of a multi-user nature and stakeholders are obliged to negotiate and listen to the aspirations of other stakeholders. The outcome is an understanding that there are several legitimate uses of the resource and that sharing on a sustainable basis is possible with goodwill and quality information available to make decisions.

Another outcome is that stakeholders, the government and the community have generally realised that fisheries are a finite resource. The sharing of information about the characteristics of fisheries resources (particularly what is not known), catch/effort data and the rate of destruction of fisheries habitat has generated a sense of awareness that uncontrolled or irresponsible fishing by any group cannot be allowed.

Furthermore, the role of government agencies in managing fisheries is changing to one of facilitation, negotiation and mediation with all major users, rather than a reliance on the ad hoc, short-term and fragmented decision-making of the past. The new role of agencies will deliver adequate protection for the resource and will allow opportunities to maximise economic and social benefits from the State's unique and valuable fisheries resource.

The leadership demonstrated by the QFMA in taking up the challenge of managing fisheries in association with key stakeholder groups was a critical element in contributing to the success of the new model. The expertise-based Board of the QFMA strongly believed that this model of management was appropriate and held firm against any efforts to dilute its effectiveness. An associated benefit was the support given by both sides of government to the process, and the sound support given by the leaders of key stakeholder groups, who were often under intense scrutiny and pressure from their constituents to modify the process for sectoral gain.

There are still several people within key stakeholder groups who do not want change. They are concerned that change will cause them hardship or inconvenience and argue that economic or status quo considerations should take precedence over stock sustainability. This issue is a very crucial one. The sustainable use of fisheries will at times cause hardship to some users, tempting the government to take options which could place the sustainability of stocks in jeopardy.

## 6. THE LESSONS LEARNT

None of the proposed new fisheries management plans are in place in Queensland as at 27 November 1997. Within the next two to three months, about four draft management plans will be in the public domain, seeking comments from interested members of stakeholder groups and the public.

It is difficult to say how successful these plans will be. It can be said that the measures being advocated in each of them have provoked more discussion, argument and input by far more people than any other management measure currently existing in Queensland fisheries. The extensive input into the process is expected to lead to the community and stakeholders adopting an "ownership" attitude to the final product.

Some people will argue that a management planning process which takes up to two years to achieve an outcome is too long and cumbersome and creates difficulties in maintaining a strong focus. Counter arguments to this are that the timeframe allows significantly more people to have input into the process, the elements of the plan will be more robust given the degree of negotiation behind them, and governments will be more confident that the measures in the plan will survive scrutiny and obtain greater acceptance by stakeholders and the community.

The development of a number of management plans simultaneously is extremely demanding on resources and places pressure on management agencies and stakeholder groups alike. The staged introduction of management plans would be preferable, but when expectations across several fisheries are as high as they are in Queensland at present, it is very difficult to slow down the process in any one of the major areas covered by the MACs.

It takes time for members in stakeholder groups to obtain the experience and capability to work with representatives from other groups to achieve a common goal. In retrospect, training of the MAC and ZAC members in conflict resolution, negotiation and fisheries management at the beginning of the process would have been extremely helpful.

One of the more important elements for anyone contemplating use of this model of fisheries management is to appoint strong Chairpersons to each of the MACs and ZACs. These Chairpersons should have a firm grasp of the issues, and the ability to work out a consensus. They should not harbour a bias towards any of the fishing sectors.

Another important element of the Queensland model is a legislative foundation which derives support from all political parties and has clear, precise objectives against which agencies can be evaluated. These objectives, set by the legislation, provide agencies with clear directions for action. Appropriate strategies can then be implemented to seek stakeholder co-operation and collaboration in managing fisheries sustainably.

Finally, the Queensland model will only be as successful as the participants allow it to be. The workability of the new arrangements depends directly on the support and participation of those involved in using the resource.

## 11. COMMUNITY INPUTS INTO FISHERIES RESOURCE MANAGEMENT

### Approach of the Queensland Department of Primary Industries

by Peter Finglas

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#### Summary

With the heightened awareness of the importance of linkages between the fisheries habitat and fisheries productivity, there is a greater need to involve the community in the decision-making process. Including the community into this process has advantages for both fisheries managers and the community. It serves to reduce conflict and foster a partnership approach to making tough environmental decisions. With the community being an integral part of the process, they become more informed about the terms and conditions of fisheries approvals. There is a better probability of successful fisheries management because the community is empowered with the information and the motivation to be the watchdog of the resource.

#### Introduction

The Department of Primary Industries, Queensland, is a rural economic development agency bringing together Government and industry in partnership to increase the profitability of primary industries-based enterprises on a sustainable basis.

Fisheries are of economic, social, ecological and traditional importance to all Queenslanders. These resources are of special significance to those with an interest in commercial fishing, aquaculture, recreation and tourism and to traditional users. Fisheries resources are available to all, and the responsibility for their management and good stewardship is a public service shared by government, the resource user and the general community.

The Department of Primary Industries, Queensland, and specifically its Fisheries Group, has been charged with providing this management in the areas of:

- <sup>1</sup> Assessing fisheries resources.
- <sup>1</sup> Fish stocking and other forms of enhancement.
- <sup>1</sup> Aquaculture development.
- <sup>1</sup> Protecting the habitat.
- <sup>1</sup> Community education.
- Enforcing compliance with rules for sustainable and fair use.
- <sup>1</sup> Boating safety.
- <sup>1</sup> Shark control.

In this regard, the Fisheries Group conducts research, education and extension, develops policy and legislation, assists development and adoption of new technology, promotes sustainable, profitable and



competitive fisheries, promotes community use of fisheries resources and enforces fisheries laws. The Group also has overall responsibility for aquaculture industry management, planning, research, extension and fish health services. Priority areas include commercial fisheries productivity, recreational fisheries development, development of the aquaculture industry and protection and management of marine and freshwater fisheries habitats

### **Legislative Framework**

The Queensland Fisheries Act 1994 is the legal statute that provides for the management, use, development and protection of fisheries resources and the fisheries habitat, and the management of aquaculture activities within the state of Queensland.

The objectives of this Act are:

- a) ensuring that fisheries resources are used in an ecologically sustainable way;
- b) achieving the optimum community, economic and other benefits from fisheries resources; and
- c) ensuring that access to fisheries resources is fair.

The objectives of the Act are achieved mainly by:

- a) establishing the Queensland Fisheries Management Authority (QFMA) to manage and protect fisheries resources with the chief executive of the Department of Primary Industries (DPI);
- b) giving the appropriate powers to enable the QFMA and the DPI to perform their respective functions;
- c) providing for the management and protection of fish habitats;
- d) providing for the management of commercial, recreational and indigenous fishing;
- e) providing for the prevention, control and eradication of disease in fish;
- f) providing for the management of aquaculture.

### **Protection of the Fisheries Habitat**

The fisheries habitat is managed under provisions for the protection of marine plants, the gazettal of Fish Habitat Areas and the restoration of damaged or destroyed habitats of importance to fisheries productivity. The legislation provides for approvals to allow works to be undertaken within intertidal areas, provided the impacts of such works are minimal, they are for fisheries purposes and/or community benefit, and appropriate mitigation measures are carried out to counter any approved loss of fisheries habitat. The Department of Primary Industries is guided by a number of policies to ensure equitable and consistent decisions in terms of issuing permits which impact on the fish habitat. An important part of this process is to include the community in the decision making.

#### *Marine Plants*

Marine plants are protected in Queensland, and this protection applies irrespective of the tenure of the land on which the **plants** occur, or the degree of or purpose of the disturbance. Marine plants are defined under the Fisheries Act to include the following:

- a) a plant (a tidal plant) that usually grows on or is adjacent to tidal land, whether living, dead, standing or fallen;
- b) material of a tidal plant, or other plant material on tidal land;
- c) a plant, or material of a plant, prescribed under a regulation or management plan to be a marine plant.

The objectives of the policy which guide the issue of marine plant disturbance permits are:

- a) to ensure that marine plant resources are used in an ecologically sustainable way;
- b) to ensure the minimisation of adverse impacts of human activities on marine plant resources;
- c) to achieve the optimum community, economic and other benefits obtainable from marine plant resources;
- d) to ensure equitable access to marine plant resources;
- e) to provide all stakeholders (e.g. community, government agencies, legal profession, private landholders, fishing industry, developers, consultants, conservation groups and educators) with a clear statement on the Department's position with regard to the assessment of applications and issue of permits to remove, destroy or otherwise damage marine plants and;
- f) to provide for a decision-making process to achieve (a) to (e).

#### *Fish Habitat Areas*

Fish Habitat Areas form an important component of the ongoing protection and management of fisheries resources and wetland habitats in Queensland. The Areas are declared with the specific intent of insuring the continuation of productive recreational, commercial and traditional fisheries in the region.

A Fish Habitat Area may be declared in both marine and freshwater environments to protect important juvenile and adult fish habitats. These habitats include sand bars, shallow water areas, undercut banks, snags, rocky outcrops, pools, seagrass beds, mangrove stands, etc.

Declaration of a Fish Habitat Area complements the existing and more general fisheries habitat management (e.g. protection of all marine plants) by:

- a) providing additional statutory protection to critical freshwater and unvegetated marine habitats,
- b) publicising the fisheries values of the area, and
- c) providing guidelines on fish habitat management to other management groups and members of the community proposing works within or adjacent to the Declared Area.

#### *The Declaration Process*

The declaration of a Fish Habitat Area generally follows the process outlined below:

1. Nomination of an area as a candidate for declaration as a Fish Habitat Area (often community driven).
2. Review of nomination and assessment of its priority for further investigation.

3. Site investigation/field habitat surveys, literature searches and reviews, assessment of fish catch records and preliminary discussions with the community (e.g. commercial, recreational fishers, indigenous groups, local authorities and other interested groups) to determine if the nominated area meets Fish Habitat Area declaration criteria.
4. Preparation of an Area of Interest Plan and draft of known management issues.
5. Initial consultation with interested parties and relevant agencies.
6. Revision of information gathered during the initial consultation phase, preparation of a draft Fish Habitat Area Plan and a draft management strategy with recommendations at an appropriate management level.
7. Second round of consultation with interested parties and relevant agencies.
8. Revision of information gathered during the second round of consultation.
9. Preparation of a Declaration Plan of Fish Habitat Area Boundaries and a submission of proposal for declaration.
10. Provision of Plan and submission to the Department of Primary Industries legal section.
11. Provision of Plan and submission to the Minister for Primary Industries.
12. Provision of Plan and submission to the Governor in Council for Declaration under the *Fisheries Regulations*.

It is expected that the declaration process from Step 4 to the final declaration should take a period of approximately 12 months to complete. However, this will depend on the complexity of issues associated with the individual area.

In general terms, Fish Habitat Area status is declared over areas that contain fish habitat that are critical for fisheries productivity and sustainable fishing in the short and the long term and to maintain the ecological character and integrity of undisturbed fisheries habitats. This management level does not impact on the normal day-to-day uses of the area by the community (e.g. boating and fishing), but does severely restrict development-related disturbances. Additional management may occur through a location-specific management plan, once the Fish Habitat Area has been declared. A decision regarding the most appropriate management category is usually made following the first round of community consultation, at which time all the relevant issues should be available for consideration.

#### The Community : Where Do They Fit into the Process?

The issuing of permits under the *Fisheries Act* to remove marine plants or to conduct works in a Fish Habitat Area equates to giving a right to impact on a community resource, that is, the fisheries productivity of an area. It is vitally important that an assessment process is followed to ensure that these impacts are acceptable and that decisions are made fairly and equitably across the state. An integral part of this process is to ensure that the community is part of the decision-making process.

Local Fisheries Officers should become involved early in the development planning process to ensure that acceptable fisheries outcomes can be negotiated. At this time, plans are reasonably flexible and fisheries can provide advice to minimise productivity impacts. It is also important to include inputs from the community early on in the process to ensure that decisions are based on all available knowledge and that community members are genuinely part of the process.

*Elements of Successful Community Input.*

- Community input should be facilitated by the local Fisheries Staff as these people have built up a level of trust and respect with the community that only time and close working contact can establish.
- Consultation with the community is recognition that the Department may not possess all the available information on which to base decisions. Anecdotal information can be valuable in itself or provide a picture of trends over time.
- All information obtained from the community should be treated with respect and considered during the decision-making process.
- The lines of communication should be open and honest. For the community to provide advice and opinion they must know all of the details and not just selected non-controversial information.

*Benefits from Successful Community Input.*

The benefits of involving the community include:

- A better level of community acceptance of decisions which affect a shared resource.
- Better economic, sociological, political and environmental information on which to base decisions.
- Education of the community on the decision-making process, the objectives of the Department and the fisheries impact issues of the area.
- Closer links between the Department and the community, and a better understanding of the aims and objectives of the Department.
- Encouragement to community policing when the terms and conditions of the development approvals are known.

**Fishcare Volunteers Programme, “Conservation Through Information”**

The Queensland Boating and Fisheries Patrol (a section of the Department of Primary Industries) has traditionally performed the compliance role, particularly enforcement and education in relation to Fisheries Regulations throughout Queensland. In recent times, a greater community awareness of conservation issues has emerged. The need for an increased education role by the patrol to address habitat and resource conservation has evolved.

The Fishcare Volunteer Programme consists of community volunteers performing a practical role in the field with the following benefits:

- Promote a community-based education programme relating to Fisheries Regulations.
- Enhance the Queensland Boating and Fisheries Patrols education programme.
- Improve communication between fisheries managers and recreational anglers
- Raise recreational community awareness of the need for a conservation ethic in relation to the utilisation of fisheries resources.
- Increase community awareness of the need for management arrangements such as bag and size limits.

- Assist fishers improve their angling skills.
- Monitor the habitat.
- Monitor recreational catches

### **Conclusion**

Including community input into the decision-making process has advantages for both fisheries managers and the community. It serves to reduce conflict and fosters a partnership approach to making tough environmental decisions. Because there is an awareness of the complicated issues involved in managing fisheries resource impacts by the community there is also a sense of being part of the solution. Solutions often reflect fisheries management objectives by leading to a better-informed community prepared to defend management decisions which they have contributed to.

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***Country Paper: Thailand***

**12. COMMUNITY-BASED FISHERIES MANAGEMENT IN PHANG-NGA BAY,  
ON THE ANDAMAN COAST OF THAILAND**

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**1. Introduction**

Consumption demand for marine products has been rising in Thailand because of a rising population, while farming areas have been dwindling in acreage because they are being taken up for housing. The sea is therefore relied on to meet demand for protein food domestically and for exports -which could generate an annual income in excess of 85,000 million Baht. Marine fisheries could stimulate economic development as well, by helping generate jobs and incomes. Many boatyards, fishing materials and fish processing firms, ice plants and cold storage companies have been set up in recent years.

Marine fish production (through both capture and culture) went up from 2.10 million metric tons (valued at 8,622 million Baht) in 1977 to 3.20 metric tons (valued at 92,950 million Baht) in 1995. The rapid expansion of Thai marine fisheries since 1960, particularly the introduction of trawlers into Thai waters, has led to heavy exploitation and depletion of marine resources, resource conflicts, and degradation of fishing habitats. Commercial fishing boats have been fishing illegally in prohibited areas.

On the Andaman coast of Thailand, Phang-Nga — which covers parts of Phuket, Phang-Nga and Krabi Provinces, with a total area of approximately 1,960 sq.km — is regarded as the most important bay. Its unique monolithic limestone islands and small islands scattered throughout the Bay, provide shelter and habitat for a wide diversity of the Bay's wildlife. Along the shoreline is an extensive mangrove area of about 250 sq.km, which serves as spawning and nursery grounds for a wealth of aquatic resources. In view of the dwindling resources offshore, fishing boats have been encroaching into the Bay, thereby affecting the catches and incomes of fishermen and triggering conflicts among them.

The Department of Fisheries attempted to solve these problems by implementing a fisheries development project in every small-scale fishing community in both the Gulf of Thailand and the Andaman Coast. This project comprises several activities such as infrastructure-building, construction of artificial reefs, promotion of non-destructive fishing gear, extension of coastal aquaculture, training etc. But the results did not meet expectations. The project therefore revised its implementation strategy. Community-based fisheries management was initiated early in 1996 in Phang Nga Bay as a pilot activity, in collaboration with the BOBP's third phase.

**2. Fishing Activities in Phang-Nga Bay**

As mentioned earlier, fishing activities in the past could be conducted freely in Phang-Nga Bay. The fishermen could fish with any type of gear available. Some even had more than one type of gear, and could use the gear suitable for the tides, the seasons and the resource abundance. Several kinds of fishing activities, both capture fisheries and aquaculture — have been conducted in the Bay such as:

1. *Trammel net*: The main fishing gear of small-scale fishermen, targeted at shrimp.
2. *Crab gill net*: Another selective fishing gear that targets mainly blue swimming crab.

3. *Sand whiting gill net*: Aims to target Sillagid species.
4. *Grouper trap*: This fishing gear aims to catch mainly small grouper for sale to cage culturists, who hope to rear them to marketable size at lucrative prices.
5. *Pushnet*: This is one of the most destructive fishing gears popularly used in Phang-Nga Bay. Aims to target shrimp, but also catches small sizes of other species.
6. *Light-luringpurse seiner*: This is one kind of commercial fishing gear operated in the outer part of Phang-Nga Bay. It uses light to attract schools of fish – mainly pelagic species such as chub mackerel, scad, sardine etc.
7. *Anchovy encircling net*: This fishing gear is designed to catch anchovy during the day. However, because of resources degradation and disturbances from light-luring purse seiners, the catch of this gear has decreased to almost zero. It was found that the purse seiners attracted all schools of anchovy within the area covered by the light, and frightened fish from schooling up the following day. In consequence, the fishermen could catch nothing. They have changed their fishing method to operate during the night, using light lures. This fishing method was then declared illegal.
8. *Trawler*: Single trawlers and twin trawlers were the most common fishing gears operated in Phang Nga Bay. The original target species were economically important demersal species. But after fisheries resources got depleted, the fishing boats changed their target species and focused on trash fish for supply to fishmeal processing plants. This would enable trawlers to at least recover their daily investment.
9. *Small otter beam trawls*: This fishing gear too targets shrimp, but also catches other species such as crab, squid, pelagic fish and economically important demersal species. This fishing gear is classified as destructive.
10. *Coastal aquaculture*: Capture fisheries apart, several aquaculture activities are carried out in the Bay: shrimp farms, shrimp hatcheries, fish cage culture of grouper and sea bass, green mussel culture, cockle culture, oyster culture.

A few other subsistence fishing gears also operate in Phang-Nga Bay.

### 3. Problems to be Addressed

The rapid development of commercial fisheries led to substantial expansion in fishing effort and eventually to degradation of resources. Fishing boats, particularly trawlers, encroached into the prohibited area (within 3 km from the shoreline) in Phang-Nga Bay, which served as a nursing ground for various types of aquatic resources. Conflicts have erupted between commercial fisheries and small-scale fisheries because of competition for fishing grounds. The following problems needed to be addressed:

#### 3.1. Degradation of fisheries resources

Fisheries resources could be degraded through natural causes or human utilisation. Natural degradation occurs through natural change such as soil erosion along the shoreline, change of current, change of sea temperature and monsoon etc. These phenomena would affect fish spawning grounds, the habitat and the food chain, impacting directly on the survival and development of aquatic resources. Human utilisation of resources causes degradation through overfishing.

It is remarkable that artisanal fishing gears used in the Bay in the past — such as trammel nets, several types of gill net, traps and hook and line etc. – did not harm aquatic resources. But after trawlers were introduced to Thailand, the coastal fisheries resources underwent rapid depletion, and became over exploited in a decade. The other destructive fishing gear is the pushnet. It is a small-scale fishing gear, but its method of operation is similar to that of a trawler.

3.1.1 Trawler: A monitoring survey by an AFDEC Research Vessel reported that the average catch in the Bay in 1969 was 160 kg/hr, comprising 48.5 % valuable species and 51.5 % trash. The catch decreased to 38 kg/hr in 1988 (33.3 % valuable species, 30.1 % small economic species, 36.6 % trash fish). The decline in catch rates is a consequence of trawler encroachment into the Bay.

3.1.2 **Pushnet:** This is another destructive fishing gear operated along the shoreline, particularly in the productive area of shrimp. Over 290 pushnetters have been recorded operating in the Bay. Most of them are long tail boats 8-10 meters long, using 5-10 HP engine. Normally, pushnets operate in the night, from sunset, at a depth less than 10 meters. Each operation takes 1-1.5 hours, and night fishing goes on for 3-10 hours. But during neap tide, fishing may go on all night.

The push net is very efficient at catching trash fish, because the mesh size of cod end is only 2 cm. It is therefore classified as a heavily destructive fishing gear. The average income from pushnets was about 460 Baht/trip, while expenses amounted to 270-300 Baht/trip.

A study of the resources status of pushnets in the Bay reported an average catch of about 67.4 kg/trip, comprising mainly 85.4 % trash fish and 14.6 % economically valuable species. Of these, marine shrimp accounted for about 10.3 % or about 6.9 kg. The composition of trash fish caught was as follows: true trash fish 56.1 %, small economic species 43.9 %.

3.1.3 Small **otter beam trawl:** This is another kind of bag net popularly used on the east of Phang-Nga Bay and Krabi Bay. Some 30 trawlers still operate in the Krabi area at present. This fishing gear normally operates two times in one night, with an approximate 4-5 hour/haul, except during high tide. A study showed an average catch rate of about 104.86 kg/trip/boat, comprising 32.1 % valuable species and 67.9 % trash fish. The trash fish included 38.2 % small economic species and 61.8 % true trash fish. This fishing gear is therefore classified as one of the most destructive.

### 3.2. Fishing Conflicts

Since the declaration of the EEZ by different countries in the region, the fishing grounds in Thailand have got reduced, and are too small for the fishing fleet. Therefore, fishing boats moved to coastal areas and finally encroached on to the Bay. These boats, particularly commercial trawlers, created many problems for small-scale fishermen -competition, scrambling for fishing grounds etc. As the trawler is much more efficient than artisanal boats, small-scale fishermen lose their fishing grounds and even their fishing gear, which gets swept away by the trawlers.

Apart from conflicts between commercial and small-scale fishermen, there are also conflicts among the small-scale fishermen themselves, such as the pushnet and trammel net fishermen. It was observed that wherever pushnets operated in the night, trammel nets had a tough time the following day. The pushnet was classified as another strong destructive gear, similar to the trawler. This is why small-scale fisherfolk have tried to keep trawlers and pushnetters out of Phang-Nga Bay.



### 3.3. Degradation of the coastal environment

The coastal environment has been degraded by several kinds of activities.

- 3.3.1. *Waste water discharged from urban and industrial areas into the Bay:* With the Thai economy developing rapidly, the coastal belt became crowded with both human settlements and industrial activities. Untreated waste water from the belt found its way into rivers or channels and flowed into the sea. Geographically, the Phang-Nga Bay is somewhat closed in. Circulation or exchange of water in the Bay is not adequate to push the wastes and other pollutants out to the open sea. Continuous accumulation of these pollutants will ultimately cause water quality in the Bay to deteriorate and affect fauna and flora.
- 3.3.2. *Destruction of mangroves:* Mangroves are the most important barrier ensuring preservation of the coastal environment. They serve as a filter for all toxic substances dissolved in the waste water that get discharged to the sea, and are also an important nursery ground for the larvae and juveniles of aquatic resources like finfish and shellfish. When mangroves are destroyed, the coastal resources and environment in the area will also be affected.
- 3.3.3. *Garbage and wastes from tourist services:* The tourist business in Thailand has developed and expanded rapidly. Every facility is sought to entertain tourists—tourist barges, floating restaurants, shore-based resorts, restaurants on land etc. The entertainment facilities that have proliferated are all sources of waste and garbage. Some of these are discharged directly into the sea. Many beaches, particularly on isolated islands, are covered with accumulated garbage washed in by wave and wind action — especially plastic bottles and plastic bags.

## 4. Fisheries Management Measures

The Department of Fisheries has realised these problems and attempted to establish management measures, strategies and mechanisms to reduce degradation of the coastal environment and stresses on fisheries resources in the Bay.

**4.1. Legislative approach :** Many “Ministerial Regulations” and “Fishery Regulations” were issued to conserve fisheries resources and control illegal fishing. A Ministerial Regulation issued on 1 August, 1979, prohibited every kind of trawler and bag net operated by a motorised boat from fishing in Phang-Nga Bay. A Ministerial Regulation issued on 11 April 1985, prohibited every size of trawler, enclosed net and gill net with a mesh size less than 4.7 cm, from fishing in Phang-Nga Bay and Krabi areas during the closed season 15 April to 15 June every year.

These regulations were not so effective initially, because the fishermen were not very clear about regulation. Both personnel and facilities (such as patrol boats) were inadequate for surveillance. But a public relations drive through posters and videos gave fisherfolk a clearer picture about management. Patrol boats for surveillance were also increased. These two measures helped strengthen enforcement.

## 4.2 Management measures

Many activities geared towards management of coastal resources have been implemented in fishing communities along the coast. These measures could be classified as follows:

- 4.2.1. *Infrastructure building:* These include landing site, gear repair hall, fish processing hall, fresh water stocking tanks, retaining wall etc., depending on the need of each village.

4.2.2. *Training and grouping:* Training courses by subject have been organised for three groups of fisherfolk — fisherfolk leaders, fishermen, fisherwomen and students. New technologies on fishing operation, boat engine repair, fish processing and other topics concerning fisheries, have been introduced to fisherfolk through regular training schemes. Posters and videos that help better understanding have also been disseminated to fishing communities in order to educate them on resources and conservation measures.

4.2.3. *Coastal aquaculture extension:* Coastal aquaculture, particularly fish cage culture, was introduced to fisherfolk in Phang-Nga Bay during the first phase of BOBP. They were provided with tools, materials and seeds, and technical assistance from the biologist. At present, coastal aquaculture has expanded throughout the coastal areas of both the Andaman coast and the east coast and could benefit fisherfolk. In the early stages, cage culture was very popular: species that have been commonly found throughout the coast are sea bass, red snapper and grouper. Fish fry can be collected from nature, sea bass fry from hatcheries. As the price of grouper is much higher than those of sea bass and red snapper, most fish cage farmers prefer to culture grouper instead. The only limitation of grouper is fry – it has to be collected from the wild and is rather difficult to obtain in adequate quantities.

*Shrimp* culture is another activity that is now very intensive; the culture area covers most parts of Phang-Nga Bay. 1992 records report that shrimp culture occupied about 2760 rai or about 460 ha. in the Bay with a production of 3.210 tons valued at 473.5 million Baht.

4.2.4. *Construction of artificial reefs:* Artificial reef construction in Phang-Nga Bay was initiated in 1983 with the use of circular concrete blocks, used tires etc. Most parts of the sea bottom in Phang-Nga Bay contain mud and muddy sand. These caused a part of the modules used earlier to be sunk, while some other modules were destroyed by the trawlers. In 1985, when the Marine Fisheries Conservation Unit was established in Phuket (it has since been transferred to Krabi) and the 'Ministerial Regulation' on closure of the area to fishing during the period 15 April - 15 June was issued, artificial reefs became an important tool of conservation.

Two types of artificial reefs have been installed along the coast. The first type is the reef constructed in front of fishing villages, which aggregates fish and facilitates better catches. The second type is the large reef, about 50 sq. km. in size, which seeks to prevent illegal fishing from trawlers in the prohibited area of 3 km offshore. It also serves as a large fishing ground for small-scale fishermen. At present, quite a number of artificial reefs have been installed in coastal areas.

4.2.5. *Awareness-building in fisheries for fisherfolk:* This important activity aims at giving fisherfolk a better understanding of conservation measures. It encourages them to protect resources and fishing grounds in front of their villages, use appropriate fishing gears, understand how to utilise resources and conduct environmental surveillance.

## 5. Institutional Participation

Some elderly fishermen in the area said that several missions in the past had visited their communities to collect information from them, and promised activities to improve the living standards of fisherfolk. But these promises had not been kept. This had disappointed the fisherfolk and eroded their confidence in officialdom. Restoring this confidence was important, to mobilize fisherfolk participation in development activities. No single organization could accomplish the task by itself. A sound organisational set up and close co-operation from government and private agencies was needed.

The institutions taking part in this project were:

- 5.1. **Department of Fisheries (DOF):** “DOF” includes institutions under the DOF, such as the Andaman Sea Fisheries Development Center (AFDEC), the Provincial Fisheries Office, and the Marine Fisheries Conservation Unit. AFDEC, which is directly responsible for project implementation, will be in charge of technical and technology transfer. It will co-operate with fisherfolk in development and management of coastal resources for sustainable utilization. The Provincial Fisheries Office will be responsible for legal aspects. It will issue fishing gear licenses, prevent illegal fishing operations in the area of jurisdiction, function as fishery extension supervisor, and help solve legal problems of fishermen. The Marine Fisheries Conservation Unit will be responsible for surveillance, using patrol boats to control illegal fishing, and serve as extension supervisor for appropriate fishing methods.
- 5.2. **Village leader:** Could be considered as the representative of local government responsible for all activities to be implemented in the village. Support from the village leader will help in more efficient implementation.
- 5.3. **Academic Institution:** The new generation of fisherfolk — tomorrow’s fisherfolk – ought to be a major power in support of coastal resources, environmental conservation and management in future. After discussion with the school headmaster, general knowledge on coastal resources conservation was made part of the basic school curriculum. Further, students will be encouraged to help environmental protection by collecting mangrove seedlings for reforestation.
- 5.4. **Health Office:** Sanitation is an important element of living standards. Cleanliness in domestic surroundings, in the community environment, in food and clothing, is essential for the health of fisherfolk. An officer in the Health Office is in charge of sanitation in the project’s target villages. He will co-operate with the project team to develop the fisherfolk’s living standards by establishing a campaign to keep the community clean, and installing garbage containers and garbage stoves in the villages.
- 5.5. **Local government:** Phang-Nga Bay (considered the most attractive area on the Andaman coast of Thailand) was being exploited in an unregulated manner by many kinds of users-for fisheries, industry, tourism etc. The Governors of Phuket, Phang-Nga and Krabi realized that coastal resource conservation and environmental protection had to be undertaken immediately. Otherwise, coastal resources and the environment would be degraded, and the tourist appeal of the area would be ruined. A project for holistic and sustainable management of the entire Andaman coast was therefore initiated in 1994. Activities implemented under the project: water treatment, beach-cleaning campaigns, garbage collection from the sea bottom, campaigns to stop dumping of wastes into the sea. Consciousness has been built among small-scale fishermen from the three provinces about the need for conservation of coastal resources, and protection of the Bay from illegal fishing. The fishermen have also pledged to help conserve the environment and work toward sustainable utilisation of Phang-Nga Bay – an earnest of their participatory approach.
- 5.6. **The NGO:** NGOs can play a crucial role in facilitating a project’s community approach. There are many areas in Thailand where NGOs have helped to promote development, living standards, and environmental awareness. This project too secured the co-operation of NGOs – such as the Wildlife Fund of Thailand, Volunteers for Social Development Foundation, and Small - Scale

Union of Phuket, Phang-Nga and Krabi — in energetic implementation of activities with fisherfolk participation.

## 6. Implementation Strategy

### *Community-based fisheries management*

Community-based fisheries management (CBFM) was initiated in Phang-Nga Bay in 1995 by the Andaman Sea Fisheries Development Center (AFDEC) and the Department of Fisheries in collaboration with the BOBP. The CBFM strategy focused on implementation by fisherfolk after building their awareness about conservation and management, and the use of destructive and non-destructive fishing gears. Implementation was divided into several steps:

- 6.1. **Site selection:** was done on the basis of past information, two important criteria being the extent of poverty in the communities and fisherfolk participation.
- 6.2. **Public hearing:** After the site was selected, public hearings were held in every community in the area to explain the project's background and objectives, and fishermen were interviewed about their problems and how they could be solved. This information was used to set up work plans.
- 6.3. **Selection of village committee:** To enable smooth project implementation, village committees were formed in each village with five fishermen in each committee. The committees identify problems and needs, follow up on activities implemented, and report on all events organised every other month. DOF extension workers provide supervision and support.
- 6.4. **Definition of activities to be implemented:** Activities to be implemented should be defined by both DOF officers and the committees on the basis of fisherfolk's willingness and capabilities to undertake the set tasks. The activities defined are:
  - 6.4.1 *Searanching* : DOF organises collection of seeds of species such as marine shrimp, blue swimming crab and sea bass for release into the sea. The fishermen co-operate in releasing those seeds in their respective areas.
  - 6.4.2 *Mangrove conservation:* Mangroves serve as spawning and nursery grounds for aquatic animals and also provide a buffer against over-exploitation of the environment, which is one of the hottest environmental issues today. AFDEC promotes mangrove conservation in co-operation with the Mangrove Protection Office and fishermen of the target area. Notice boards have been put up around the mangrove area to prohibit felling of trees.
  - 6.4.3 *Mangrove reforestation:* Students are being paid incentives to collect mangrove seedlings in the villages during their free time. This strategy aims not only at benefiting students during their free time, but also at building awareness on the importance of mangroves among students.
  - 6.4.4. *Seagrass bed transplantation:* Normally a seagrass bed is an area abundant with living resources. But many areas that used to be rich with seagrass in the past in Phang-Nga Bay were later degraded by pushnetters that crushed the grass area. This project has been successful so far in its object of banishing pushnetters from the target area.

- 6.4.5 *Training*: Training courses were held on subjects like boat engine repair, gear assembly etc, to transfer knowledge and new technology to the community. Some general knowledge on fisheries resources conservation was also added to the school curriculum in the target area.
- 6.4.6 *Release of gravidfemales*: The project urged fishermen to return to the sea any gravid females of blue swimming crab that they happened to catch, so that they could spawn and multiply. The request was not heeded, because fishermen were not sure that other fishermen would do the same. The project then provided two cages to each community. Every gravid female caught would be kept in one cage till it spawned. It would then be sold in the market. This money would boost a revolving fund to be used for the community. The campaign has borne fruit. Production of crab in the area is now 20-40 kg/boat/day, while earlier it was only 5-10 kg/boat/day.
- 6.4.7 *Stewardship*: In the past, enforcement and surveillance in Phang-Nga Bay were not strict, and illegal fishing, particularly by trawlers and pushnetters was widespread. AFDEC, with the co-operation of the Fisheries Conservation Unit, Provincial Fisheries Office, have set up a programme to strengthen enforcement in the Bay. Meanwhile, fishermen themselves have set up their own surveillance group to keep out destructive gears and fishing methods such as trawls and pushnets.
- 6.5. **Implementation**: Past experience, plus interviews with fishermen, yielded the following lessons and conclusions:
- Extension workers should maintain regular contact with the fishermen, be close to them, and win their confidence. They should be prepared to work hard and sincerely, otherwise the project will make no impact.
  - When the project began, it had to confront many problems that didn't redound to the credit of the extension workers. Further, a group of NGOs was already active in the area. To compete for the community's attention with the NGOs was difficult.
  - To win fisherfolk participation in the project, the project should co-operate with NGOs of the area. The workplans of the project and the NGOs should be dovetailed and their activities streamlined. The plans then have better chances of success.
  - A DOF floating pontoon functioned as a 24-hour service station for fisherfolk. The pontoon became a rest area for fishermen, it was a landing site for post-harvest sorting of catch, it provided shelter during the rains. Catch sampling too could be carried out accurately.
- 6.6 **Follow-up and assessment**: To follow up on project implementation, village committees met regularly with DOF officers from the Andaman Sea Fisheries Development Center, the Fisheries Conservation Unit, the Legal Office in the DOF. the Provincial Fisheries Office, also with university instructors, representatives from the Health Office and NGOs of the area. Meetings were held every second month to report on progress in each village, exchange experiences, review and help solve problems. This meeting was held by rotation in different villages. Thus fishermen in a village could learn about what was happening in the entire target area. Some communities initiated their own revolving fund through a "stock system" consisting of shares of 20 Baht each.

## 7. Constraints in implementation

The project has been implemented efficiently and smoothly, but some constraints still remain.

- 7.1. **Weaknesses in enforcement:** Personnel and facilities were limited. Result: rampant illegal fishing in the Bay. Patrol **boat** surveillance was inadequate and could not effectively cover the entire coastal area, because most of the culprit boats are equipped with modern communication equipment and manage to evade patrol boats. It often happened that a patrol boat reported illegal fishing, but the culprit boats disappeared by the time project representatives arrived. Most of the culprit boats are trawlers and pushnetters — they can always create problems for small-scale fishermen.
- 7.2. **Living conditions of fishermen:** Most small-scale fishermen live in poverty along the shoreline. Some communities lack even essential infrastructure such as roads, power and fresh water. Most small-scale fishing villages were short of fresh water during the dry season and had to buy water at a very high price. Their average daily income from fishing was about 300-500 Baht/day. To achieve better fisherfolk participation in the project, high priority should be given to increasing their incomes and improving their facilities.
- 7.3. **Education:** Fishermen of yesteryear had few opportunities to study because they were poor and their villages had no schools. Some did not even go to school. But schools exist today in many villages, and the children there have better opportunities than their parents did. But during the peak fishing season, students join their parents and go out fishing to earn more money. It is believed that the next generation of fishermen would be better educated than today's.
- 7.4. **Investor system:** It is remarkable that a lot of fishermen still rely on “investors” or entrepreneurs for supply of boat, engine, gear, fuel and other daily essentials. In return, the fishermen have to sell their catch to the investors at a price lower than that in the market. Their relationship is one of inter-dependence. Freeing the fishermen from debt is not easy. Even if they attain physical freedom, their mental dependence on the “investors” will continue.
- 7.5. **Not enough extension workers:** The project could not expand in the Bay because it was short of extension workers to implement its activities. Many villages that wanted to take part in the project and benefit from it have not been able to do so. This problem awaits solution.

## 8. Outcomes of the Project

After two years of the project, progress of activities is as follows:

- 8.1. **Rehabilitation of fisheries resources:** This has been done in many ways:
  - 8.1.1. Sea ranching: More than six million fry of various species — the black tiger prawn *Penaeus monodon*, banana prawn *Penaeus merguensis*, blue swimming crab *Portunus pelagicus*, and seabass *Lutes calcarifer* — were released into the mangrove areas of target villages. It was reported that fishermen could catch 5-10 kg/boat/day of shrimp compared to what they caught before the project (only 0.5-1.5 kg/boat/day).
  - 8.1.2. *Release of gravid females:* The gravid females of blue swimming crabs are now released into spawning cages after they are caught, allowing them to reproduce. More than 1,000 crabs were

released into cages. The catch rate of crabs nowadays is 20-40 kg/boat/day, compared to the figure of 5-10 kg/boat/day before the project. Further, fishermen agreed among themselves to control the mesh sizes of crab gill net to catch only marketable-size crabs. The income from the sale of the spent crabs after spawning creates a revolving fund in some villages. In some others, it is provided to the local mosque to meet its expenses.

- 8.2. Rehabilitation of the coastal environment:** Some habitats, such as those of mangroves and seagrass, have been restored. They will now help protect the coastal environment and serve as spawning and nursery grounds for aquatic resources.
- 8.2.1 Mangrove reforestation:** The mangrove is the most important eco-system for the aquatic resources life cycle. At present, mangroves are destroyed for many purposes: setting up shrimp ponds, charcoal, pile, cage frame etc. To rehabilitate mangrove areas, a reforestation scheme has been initiated. About 10 hectares of areas destroyed were reforested, using more than 50,000 seedlings. To help protect the remaining mangrove areas still in good condition, notice boards have been put up around these areas. The fishermen have agreed among themselves not to utilize mangrove trees and to prevent outsiders from cutting them down.
- 8.2.2 *Sea grass transplantation:*** Many areas of Phang-Nga Bay used to be abundant with sea grass in the past, and it sheltered aquatic resources such as shrimp, crab, fish and mollusc etc. With the increase in population and the introduction of modern fishing gears, there is indiscriminate exploitation of coastal resources to meet consumer demand. Trawlers and pushnetters are considered to be the most destructive fishing gears that could sweep sea grass away during fishing. Result: degradation of the sea grass bed, the habitat of coastal resources. Rehabilitation of coastal resources by transplanting sea grass from dense areas to depleted areas has been tried in different places. Remarkably enough, the transplanted sea grass could grow well, and the seagrass bed will be expanded in future to cover more areas. Hopefully, coastal resources in that area will soon recover their abundance.
- 8.3. Awareness-building among fisherfolk:** To induce better understanding among fisherfolk of resources conservation and management, awareness materials such as posters, newsletters and manuals have been distributed to villages and schools not only in the target area but also in some other villages of Phang-Nga Bay. After two years of implementation, a feeling of "ownership" of coastal resources was discernible among fisherfolk. This might be indicative of future trends.
- 8.4. Training and grouping:** Two training courses were organised in the target villages — one for about 30 participants on boat engine repair and maintenance in collaboration with an NGO; and another on sanitation and environment conservation with about 70 participants in collaboration with the health office.
- 8.5. Extension and development livelihood:** Sea-bass fry are supplied to fisherfolk, so that they may supplement their incomes with aquaculture. This activity interested many villagers in the Bay. A study has been conducted on the impact of this activity.
- 8.6. Strengthening enforcement and surveillance:** Two steps were taken. The Conservation Unit of the Department of Fisheries agreed to conduct surveillance around the Bay, in particular the target areas. Second, the idea of voluntary fisherfolk participation in target areas to protect coastal resources and the environment in the Bay was authorised by the Governor of Phang-Nga Province.

Illegal fishing — especially by push netters that encroached on fishing grounds in the Bay — came under special surveillance later. Under pressure from both the patrol boats and the volunteers, the pushnetters surrendered.

AFDEC took the opportunity to approach pushnet users and convince them to take up alternatives to push nets. Finally, about 30 push netters from the village became members of the project. To be sure that this group of fishermen had abandoned push nets, patrol boats had still to conduct surveillance in the area for a period of time. Likewise, push net communities in another part of the Bay have been approached. Fishermen in eight villages from three areas using about 100 pushnets are now waiting for the DOF to help replace their fishing gears. Hopefully, pushnetters will disappear from Phang-Na Bay in two years.

As for trawlers: Following discussion between AFDEC and the fishery association of Phuket, the major trawler-owners operating in the Bay, it was agreed that these owners would prohibit their master fishermen from fishing in the Bay. The fishery association pledged support to DOF for raising money from members to finance installation of artificial reefs on the Bay's entrance to prevent trawling operations.

Moreover, representatives from the fishery association of Phuket will be invited to join the meeting of small-scale fisherfolk. The idea is that the association should represent not only commercial groups but small-scale fishermen as well. This idea has generated a positive response from the fishery association. It is anticipated that if these two groups of fishermen collaborate in protecting and conserving the coastal resources of the Bay, the project's goal would be closer to realization.



***Country Paper: Malaysia***

**13. CBFM : AN ALTERNATIVE APPROACH TO  
FISHERY MANAGEMENT IN MALAYSIA**

**by Kamaruzaman Haji Salim**

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**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.

The fishery resource is a common resource. It has two distinctive attributes: its benefits are non-excludable and rivalrous (Comes and Sandler, 1986; Gardner, Ostrom and Walker, 1990). "Non-excludability" implies that it is difficult to exclude potential users or newcomers from tapping it. This is particularly true of fishery resources – preventing some one from fishing is difficult when the area is vast and the coastline is long. When the benefits can be obtained for free, it is natural for some one to refuse to conserve these common resources.

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.

However, the benefits of fishery resources are "rivalrous" in the sense that the catch by one fisherman will reduce the quantity of fish available to others at that particular time. Fish resources are limited and renewable and subject to overfishing. This problem may occur when the exploitation rate substantially exceeds the rate of biological replenishment. When overfishing occurs, the catch rate will decline but the cost of fishing will increase. Hence, to increase or to maintain fishing productivity and profitability, all fishermen must work collectively and refrain from overusing these resources.

To refrain from overfishing means to forego the current benefits of using these resources so as to sustain future benefits. This is the cost of using the fishery resource as an input in the capture fishery production process. Hence, anybody who carries out fishing must incur this cost so that the threat of overfishing can be prevented. Clearly, there is a strong interconnection between the biological and human aspects in the fishery. Thus, an effective fisheries management scheme must not neglect the management of stakeholders, especially the fishermen. O'Riordan says in this context (1971): "...resource management is a human problem involving values, preferences and aspirations, whose details are sculptured by human behaviour and action".

The fisherman's influence on the quality of fishery resources depends on two things: the damage he does and the effort devoted to undoing (or restricting) that damage. If fishermen are unwilling to restrict their individual fishing effort, fishery resources will eventually be destroyed. However, if only a fraction

of the fishing population is willing to restrict the fishing effort, the problem of overfishing will still occur. This is because the individual action to reduce fishing effort is miniscule in relation to the overall reduction that is needed to secure healthy fishery resources. Hence, a collective effort by all fisher-men is needed to overcome the problem of overfishing. The approach of community-based fisheries management (CBFM) is thought to be relevant in achieving sustainable fisheries development.

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 fishery because the cost of management will be shared with other stakeholders.

## 2. Fisheries Industry's contribution

The fisheries industry 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 fisheries industry in Malaysia has bright potential in view of the availability of natural resources. In line with the national Vision 2020, the fisheries industry will be developed into a modern, efficient and highly commercial industry on a sustainable basis. Hence, the development and management objective of the fishery 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 framework 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 fishery 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. In Malaysia, as in other countries, central government management of the fisheries industry is seen as the means to achieve socially desirable results. However, 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 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. The possibility of improving the effectiveness of monitoring and enforcement activities by increasing personnel is also 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 parameters as well as the socio-economic 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, minimal enforcement activity is required to manage this fishery. 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 with these 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 the 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, 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:

- <sup>1</sup> Definite location or area;
- <sup>1</sup> Type and number of stakeholders; and
- <sup>1</sup> 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 people 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, hence promote sustainable collective action 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 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 fishery 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.

(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 will try to maximize private benefits and 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 the CBFM among stakeholders and to explain their individual roles in the implementation of the 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. During the process of implementation, the government will have to monitor and supervise activities closely from the standpoint of national interest. 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 fishery 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.

## 9. Acknowledgements

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***Country Paper: Indonesia***

**14. COMMUNITY-BASED FISHERIES MANAGEMENT  
IN EASTERN INDONESIA**

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**Background**

Community-Based Fisheries Management (CBFM) may be viewed as a process by which fishers are given the opportunity and responsibility to manage their own resources; define their needs, goals, and aspirations, and take decisions affecting their well-being. CBFM strives for more active fishers' participation in the planning and implementation of fisheries management. (Pomeroy, 1994). The potential advantages of CBFM include effectiveness and equity.

CBFM can be more economical from the standpoint of administration and enforcement than a national centralized system. CBFM involves self-management: the community takes over responsibility for monitoring and enforcement. CBFM gives the community a feeling of ownership over the resource, which makes the community far more responsible for long-term sustainability of resources. Hence, community participation and fisheries management are central to CBFM.

Fisheries management is now the focus of much attention, because it is realized that fisheries resources are over-exploited and that demand from a growing population is on the rise. Fisheries management has various objectives (Panayotou, 1982). In Indonesia, the objectives are to increase fish production and consumption, obtain a positive trade balance, and increase the incomes of fishers. Management of fisheries resources includes conservation of the coastal environment and implementation of fishing strategies that will guarantee long-term utilization of fisheries resources. Thus, the aim of management is rational use of fisheries resources.

The overall responsibility for fisheries resource management in Indonesia is under the central government. The Outline of State Policy (GBHN) says that marine resources are managed and utilized by considering environmental functions and sustainability, so that the resources benefit all citizens and increase their well-being. It is also said that people's awareness of the importance of the natural environment needs to be cultivated through extension, formal and informal education, reward and punishment systems, and promoting people's participation to conserve natural resources in all social and economic activities.

The Directorate-General of Fisheries (DGF) of the Ministry of Agriculture (MOA) is the coordinating institution for management of fisheries resources. In the provincial and regencial levels, the task of fisheries resources management is partly executed by the Provincial Fisheries Service (PFS) and the Regencial Fisheries Service (RFS) respectively. But licensing is done by the DGF for all large vessels (more than 30 GT), even if they are based in a province. The task of PFS and RFS mostly concerns small-scale or artisanal fisheries. So the management of deep-sea and EEZ fisheries is looked after by the DGF, while the management of inshore waters and coastal fisheries is mostly the concern of PFS and RFS. Management in this case refers only to control on the issue of fishing licenses.

The need for people's participation in natural resource management as an aspect of the development process is also clearly stated in the GBHN. The closing chapter of the GBHN points out that national

development greatly depends on the active participation, commitment and enthusiasm of all society. Participation of the societies may be individual or collective. Fishers, as citizens who directly rely on the marine environment **and** resources for their living, should therefore participate in fisheries resource management as entrusted by the GBHN.

This study is about the participation of fishers or coastal residents in marine fisheries resource management. The area of coverage is the eastern part of Indonesia, since this region is dominated by islands. Many coastal communities rely on fishing activities.

### **Purposes**

The purposes of this study are manifold:

- 1) To identify studies of CBFM already undertaken that could help further fisheries management.
- 2) To inventory reports, papers, student theses, and journal articles of CBFM studies which are unpublished or published locally but have a limited circulation.
- 3) To evaluate impacts of CBFM to society based on available information.
- 4) To synthesize the main ideas of the articles to arrive at policy and research recommendations.

### **Types of CBFM by area**

The eastern part of Indonesia consists of nine provinces: Irian Jaya, Maluku, North Sulawesi, Central Sulawesi, South Sulawesi, East Timor, East Nusa Tenggara, and West Nusa Tenggara. This paper, however, is confined to the provinces of Irian Jaya, Maluku, North Sulawesi, South Sulawesi, and East Nusa Tenggara since information is available only about these five provinces. It does not necessarily mean that the other provinces do not practise CBFM. Table I summarizes the type of CBFM by province.

CBFM practices concerning a particular area are found in Maluku, Irian Jaya, North Sulawesi and East Nusa Tenggara (Nikijuluw, 1995<sup>a</sup>; Imron, et al 1993; Patji, 1996; Saad, 1994). The area is managed by village (Irian Jaya, Maluku), by clan (Irian Jaya), by tribe (East Nusa Tenggara) and by community (North Sulawesi). Management means that people have access rights to the area, extract benefits from it, protect the area and resource from other users, control future use through covenant, and transfer ownership.

Closing and opening of fishing or harvesting seasons is found to be part of CBFM rules in Maluku and North Sulawesi (Nikijuluw, 1995; Kissya, 1993; Wahyono et al. 1993). Other CBFM rules which exist in all areas relate to what types of fishing gears are allowed, the method of fishing, the schedule for using certain kinds of fishing gear, fishing targets, total amount of allowable catch, and origin of fishers. In addition to rules on capture of resources, CBFM also contains rules on violation, penalty (punishment) and reward. Distribution of the catch or harvest is also a part of CBFM rules.

Specific area closure at particular times is a rule observed in Demta District, Jayapura, Irian Jaya. This CBFM is designed to protect coral fish which can be caught only on special occasions such as church ceremonies and cultural festivals (Imron, et al 1993). The catching of tude fish (*Selar umenothalmus*) in Sangihe Talaud, North Sulawesi, is scheduled on every Monday, Wednesday and Saturday. Tude fish fishing grounds can be beyond CBFM area boundaries. In this case, fish found outside CBFM areas are driven into the CBFM area or close to the beach, where they are easily captured (Wahyono, et al. 1994).

**Table 1. CBFM Types by Five Provinces in Eastern Indonesia**

| PROVINCE              | REGENCY  | CBFM   | DOCUMENTS  |
|-----------------------|--|--|--|
| Irian Jaya            | Biak-Numfor<br>Jayapura  | CBFM managed by village<br>CBFM managed by clan<br>Closed Gshing season<br>Co-management to issue fishing licenses                         | Nikijuluw, 1995<br>Imron and Ali. 1994<br>Imron. et al. 1993                           |
| Maluku                | Central,<br>North<br>Southcast<br>Maluku and<br>Ambon<br>Municipality                | CBFM managed by village.<br>Co-management to legalize local rules  | Nikijuluw. 1994. 1995<br>Lokollo. 1988<br>Kissya. 1993<br>Rahail. 1993<br>Letelay 1993 |
| North<br>Sulawesi     | Sangihe<br>Talaud  | CBFM managed by village community.<br>Rules in catching "tude fish".<br>Fishing schedule hy type of gears.                                 | Wahyono. et al. 1993<br>Wahyono et al.. 1994   |
| South<br>Sulawesi     | Bulukumba<br>Sinjai. Polmas<br>Pangkep,<br>Mamuju<br>Jeneponto,<br>Maros,<br>Selayar | Management of waters around rumpon<br>Co-management between NGO and<br>villagers.<br>Consultations of fishers with traditional<br>leaders. | Sand. 1994<br>Dja ali. 1996<br>Laude. 1996   |
| East Nusa<br>Tenggara | Alor   | CBFM managed by tribe  | Patji, 1996<br>PMB-LIPI, 1995  |

Collaborative fisheries management (co-management) between government and fisheries or villages was found in Maluku and Jayapura. In Latuhalat village of Ambon Municipality, the Ambon Mayor stipulated (through decree No Kep. 188.45.1322/KMA dated 23 April 1990) that he would protect the village-based rules. These rules relate to fishing permits and licenses in village territorial waters and are set out in writing. The boundaries of village territorial waters were stipulated on the Village Decree No. 3/1 990 (Masyuri, 1995).

In Jayapura, Irian Jaya, fishing licenses are issued to big enterprises by the Provincial or District Fisheries Service only after permission is obtained from the local community. Those who want fishing permits first go to community leaders (*Ondoafi* and *Dewan Adat*) to ask for a license. If these leaders agree, the enterprises concerned may seek a formal license from the Fisheries Service (Imron, et al 1993; Imron and Ali, 1994). In other words, the Fisheries Services does not issue a fishing license without a recommendation from the local community.

Collaboration between Non-Governmental Organizations (NGOs) and local fishers exists in several districts on the mainland of South Sulawesi. An NGO named institute for Maritime Assessment and Development (BPPK) has set up programs of fisheries management. The programs include improving

fisher awareness of marine environment conservation through ecologically friendly activities such as marine aquaculture (Dja'ali, 1996). Another NGO, the Center for Rural, Coastal and Society Studies (LP3M), works with local residents of Taka Bone Rata Atolls in Selayar Island of South Sulawesi. The main program of LP3M is to spread information on the importance and status of marine parks, introduce endangered and protected species to the people, and make written and unwritten reports to the police if they find illegal and destructive practices (Laude, 1996).

### **CBFM Organization**

Organization of CBFM in eastern Indonesia is basically vested in traditional authority, whose nature varies according to social organization. CBFM bodies that have been set up recently do not depend so much on traditional authority.

Sasi as a type of CBFM existed throughout the province of Maluku. It is organized by traditional secular leaders. *Sasi* may be defined as a family of customary practices and laws (or rules) which establish limits on access to individually or collectively controlled territory or resources. To place sasi on an area means to put into effect a limited prohibition on entry and behavior within that area (Lokollo, 1988).

The head of the village is normally the leader of the sasi organization. In implementing and enforcing sasi rules, he is assisted by *kewang* (traditional rural police) corps whose members represent village clans. Although enforcement of this CBFM is the responsibility of *kewang*, in practice villagers are also involved, as they always report any violations of the system to the *kewang*.

Aside from this village-managed *sasi*, there is also a *sasi* system organized by church during a certain period of the year (Lokollo, 1988). The church-managed *sasi* is led by church leaders. This system does not lend itself to field control and surveillance. Also, it does not have a system of penalties for violations. Nevertheless, implementation of the church-managed *sasi* seems to be very effective (Nikijuluw, 1995<sup>a</sup>).

Organization of CBFM in Irian Jaya, North Sulawesi and East Nusa Tenggara is headed by traditional secular and church leaders. The *Dewan Adat* (customary council) consisting of the head of clan, formal leaders, and church leaders, formulates and implements CBFM rights and rules in Irian Jaya (Imron et al. 1993). In North Sulawesi, the head of the village under the auspices of the village council determines CBFM rules and rights. Implementation of the rules and rights in the field is undertaken by experienced fishers (Wahyono, 1994). In East Nusa Tenggara, CBFM was once headed by the dominant clan. This system has now vanished because of several factors-migrants who did not understand the systems and therefore tended to violate them, land-based economic development on account of which people did not pay much attention to the sea, and lack of support from the village government (Patji, 1996).

Organization of the CBFM in South Sulawesi is headed by NGOs, which initiated the establishment of the CBFM. CBFM here is based on written rules and rights formulated together by NGOs and villagers. Enforcement of rules is undertaken by villagers themselves (Dja'ali, 1996; Laude, 1996). Another CBFM system in South Sulawesi is based on the rights of the owner of *rumpon* (fish aggregating device) to access and control the waters around the *rumpon*. All the villagers and fishers from surrounding places recognize this individual right (Saad, 1994).

### CBFM Rules and Rights

Rules refer to prescriptions agreed on and enforced that require, forbid, or permit specific actions for more than a single individual (Schlager and Ostrom, 1993). Such rules specify fishing gears disallowed at a particular location and time.

The terms “rules” and “rights” are frequently used interchangeably in referring to utilization of fisheries resources. Basically, “rules” refer to the prescriptions that confer authority, while “rights” refer to particular actions that are authorized. “Rights” go with complementary duties. Thus, to possess a right implies that someone else has a commensurate duty to observe this right (Schlager and Ostrom, 1993). As regards fisheries resources, the most relevant operational-level property rights in utilizing coastal fisheries resources are “access” and “withdrawal” rights. They are defined as:

“Access”: The right to enter a defined physical property.

“Withdrawal”: The right to obtain the “products” of a resource (e.g. catch fish)

The collective-choice property rights include management, exclusion and alienation rights which are defined as follows:

“Management”: The right to regulate internal use patterns and transform the resource by making improvements.

“Exclusion”: The right to determine who will have an access right and how that right may be transferred.

“Alienation” The right to sell or lease either “management” or “exclusion rights” or both of them.

#### (i) CBFM Rights and Rules in Irian Jaya

In Teblasufa village, Jayapura, marine waters are divided from the standpoint of ownership into waters belonging to the village and free waters that are owned by everybody. The waters owned by the village are broken down into waters owned by clans. There are three clans in the village. Initially, the Serontouw clan was the only owner of the village territorial waters. The ownership rights of this clan were later shared with the other clans due to inter-clan marriage. Ownership of each clan is further subdivided into sub-clans. Currently, there are 10 sub-clans that own village territorial waters (Imron and Ali, 1994).

The people of Teblasufa have access and withdrawal rights but not collective-choice property rights. The management, exclusion and alienation rights are owned by the head of the clan (*ondoafi*). *Ondoafi* is the one that permits a particular fisher to fish even if the latter is not a member of clan or sub clan whose territorial waters are entered. The head of the village also has the right to issue permits to non-villagers to operate their fishing gears in village territorial waters. However, in such circumstances, the head of the village should consult with the three *ondoafi* in this village. The *ondoafi* can veto a decision of the village head.

Besides issuing fishing permits, the *ondoafi* also has the right to determine certain coral reef areas which should be closed for fishing at a particular period (Imron and Ali, 1994). This kind of CBFM is named *pele karang* (to put a fence over a coral reef area). The objective of this CBFM is to let fish grow

until they reach capture size. The rule related to this CBFM is that villagers are not allowed to enter this area during the closed season. The time of fishing is always connected with the need to finance a village program such as inauguration of the church, building public property, or celebrating a village festival. Hence, it can be said that villagers individually do not have a withdrawal right in this coral reef area.

Similar to Teblasufa village, the territorial waters of Endokisi Village, Jayapura, are also owned by clans. "Demena" is the biggest clan in terms of the clan territorial waters. It is the first clan that decided to stay by the sea and hence relied on the sea resources for its livelihood. The Demena clan was recognized as the first owner of the village territorial waters. Through intermarriage with other clans, however, the ownership of the village territorial waters is then shared by three other clans — "Mattiseray", "Nerokepoaw", and "Kereway". Therefore, the territorial waters of Endokisi village are currently owned by four clans (Imron, et al. 1993).

Each clan may catch fish in its own territorial waters. However, members of a particular clan may also catch fish in other clan-owned areas provided they use simple fishing gears such as hook, line and spear. Use of more modern fishing gears for commercial purposes is possible only through a permit from the *Dewan Adat*, a village council consisting of formal leaders, church leaders and heads of clans (ondoafi). In practice, the council should have first sought permission from members of the clan whose area it entered. Therefore, it can be said that clan members exercise the right of exclusion.

In implementing access and withdrawal rights, the villagers of Endokisi formulated rules concerning penalties for violators. The penalties currently applied include fine and warnings. Use of poison in fishing is strictly prohibited. Therefore, of the three collective-choice property rights, only the right of management is executed by villagers. The rights of exclusion and management are owned by *Ondobafi* and *Dewan Adat*.

## (ii) CBFM Rights and Rules in Maluku

In coastal villages of Maluku, communities claim that they have access and withdrawal rights over the waters facing their village (*petuanang*). The system of local management of *petuanang* and the resource therein is called *sasi*. Villagers and their leaders together set the *sasi* rules. Basically, these rules have existed for decades. What exists now are modifications of rules made during the pre-colonial era. For instance, the amount of fines for certain violations was adjusted to present value. The rules include how, when, and where to harvest or collect the resources. In addition, there are also penalty systems for breaking the rules (Nirahua, et al, 1991; Kissya, 1993; Lokollo, 1988).

Under the *sasi* system, most communities entertain both operational level property rights (rights of access and withdrawal) and collective-choice property rights (rights of management, exclusion, and alienation). The right of management is embodied in forms of common consent on the fishing time, the area opened to fishing, allowed and disallowed fishing gears and equipment, and allowable catch. There are also rules on environmental protection such as bans on coral head-taking. Execution of management rights is undertaken by village police named *kewang* whose members normally are representatives of each clan. *Kewang* has its own rules and organization (Lokollo, 1988). This institution may not be a part of the formal village government structure, but is controlled by villagers and customary leaders. The village head is usually appointed or chosen from informal leaders.

The right of exclusion is entertained while deciding on permits to non-villagers to enter *petuanang*. In some villages, outsiders may fish in *petuanang* or enter the *sasi* area without a permit if they fish for

home consumption and use the same fishing gears that villagers use. But the outsiders need a permit if they catch fish using commercial fishing gears. During the last 10 years, outsiders with permits to enter and fish in *petuanang* or *sasi* areas came from other provinces of Indonesia, especially from East Java and South Sulawesi (Nikijuluw, 1995<sup>a</sup>.)

Decisions on issuing fishing permits to outsiders are made at community meetings. But nowadays, decisions on fishing rights have been taken over by the formal village government. It passes formal village rules on the subject. In other words, community consultation is left out (Nikijuluw, 1995<sup>a</sup>, 1995<sup>b</sup>)

There is also a tendency to transfer collective-choice property rights from villagers and village government to church organizations -especially in Christian villages. In this case, the church, through its pastors, elders, and deacons, is the body that stipulates rules for harvesting or exploiting resources. In this church-organized *sasi*, there is no *kewang* patrol. Nevertheless, this *sasi* system seems to be very efficient since there are no violations. A percentage of the harvests or fish landings of villagers must be given to the church organization. Normally, the money is used for church construction and renovation (Lokollo, 1988; Nikijuluw, 1995<sup>a</sup>)

### (iii) CBFM Rights and Rules in North Sulawesi

Bebalang village is located at Manganitu, Sangihe Talaud. Residents of this village have access to certain fishing grounds near their place to catch *malalugis* fish. The rule for capture of *malalugis* fish is that fishers should use bamboo traps, locally named *seke*. The *seke* is owned collectively by villagers. In 1991, there were two units of the *seke* in Bebalang. The first *seke* is owned by those staying in the first two hamlets. The second *seke* is owned by those in hamlet number three. Aside from the *seke*, other small-scale fishing gears such as hook and line were also employed by villagers, but not for catching *malalugis* fish. (Adhuri, 1993; Wahyono, et al, 1991).

The people of Bebalang manage waters where *malalugis* fish are found by carrying out regular monitoring and surveillance. Outsiders found in these waters are driven away. If the outsiders are found to have caught many fish, they are detained and tried. The villagers have exclusion and alienation rights. By common consent, they lay down rules that permit outsiders to fish. To obtain the right to fish, outsiders should pay a fee and restrict themselves to simple fishing gears.

The use of *seke* to catch *malalugis* fish is also practised in Para Village, Sangihe Talaud. In this village, however, the *seke* competes with small purse seines to catch the same species. In 1992, there were six units of *seke* and 42 small purse seines in Para village. *Seke* is owned communally, while the small purse seines are owned by individual fishers. Since *seke* and small purse seines target the same fish, the location and time for operating these two fishing gears are regulated by the head of the village. Fishing grounds for the gears are set apart. The schedule for fishing is rotated and arranged so that every fisher has a chance to operate his gear in different fishing grounds. The head of the village has ruled that only four *seke* can be operated per day. Therefore, each *seke* can be operated four times a week or about 16 times a month. Eighteen fishing grounds have been designated for use by small purse seines, and there are 18 purse seines that can be operated every day. Since Sunday is an off day, every small purse seine can be operated an average of 10 times a month. This fishing schedule is very efficient and there is almost no trespassing. The village government levies penalties for violating rules. Each violator is fined 5-10 bags of cement, these are used for public infrastructure construction in the village. On the basis of this information, one may infer that although fishers have access and withdrawal rights, they do not have resource management rights (Wahyono, et al. 1993).

#### (iv) CBFM Rights and Rules in South Sulawesi.

In Bulukumba, South Sulawesi, CBFM is practised for exploiting fish resources in *rumpon*. Fishing rights around waters where *rumpon* is placed, belong to the owner of the *rumpon* (*parrompong*). The area covered by each *rumpon* is about 10,000 sq. meters. The fishing gear used by *parrompong* is a small purse-seine. Other fishers are allowed to fish in *rumpon* so long as they use hook and line. The right to use the waters around *rumpon* can be bequeathed, although the *rumpon* itself has been destroyed. In this case, fishers should know the location of the *rumpon*. If other fishers want to install another *rumpon* or use the existing one, they should ask for permits (without any payment) from the previous owner (Saad, 1994). Deployment of a new *rumpon* by a new owner automatically undermines the rights owned by the previous *rumpon* owner. Hence, the deployment of *rumpon* gives the owner rights of access and withdrawal.

Collaborations between NGOs and local communities in some districts of South Sulawesi have made areas for mariculture activities accessible. At the same time, fishing activities which normally employ destructive methods have ceased. The individual fisher's right to fish has been replaced by the right to use a particular area for marine fish cultivation. Together with NGOs, villagers developed a patrol system for control of marine resources and environment from destruction by outsiders. This situation has occurred because of the increasing awareness of villagers about the importance of marine resources and environment to sustain their life (Dja'ali, 1996; Laude, 1996).

#### (V) CBFM Rights and Rules in East Nusa Tenggara

In Alor Kecil, East Nusa Tenggara, people historically recognized that the waters facing their village were owned by the tribe of Manglolong. This is because the first fisher in Alor Kecil was from this tribe. Currently, however, fishers are from eight native tribes in this area. Besides, there are also fishers who come from other surrounding islands. For the success of the fishing operation, there was a rule that before fishing the fishers should consult the head of the Manglolong tribe. This tribal head was the one who decided where and when to fish. But at present, everybody can fish without seeking permission from the tribal head. Transfer and sharing of fishing rights from the Manglolong tribe to other tribes happened unconsciously. Nobody knows when all residents began to share the rights (Patji, 1996; PMB-LIPI, 1995).

#### *Factors determining establishment, existence and devolution of CBFM*

The following factors that affect the establishment, existence and devolution of CBFM have been identified:

##### (a) Belief

CBFM on *malulugis* fish in Bebalang village in North Sulawesi is still on, because villagers believe that the fish is the playmate of the Prince of the Sea (Prince of Adang). The fish should be captured carefully, so that its environment will not be destroyed. Villagers of Bebalang, therefore, use bamboo traps (*seke*) to catch the fish. As *seke* is a passive gear, the environment apparently will not be destroyed (Adhuri, 1993; Wahyono et al. 1991).



**(b) Availability of Regulations**

Regulations (written or unwritten) affect CBFM. Regulations do not allow outsiders to join the fishery (Nikijuluw, 1994, 1995; Imron, et al. 1993). Rules about fishing season and fishing area specify that fishers should fish at a particular time and place (Wahyono et al. 1993, 1994, Nikijuluw, 1994, Nirahua et al. 1991). In Irian Jaya, Maluku, South and North Sulawesi, only permitted outsiders can join the fishery. In Maluku, outsiders should buy a fishing license or pay the village a penalty depending on how much fish they have caught. (Norah et al 1991, Nikijuluw, 1995). A rule on allowable catch was found in Ternate, North Maluku. The amount of catch was determined before fishers went to sea. If the catch was more than that allowed, the fishers were penalized for the excess catch. The penalties, however, were not specified. (Nirahua, 1991). Monitoring, controlling, and surveillance (MCS) guarantee proper implementation of the rules.

Community MCS was found in Maluku, Irian Jaya, and North Sulawesi. The practice of penalties imposed on rule violations by custom and local judicial systems could be included as factors that affect the existence and continuity of CBFM.

**(c) Fishing Gears**

Generally, villagers in Maluku still use simple fishing gear to catch fish in CBFM-managed waters. These gears cannot harm resources and their environment. If outsiders are allowed to fish, they should use the same fishing gears that villagers do (Nikijuluw, 1995; Titahelu, 1996). This condition also prevails in Irian Jaya. If fishers from one clan want to fish in the waters owned by other clans, they must use the same fishing gears (Imron, et al. 1993, 1994). The use of ring net or purse seine made of nylon fibres in North Sulawesi affects the implementation of CBFM in the capture of *malalugis* fish. The presence of ring net, which is in fact more productive and owned by individual fishers, prompted traditional bamboo trap fishers to move away from fishing activity. Fish formerly caught with bamboo traps are currently also being exploited by ring net fishers.

The fishing schedule and zonation offishing ground were finally programmed in order to avoid possible gear use conflict (Adhuri, 1993, Wahyono et al, 1993, 1994).

**(d) Industrial Fisheries and Intensive Fishing Operation**

The expansion of industrial fisheries considerably affected CBFM, especially the sasi system in Ambon and Saparua islands. In Batumerah, a village near to Ambon City, sasi no longer prevails. The use of coconut leaves to indicate the end of the fishing season has disappeared during the past decade (Lokollo, 1988). Batumerah village is now an industrial fishing base in Ambon.

Similarly, the operations of a joint venture fishing company using deep sea FAD in Maluku waters have affected the availability of fish in sasi-managed waters. As a result, the productivity of local fishers declined sharply. Eventually, fishers encroached on susi-managed waters to collect and catch sedentary species. Another impact was that the closed season regulation for some fish in susi-managed waters was shortened, to give villagers an alternative income (Andarmari, et al. 1991; Nikijuluw, 1995).

In Kei Kecil, Southeast Maluku, villagers leased their sea territory to outsiders to be used for pearl culture. Antariksa (1995) reported that the cost of leasing the territory in Debut Village was Rp 10 million for 20 years. In Teblasufa, Irian Jaya, intensive gear operation obscured the boundaries of

waters owned by clans and sub-clans (Imron, 1994). In Alor Kecil, East Nusa Tenggara, Patji (1996) found that industrial fishing companies owned by outsiders which employed villagers as boat crews has caused the local CBFM to disappear.

**(e) Change of Government Structure**

CBFM existed in coastal villages of North Maluku during the era of the Ternate Kingdom. Before going out for fishing, fishers got permission from the king of Ternate. After the proclamation of independence of the Republic of Indonesia, the Ternate Kingdom no longer existed. As a result, CBFM practices vanished in some villages (Lokollo, 1988).

The *sasi* system in Maluku was essentially a village government type of system. According to that system, the head of the village was not a government official. He was a formal leader but at the same time acted as a customary leader. The structure of village government was unique for each village, depending on the number of clans and the population. The village guard (*kewang*) was placed as one of the functional institutions in the village government system. In other words, the structure of the village government system enabled a *sasi* system (Lokollo, 1988). However, since Law No. 5/1974 on the Local Government was passed, all villages in Indonesia, including Maluku, had a standard government structure. By this law, a village head could be an outsider and he is not a customary leader. This caused *sasi* to disappear from some areas.

**(f) Recognition and Initiative of Government**

Recognition of CBFM by government often allowed CBFM to survive. In Latuhalat village in Ambon, local CBFM rules were legitimized by the Ambon Mayor through decision no. Kep. 188.45.32/KMA of 23 April 1980 (Antariksa, et al 1983).

Nikijuluw (1995) says that each *sasi* regulation made by village government in Central Maluku should be legitimized by the Regent before its implementation. In South Sulawesi, a local NGO received strong support from the Indonesian Navy and provincial government to establish CBFM in coastal villages (Dja'ali, 1996).

**(g) Impact of Trade and Prices on CBFM**

In Bantean, North Sulawesi, CBFM was established for the collection of milk fish fry, because outsiders came to Bantean to fish, and the villagers realized that collection of fry was a lucrative enterprise. When the price of milk fish fry was low, the coming of outsiders to Bantean did not worry the villagers. But conflicts erupted between villagers and outsiders once the villagers realized that the fry commanded a good price. Finally, outsiders were banned from entry into the milk fish fry collection ground. Villagers then laid down rules for the use of fry-aggregating devices in fry collection (PMB-LIPI, 1995).

In Saparua island, trade strongly influences CBFM relating to sea cucumber and trochus resources. Increases in the price of sea cucumber and the presence of traders in the village shortened the closed season. Traders came from as far as Java to buy sea cucumber and offered higher prices. Result: over-exploitation of resources, reflected in the smaller sizes of sea cucumber harvested later (Nikijuluw, 1995). The high demand for sea cucumber in Java brought fishers from East Java to seek this commodity in *sasi*-managed areas. In some villages, the right to exploit this commodity was leased to East Java

fishers. Within a very short period, better equipment to harvest sea cucumber resources was introduced. Since the East Java fishers did not own the resource, they were not bothered about environmental and resource sustainability (Nikijuluw, 1995<sup>b</sup>).

#### (h) **Structure of Society**

CBFM was easily established and survived in areas where villagers hailed from similar backgrounds. CBFM existed in many places of Maluku and Irian Jaya, because the social structure of the villages in these two provinces was uniform in terms of origin, religion and economic status. In Alor Kecil, East Nusa Tenggara, where CBFM vanished, the structure of society was dominated by non-native residents (Patji, 1996).

#### **Impact of CBFM**

Almost all literature has dealt with descriptions of CBFM rather than examples. Therefore, not much information could be obtained to analyze the impact of CBFM on society. But some qualitative information could be obtained and utilized.

In some villages of Maluku, CBFM gave villagers an opportunity to exploit fisheries resources for their domestic needs. But in some other villages, the lease of fishing rights to outsiders reduced such opportunities. The lease fee was normally supposed to be used by village government for public purposes. From the individual fisher's viewpoint, however, lease to outsiders meant loss of income, hence negative impact.

People in North Sulawesi perceived positive impact from CBFM implementation. The landings of *seke* were distributed proportionally to all villagers. This could be done because *seke* is collectively owned by villagers. From a sustainability viewpoint, the CBFM on the use of *seke* to catch *malalugis* fish did not harm the fish resource and therefore guaranteed continuity of resource utilization.

Villagers in Irian Jaya used very simple fishing gear to exploit CBFM-managed waters. The impact on villagers was very clear since each clan or sub-clan has its own territorial waters.

In South Sulawesi, the impact of CBFM on the villagers was reflected in higher incomes and lower pressure on the resources. After CBFM was initiated by an NGO, fishermen had one more option: marine aquaculture. Working days went up, so did incomes. Excessive fishing pressure was avoided.

#### **Implications of CBFM**

Literature collected for this review was confined to five provinces of Eastern Indonesia. The area covered in each province was also limited to a few villages or localities. Except for Maluku, information on CBFM for other provinces was difficult to find. There are two possible reasons why little information on CBFM was available. The first is that CBFM was not practised. The second is that although CBFM was practised, no studies or efforts documented the system. Priority should therefore be given to documenting and preparing an inventory of CBFM in all provinces.

The studies reviewed in this report were concerned with describing CBFM. As the first step of research, describing CBFM in each area is indeed very important. But since CBFM is now thought of as a panacea to compensate for failure in fisheries resource management, the impact of CBFM should be clearly

understood. Research should be directed at evaluating the impact of CBFM on stakeholders and society. It is also important to understand sustainability of the resources managed under CBFM.

Comparative studies should be undertaken of CBFM in different areas in order to find out the factors that determine each system. On the basis of this information, the transferability of CBFM could be established into areas where traditionally no CBFM are found, or into areas where CBFM once existed but later vanished.

CBFM is a local management approach. It is unique in the sense that the same system may not be found in other areas. At the national level, therefore, CBFM could be at odds with the national resource management policy. Hence, a nationwide study should be carried out to evaluate the appropriateness of the CBFM approach with the national policy, regulation, law enforcement, and judicial system. Finally, the impact of CBFM on fisheries sector development should also be evaluated, particularly as it relates to macro-economic issues such as investment, trade, and employment.

CBFM could be regarded as a stepping stone for the government to increase people's participation in resource management. Although people's participation in development of all sectors has been cited in the Outline of State Policy (GBHN), in reality people's participation does not fully exist.

Since development in eastern Indonesia is currently being promoted, CBFM in this part of the country may become a basis for people's participation in the overall development program. In other words, from management of resources, local people could broaden their participation to cover areas of economic and community development other than fisheries and coastal zone management.

This study found that CBFM systems may survive and function better if the systems could be tied with government. Local rules would be respected more if they were given formal status. Village-based rules need to be legitimized.

The most enduring and successful CBFM exists in villages whose social and cultural identity is well established. When this identity becomes unclear, for instance due to in-migration, CBFM tended to gradually vanish. On the basis of these findings, the government should be able to control resettlement programs which do not affect the identity of local people. Conversely, resettlement or regional development should enrich the local identity. In a similar manner, fisheries development, through provision of credit schemes or a revolving fund, should not radically change resource use patterns in fisheries.

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*Country Paper: Indonesia*

## 15. FISHING AND RESOURCE MANAGEMENT PARTNERSHIPS UNDERTAKEN BY PT USAHA MINA (PERSERO), INDONESIA

by Soepanto and Victor P.H. Nikijuluw

### 1. Introduction

Pt Usaha Mina Persero is a government-owned company established in 1973, devoted mainly to tuna and skipjack fishing. Its operations include:

- fishing, aquaculture, fish processing and marketing
- dockyard services and workshops for boat and maintenance and repair
- cold storage and ice plants
- marketing of fishing inputs.

Usaha Mina has constantly reoriented its activities during the past 25 years to make the company more economically viable. It has made the following adjustments for better performance :

- Widening fishing grounds and operation bases, from Sorong to other parts of eastern Indonesia.
- Diversifying target fish from tuna and skipjack to high-value pelagic and demersal fish.
- Diversifying products from frozen to semi-processed and processed fish.
- Installing fish-aggregating devices (*rumpon*). The deployment of *rumpon* has become an entry point to involve small-scale fishers in the company's production line. It also creates a new system of **resource** accessibility.

The company's reorientation was a response to the new approach to resource management in Indonesia. Management of fish resources is a major objective of fisheries policy. What's important is not to catch more fish, but to obtain better returns. **There** are many ways of coming up with more returns, but sound resource management seems very important. Proper management of fish resources will ensure sustained and long-term returns.

This paper highlights efforts that have been launched by Usaha Mina, the biggest state-owned enterprise, to develop its business. How these efforts impact on small-scale fishers and on fish resources management is discussed in the paper, after a short account of Usaha Mina's partnerships.

### 2. Partnerships as a core business

The partnership relationship between P T Usaha Mina and small-scale fishers has developed from 1985. It started in Sorong at Irian Jaya, thence spread to other parts of Irian Jaya and covers some fishing bases in Maluku and Sulawesi. This successful partnership has replaced the main activity of Usaha Mina, which focused on fishing by using its own pole and line vessel and crews. The partnership allows Usaha Mina to buy fish from fishers who employ their own vessels and fishing gears.

#### 2.1. Partnership Institute

The partnerships developed by Usaha Mina can be divided into four stages as follows:

1. The organisation of individual fishers into groups of fishers. Individual fishers with technical capability are guided by Usaha Mina. The fishers are encouraged to form a group to benefit from economies of scale and be ready for extension and guidance.
2. The application of a co-operative management approach in developing fisher groups. The fisher groups are helped to understand and apply the principle of co-operative management prior to establishing a fisheries co-operative.
3. The development of fisher groups into a fisher co-operative. By Indonesian law, a fisheries co-operative is more powerful than a fishers group. The co-operative has access to bank credit and other government aid programs.
4. Outstanding members of the co-operative may become private fishers with fishing assets and capital, and get guidance to set up their own fishing companies. These new companies can create a system to involve other small-scale fishers.

Apart from the above system, Usaha Mina also develops partnerships with fishery-related companies, such as those concerned with fish processing and dockyard services. These relationships are established to control fishery inputs. A specific relationship is established with each partner company, depending on its activities. In other words, the relationship is based on possible integration and co-operation.

## 2.2. Types of Partnership

Partnership is a kind of vertical integration to cover a company's forward and backward links. In the case of Usaha Mina, the partnership emphasizes fishing. The types of partnership developed by Usaha Mina are as follows :

### a. Fishing Activity

The partnership between Usaha Mina and its partners is one of mutual benefit. The goal is to promote efficiency, reflected in the increased fish catches that can be procured by Usaha Mina. Partner fishers in turn make better profits, and are more certain about the feasibility and viability of their business.

To achieve benefits for both parties, they must work hand in hand. Usaha Mina bears all the operating costs and risks of the fisher's boats. The prices the company pays to fishers should cover the investment value of the fishing boat and equipment. This model is known as a smallholders nucleus system (PIR system).

To maintain this type of co-operation, all factors determining the success of the fishing operation should be under control, then shared between Usaha Mina and the fishers. These shared responsibilities are identified as success keys of fishing. The success keys for tuna and sipjack fishing are elaborated in Table 1.

### b. Procurement of Boat and Other Input Factors

To facilitate growth and development in joint or collaborative fishing between the company and small-scale fishers, a link must be established with dockyard and shipbuilding companies. This kind of link is demanded also by the dockyard company as it wants to guarantee the marketing flow of its product. A three-party collaboration was established between P T Usaha Mina, fishers and the dockyard company.



**Table 1. The “success keys” (shared responsibilities) for tuna and skipjack fishing under the smallholder nucleus system**

| SUCCESS KEYS            | RESPONSIBILITIES   |   |  |
|-------------------------|--|---|--|
|                         | NUCLEUS FIRM<br>PT USAHA MINA  | COOPERATIVE/<br>GROUP   | PLASMA<br>INDIVIDUAL<br>FISHERS  |
| 1. Boat procurement     | <ul style="list-style-type: none"> <li>Financial</li> <li>Boat technology</li> <li>Collaboration with dockyard firm</li> </ul>   | <ul style="list-style-type: none"> <li>Some financial responsibilities</li> <li>Fisher screening</li> <li>Select receiver for boat credit</li> </ul>          | <ul style="list-style-type: none"> <li>Skills</li> <li>Boat management</li> </ul>  |
| 2. Days of operation    | <ul style="list-style-type: none"> <li>Infrastructure</li> <li>Dock, workshop</li> <li>Technician</li> <li>License</li> <li>Boat supplies</li> <li>Boat insurance</li> </ul> | <ul style="list-style-type: none"> <li>Sailing license</li> <li>Crew supplies</li> <li>Crew insurance</li> </ul>  | <ul style="list-style-type: none"> <li>Readiness of boat and crews</li> <li>Discipline on boat</li> </ul>                          |
| 3. Boat Productivity    | <ul style="list-style-type: none"> <li>Fishing ground</li> <li>Fishing technique</li> <li>Operational guidance</li> <li>Carrier and processing vessels</li> </ul>            | <ul style="list-style-type: none"> <li>Improve crew motivation</li> <li>Maintain crew balance and composition</li> <li>Ensure fishing co-operation</li> </ul> | <ul style="list-style-type: none"> <li>Find out the best fishing ground</li> <li>Communicate for operational management</li> </ul> |
| 4. Production Value     | <ul style="list-style-type: none"> <li>Market research</li> <li>Quality management</li> <li>Unlimited demand</li> <li>Fixed procurement price</li> </ul>                     | <ul style="list-style-type: none"> <li>Determine selling price to the nucleus firm</li> <li>Supply local markets</li> </ul>                                   | <ul style="list-style-type: none"> <li>Proper fish handling</li> <li>Selling all fish to nucleus</li> </ul>                        |
| 5. System establishment | <ul style="list-style-type: none"> <li>Management of the nucleus and plasma</li> <li>Inter-institutional coordination</li> <li>Development of the system</li> </ul>          | <ul style="list-style-type: none"> <li>Apply co-operative management approach to fisher groups</li> <li>Institutional development</li> </ul>                  | <ul style="list-style-type: none"> <li>Apply management concepts</li> <li>Suggest improvement to management</li> </ul>             |

This collaboration will help fishers own more boats and thereby expand their business. It will give Usaha Mina access to more fish and the chance to advise more fishers. Boats provided by the dockyard company are credited to fishers without collateral. Management of fishing activities, marketing of catch as well as fish quality control are the responsibility of Usaha Mina. Fishers pay the dockyard company in instalments for the boats. The amount of instalment depends on the amount of fish landed. Usaha Mina deducts the credit instalment directly from the value of fish landed.

This type of boat procurement is regarded as successful for the following reasons :

1. The moneys paid for the boat by the fisher to the dockyard company depend on the amount of catch, so the risks of catch fluctuation are shared between fishers, Usaha Mina and the dockyard company.

2. The dockyard company's direct involvement in fishing prompted the company to provide boats of good quality.
3. The credit provided by the dockyard company is without collateral and does not follow formal banking procedures. The credit is based merely on the reputation of individual fishers.

c. **Processing and Marketing**

Certain products such as fresh fish (sashimi) and certain other final products (fillet and surimi) have specific market segments. To ensure marketing certainty for these products, and in order to respond to market demand, a collaboration has been established between P T Usaha Mina, including fishers and fish buyers. For the fish buyers, this collaboration guarantees continued fish supply. This arrangement is actually a four-party collaboration that involves Usaha Mina, fish buyer and processor, dockyard company, and fisher plasma.

### **Partnership Realization**

#### **3.1. Institution**

The partnerships established by Usaha Mina are presented in Table 2. Currently, at least 16 fisher groups and co-operatives are involved in the production line at Usaha Mina. The trend so far has been that every year, a new group or co-operative is established. Those who concentrate on fishing are not only individual fishers, groups or co-operatives but also private companies. This shows that Usaha Mina is doing a good job of guiding its partners.

Three of Usaha Mina's partners are active in dockyard services, while four partners are into fish processing and marketing. Usaha Mina's relationship with these seven companies shows that both forward and backward-linked activities are crucial. The partner companies are national and multinational firms, and help Usaha Mina develop national and international marketing channels.

#### **3.2. Business Development**

The development partnerships undertaken by Usaha Mina, reflected in the size of the fleet and the amount of sales and fish landings, are shown in Table 3. The partnership started in 1985. The roles of partners grow significantly in terms of sales, landings and fishing fleets. Once the partnerships were established, the landings of Usaha Mina fleets were about 10 times that of their partners. Only in 1987 did the reverse occur, when the landings of partner fleets were about twice the landings of Usaha Mina's own fleets. In 1996, the role of partners became about seven times higher than the role of the main company. Table 3 shows that sales increased tremendously from about Rp 3 billion in 1985 to more than Rp 46 billion in 1996.

### **4. Business Policies**

Usaha Mina's main objective is to grow by letting its partners grow. In other words, mutual growth is the basis for increasing the future role and performance of Usaha Mina. To arrive at this objective, the following policies are undertaken.

**Table 2. Types of Business Collaboration Undertaken by Usaha Mina.**

| No    | Partners of Usaha Mina                   | Historical Trend                        |
|-------|--|---|
| 1. 1. | Fishers Co-operative, Tumas Jaya. Sorong | Fishers group 1985, Co-operative 1992   |
| 1.2.  | Fishers Co-operative, Tunas Jaya, Bacan  | Fishers group 1987, Co-operative 1993   |
| 1.3.  | Fishers group, Tunas Jaya, Gorontalo     | 1989                                    |
| 1.4.  | Fishers group, Tunas Jaya, Luwuk         | 1990                                    |
| 1.5.  | Fishers group, Tumas Jaya, Fakfak        | 1992                                    |
| 1.6.  | Fishers group, Serenia, Bacan            | 1992                                    |
| 1.7.  | Fishers group Laying, Bacan              | 1993                                    |
| 1.8.  | Fishers group, Ganesko, Bacan            | 1995                                    |
| 1.9.  | Fishers group, Tunas Jaya, Tual          | 1995                                    |
| 1.10. | Fishers group, Mina Bahari, Bacan        | 1996                                    |
| 1.11. | Fishers group, Tunas Jaya. Bone          | 1996                                    |
| 1.12. | Fishers group, Tunas Jaya, Kajang        | 1996                                    |
| 1.13. | CV Lippopuna, Bacan                      | 1995                                    |
| 1.14. | CV. Safari, Bacan                        | 1996                                    |
| 1.15. | PT Ramol, Sorong                         | 1993                                    |
| 1.16. | PT Tirta Khatulistiwa Farming, Sorong    | 1996                                    |
|       | Dockyard Facilities                      |   |
| 2.1.  | PT Karya Teknik Utama, Sorong            | 1991, Supply 30 boats of 40-70 GT       |
| 2.2.  | PT Karya Cipta Buana Sentose, Bacan      | 1996, Supply of 60 FRP boats of 10 CT   |
| 2.3.  | PT Mahkota, Gorontalo                    | 1996, Supply 100 FRP boxes              |
|       | Processing and Marketing                 |   |
| 3.1.  | Aizac Co. Ltd/Mina Maluku Inc, Japan     | 1993, Marketing of block sashimi, Bacan |
| 3.2.  | Trimarine Int Japan                      | 1996, Tuna Processing (loins and CC)    |
| 3.3.  | PT Dharma Samudera, Kendari.             | 1996, Demersal Fish Processing          |
| 3.4.  | CV Ome, Sorong                           | 1995, Arabushi Processing               |

Notes: FRP= Fiber Reinforced Plastic

#### 4.1 Pricing Policy

Pricing policy refers to a mechanism to determine fish prices at the fishers level. Usaha Mina, together with fishers or other partners, determines fish price in a way that it satisfies everybody and meets the following conditions.

- Fisher income is higher than the daily regional minimum wage rate as stipulated by the government. Currently, the rate ranges from Rp 3,000 to Rp 5,000 per day, depending on location.
- Payment for the boat is done in instalments. It is complete when the boat has served two-thirds of its economic life. This means the fisher uses the boat for one-third of its economic life after it has been fully paid up.

**Table 3. Development of Partnerships of PT Usaha Mina**

| Year | Business Development                             |                          |          |                     |                 |                    |                   |
|------|--|--------------------------|----------|---------------------|-----------------|--------------------|-------------------|
|      | Sales of<br>Usaha<br>Mina<br><br>(Rp<br>Million) | Fish<br>Landing<br>(ton) |          | Fleets              |                 |                    |                   |
|      |  |                          |          | U. Mina<br>(>30 GT) | Partners        |                    |                   |
|      |  | U.Mina                   | Partners |                     | Small<br>(<3GT) | Middle<br>(3-30GT) | Large<br>(>30 CT) |
| 1985 | 3269   | 5 239                    | 530      | 29                  | 2               | 5                  | 2                 |
| 1986 | 4 110  | 4 100                    | 1106     | 28                  | 2               | 2                  | 6                 |
| 1987 | 5 972  | 2857                     | 4 108    | 29                  | 39              | 41                 | 9                 |
| 1988 | 11644  | 2495                     | 8276     | 29                  | 158             | 63                 | 9                 |
| 1989 | 13472  | 2297                     | 9717     | 24                  | 275             | 82                 | 14                |
| 1990 | 22069  | 3769                     | 13424    | 43                  | 337             | 74                 | 15                |
| 1991 | 22862  | 6408                     | 11713    | 35                  | 389             | 78                 | 23                |
| 1992 | 24897  | 4053                     | 13424    | 30                  | 261             | 79                 | 23                |
| 1993 | 30375  | 3527                     | 14436    | 27                  | 238             | 81                 | 26                |
| 1994 | 33239  | 2163                     | 11880    | 27                  | 211             | 91                 | 27                |
| 1995 | 37852  | 2702                     | 13005    | 27                  | 214             | 71                 | 30                |
| 1996 | 46 150   | 2 153                    | 15041    | 27                  | 156             | 60                 | 35                |

It is not easy to apply these policies, considering that landing fluctuates highly. To cope with these problems, Usaha Mina adapts five approaches to increase the value of the landings. These approaches are constant innovations in process, product, system of management, resources, and marketing.

#### 4.2 Out-sourcing Policy

Usaha Mina works closely with individual fishers who form a co-operative. These are not artisanal fishers, as they may have the assets to go farther out for fishing than artisanal fishers, and may be knowledgeable in both business and fishery. As they fish in off-shore and EEZ waters, one may as well say that Usaha Mina expands activities to cover off-shore and EEZ fishing.

Expanded business covers a greater variety of products, particularly those with high value added and high international demand. Expansion is done to include forward and backward-linked activities, and similar businesses. To do this, huge capital and resources are required.

Considering that local capital is limited, Usaha Mina seeks to develop partnerships with other firms which could bring in capital. Usaha Mina has developed collaborations with some international companies which help in capital (investment) as well as in processing technology and marketing information. Besides, Usaha Mina has plans to go public by 2000 AD.

#### 4. Co-Management of Resources

Co-management refers to the sharing of responsibilities between Usaha Mina and fishers in managing fisheries resources. It is carried out at the local level and covers the waters in which fishing activities are conducted. More specifically, co-management is applied in waters around *rzmpon* or areas still affected by the existence of *rumpon*.

Before the partnership began, individual fishers fished in all coastal waters, wherever they liked. Some fishers owned gears and others worked as boat crew. The gears and boats owned by many fishers were traditional in nature, being able to catch fish only in limited areas. In these circumstances, the catch was small and volatile because fishing was determined by season and boat capacity. The landings were generally sold locally. Because of limited local demand, fish price was low and consequently did not encourage fishers to produce more.

With the partnerships developed by Usaha Mina, all these shortcomings were overcome. The partnerships brought about a new business environment; Usaha Mina, as the nucleus firm, bought whatever was landed by the small fishers. Result: bigger fisher returns and better earnings. The evaluation done by Usaha Mina and government research institutes showed that fishers' income increased several times, leading to better social and economic conditions (Nikijuluw et al 1994).

The partnership gave fishers a chance to control the fishing ground. The waters around the deployed *rumpon* were meant to be used by fishers who are Usaha Mina's partners. Other fishers, particularly those using large-scale boats and gears, are not allowed to fish in the waters around the *rumpon*. Indeed it is not an easy task to patrol the *rumpon*. However, whenever fishers go out fishing, they can recognize whether those operating their boats in the *rumpon* are their fellows or other fishers. The deployment of the *rzmpon* creates a new approach to resource management which confers rights to access fish resources or leave them alone.

It is Usaha Mina's responsibility to bear all costs related to installation and repair of *rumpon*, while the fishers are expected to use, take care of and patrol the *rumpon*. Fishers get the benefit of efficient fishing operation as fuel cost declines and catch increases. Usaha Mina benefits through greater fish supply from the fishers.

The availability of *rumpon* makes fishers change their fishing strategy. Instead of sailing around to find fishing grounds, fishers direct their boat to the *rumpon*. In other words, the fishing ground is no longer anywhere in the deep blue sea, but at a specific place. Result: many areas where *rumpon* are absent, tend to be free from fishing activities. So while fishing intensity increases in the waters around *rumpon*, fishing effort in some other areas declines.

The placement of *rumpon* indeed affects the availability and sustainability of fish. If *rumpon* are placed in spawning or nursery areas, young and mature fish may be caught. Consequently, recruitment fails and fish stock declines. This is also the result when *rumpon* are placed in paths where fish migrate to spawn. To avoid such happenings, *rumpon* deployed by Usaha Mina are in waters which have no biological

consequences, except fishing itself. The exact location of *rumpon* is determined together with the Directorate General of Fisheries, and is based on scientific information.

## 5. Conclusion

Business collaborations developed by Usaha Mina include fishing activity in the form of a nucleus-plasma relationship supported by dockyard and other input supply companies, processing and marketing firms. This type of collaboration is known as an integrated nucleus-estate small holder relationship.

Partnerships developed by Usaha Mina have gone on for 12 years in various fishing villages of eastern Indonesia. They include a variety of activities with different types of management involvement on the part of Usaha Mina. All these relationships are essentially based on the core business competence of Usaha Mina. Control on “success key” factors applied by Usaha Mina determines the success of fisher activities. This type of relationship can be considered a model in developing co-operation between big and small enterprises.

As the activities of fishers develop, the fisher group should be changed to a fisher co-operative. This kind of institutional development is in line with people’s participation and the idea of government to empower the grassroots. However, to change a fisher group into a co-operative is not that easy, because a co-operative should have more than one type of activity, while a fisher group deals with fishing as the only activity. A fishers co-operative which only deals with fishing as a core business may develop and succeed, provided it extends its business to cover other (forward and backward) related activities.

The deployment of *rumpon* by Usaha Mina to be used by small-scale fishers creates co-management of fish resources. Under this local co-management arrangement, Usaha Mina is responsible for providing and maintaining *rumpon*, while fishers are responsible to utilize, take care of and patrol the *rumpon*. The creation of the *rumpon* helps reduce fishing effort in areas far from *rumpon*. Yet it increases fishing intensity and economic returns both for fishers and Usaha Mina. The creation of the *rumpon* gives fishers better access to resources, they don’t have to fish blindly everywhere. The use of *rumpon* makes fishers refrain from using destructive fishing gears and methods.

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***Country Paper: Philippines***

**16. COMMUNITY-BASED FISHERIES MANAGEMENT IN  
THE PHILIPPINES : AN OVERVIEW**

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*"I am a Filipino – inheritor of a glorious past, hostage to the uncertain future. As such I must prove equal to a twofold task – the task of meeting my responsibility to the past, and the task of performing my obligation to the future.*

*I am sprung from a ~~hardy~~ race. Across the centuries, the memory comes rushing back to me: of brown-skinned men putting out to sea in ships that were as frail as their hearts were stout. Over the sea, I see them come, borne upon the mighty swell of hope – hope in the free abundance of the new land that was to be their home and their children's forever*

*This is the land they sought and found Every inch of shore that their eyes first set upon, every hill and mountain that beckoned to them with a green and purple invitation, every mile of rolling plain that their view encompassed, every river and lake that promised a bountiful living and the fruitfulness of commerce is a hallowed spot to me.*

*By the strength of their hearts and hands, by every right of law, human and divine, this land and all the appurtenances thereof – the black and fertile soil, the seas and lakes and rivers teeming with fish, the forests with their inexhaustible wealth in wildlife and timber, the mountains with their bowels swollen with minerals – the whole of this rich and happy land has been, for centuries without number, the land of my fathers. The land I received in trust from them, and in trust will pass on to my children, and so on until the world is no more" – from I am A Filipino by Carlos P. Romulo*

**Introduction**

The management of fisheries has shifted from the typical catch-and-effort analysis to include other biological and ecological aspects pertaining to the resources and the manner of exploitation by its users. Information related to growth, reproduction, recruitment and predation (causing natural mortality) is now desirable for a complete evaluation of the status of the fishery and the selection of an appropriate management strategy (Sale, 1982; Sainsbury, 1982). The ecological impacts of the fishing activities, both destructive and non-destructive, are now considered just as important in addition to the knowledge of fishing effort in the fishery (e.g., Koslow et al, 1988; Cabanban, in press). The manner of exploitation, specially with destructive and illegal fishing practices, has led to the realization that fisheries management needs the co-operation of the users (Alcala and Vande Vusse, 1994).

The involvement of the community in the conservation of the marine environment and the management of resources began in the 1970s (e.g., Alcala, 1981; Alcala, 1988; Cabanban and White, 1981). Community management of fisheries as a concept is discussed in Feeny (1994), Ostrom (1994), and Rerkes (1994) and the methods to carry it out are outlined in several papers (e.g., Pollnac, 1994; Kurien, 1994; Abdullah and Viswanathan, 1994; McArthur, 1994). This concept has spread throughout the

Philippines since the 1970s and the problems encountered, lessons learned, and successes gained are recorded in Ferrer (1996). The efforts over 1984- 1994 were then reviewed and evaluated by Pomeroy and Carton (1996). This paper draws on these papers and condenses information for this workshop.

### **Problems in Fisheries**

Fisheries production in the Philippines saw declining catch trends in the last decade. With a growing population and rising demand for fishery products, the authorities faced the challenge of sustainable management while increasing production. The government for some time infused capital to expand fisheries ventures in off-shore areas despite the advice of experts that these areas were already overfished. Eventually, the authorities also realized the limitations of managing fisheries in distant areas with limited resources from a central office.

In addition, the problems of coastal fisheries in the Philippines are not only due to overfishing but to a variety of other factors : 1) destruction of critical habitats; 2) sedimentation; 3) over-exploitation; and 4) destructive fishing practices (Gomez, et. al, 1988; ). A pragmatic and integrated approach is therefore needed to address this problem. The concept of community-based resources management (CBRM) was then adopted for nearshore fisheries management (Alcala and Vande Vusse, 1994)

### **Context and Relevant Actors**

#### *Economic and Political Situation*

The Philippines economy recorded strong growth during the 1960s and the 1970s. But the increase in the prices of oil led to an economic slowdown during 1980s. Economic development was also hampered by political instability during the 1980s. In addition, population growth increased by 23 % per year, increasing the demand for fish. Despite a wide range of fishery rules, regulations, and laws, the sustainable management and development of fisheries was ineffective. The catches of fishermen declined.

The government soon realized that fisheries management should be decentralized – a switch from the earlier centralized, top-down, and non-participatory approach to management. Government policies changed from “use orientation” to “resource management” through community-based activities to rehabilitate, conserve, and protect natural resources. Fisheries management then borrowed experiences from the management of water and forest resources.

During the late 1970s, some university experts began to stress the importance of the people in nearshore fisheries management, particularly coral reef fisheries. Dr. Angel C. Alcala of Silliman University, Dumaguete City, Philippines, is credited for this initial step in CBRM at Apo Island, Central Visayas, Philippines (Cabanban and White, 1981). Subsequently, there was a marked increase in community-based efforts in the conservation of marine resources by NGOs throughout the country (Ferrer, 1996).

The government also provided the institutional mandate for CBRM. In 1989, the Aquino government created a Presidential Commission on Anti-illegal Fishing and Marine Conservation or the Bantay Dagat (Sea Watch) Committee. This Commission was tasked to increase coordination of all governmental agencies in the enforcement of fisheries laws and the participation of fishers in management. Furthermore, the Local Government Code was passed in 1991. Under this Code, the management of nearshore fisheries is the now responsibility of municipalities and local fishing communities. Municipalities and Local



Government Units **can** now join forces with NGOs to diversify fishery enterprises, grant fishery privileges in municipal waters, and impose rentals, fees, or charges. Embedded in the 1993- 1998 Medium-Term Philippine Development Plan (MTPDP) is a strategy to implement community-based fishery management for sustainable management of fisheries.

#### *Organizations involved in Fisheries Management*

Two agencies have mandates in the nearshore marine waters. The Bureau of Fisheries and Aquatic Resources (BFAR), under the Department of Agriculture, is responsible for fisheries management in the Philippines. BFAR has regional branches throughout the Philippines. The Department of Natural Resources is responsible for the quality of marine waters and has taken up the task of applying community-based resources management under the Coastal Environment Program.

#### *Non-Governmental Organizations (NGOs) and People's Organizations (POs)*

Many NGOs and POs take part in CBRM in the Philippines (Table 2). The apparent motives of these organizations are to alleviate poverty, improve living conditions, and conserve the resource base.

#### *Involvement in Policy or Decision-making Processes*

The NGOs and POs act as catalysts and technical advisors in the decision-making process. This can be seen in the various strategies that these organizations have employed.

### **Solutions and Approaches to Dealing with the Challenge**

Community-based resources management was implemented in various ways in the Philippines. These include research and publications, resource assessment and monitoring, education and training, community organizations, development of alternative livelihoods, resource management implementation. The sequence of the steps may vary from one site to another but the first step commonly taken is resource assessment and monitoring.

### **Lessons Learned**

The various lessons learned can be classified under design and implementation of CBRM, Programs and Projects and CBRM interventions

#### **A. Considerations in Design and Implementation**

##### *1. Planning and preparation*

A good plan is essential for the three phases of the CBRM because the concept is fairly new and involves people. The project preparation, implementation, and pull-out phases must have clear-cut and appropriate short-term and long-term objectives and goals. These require a good knowledge of the biophysical and social environment; it can be picked up from the community and from experts

##### *2. Involvement of communities*

Community involvement is important for the success of any intervention. It ensures 1) partnership between external agencies and the community; and 2) a sense of responsibility in resource

management (through equitable dialogue and partnerships). Social preparation in the form of education, training, leadership development and formation of management groups is necessary before any technical intervention. Formal groups are necessary to implement interventions, but it will be more effective if the communities have already organized themselves so that organization by external actors is no longer needed. Community participation and feedback are important aspects of community involvement.

3. *Funding*

To ensure the success of CBRM, sufficient, regular, and sustained funding for activities is essential. This is particularly necessary for long-term activities that require external funding before results can be visible (e.g., mariculture ventures).

4. *Government support*

Local government support, particularly to implement regulations, is needed for the success of community-based activities. Further, government support can help resolve inter-agency disputes.

5. *Inter-organization collaboration and co-management*

Since the problem being addressed is multi-faceted, support is needed at many levels : technical support from government, universities and research institutions; funds from international agencies; and NGO support for assistance in education, training, community organisation etc. All these players work closely with the community. This is the essence of co-management

6. *Project monitoring and evaluation*

When CBRM is launched, the progress of interventions and activities must be monitored. During monitoring, some quantitative criteria to gauge progress would be useful. It will also provide a basis for solving problems and facilitate feedback to the community.

7. *Project staffing*

Ideally, the team should be multidisciplinary – with biologists, economists, ecologists, social workers, anthropologists, and agriculturists. The project staff must be equipped not only with technical skills but also with “inter-personal” skills. The technical staff should have experience in fisheries management and resource management as well as an understanding of the activities of the other members of the team.

**B. Design and Implementation of Interventions**

1. *Community organization (CO)*

The success of community organization depends a lot on the expertise, experience, and inter-personal skills of the community organizers. It would help if the CO lives in the community itself so that he acquires an in-depth understanding of the dynamics and aspirations of the community.

Several problems are faced in community organization – ranging from limited leadership and incomplete understanding of goals to poor participation. The strategies to adopt are to allow self-evolution of community groups, assist in forming core groups, or develop groups through continuous dialogue.

2. *Alternative livelihood development and credit*

If the authorities decide to limit fishing effort by closing the fishery temporally or spatially (establishing marine reserves), they must give serious thought to the question of gainful employment of fishermen and their families. Alternative livelihood projects and credit support need to be organized with the community. The pre-requisites are an organized fishers group, knowledge of the socio-economic conditions of fishers, consultation with the community, and training of fishers and household members on income-generating activities.

3. *Education, training, skills, and development*

In community-based management, the level of understanding of the community on conservation and management of resources and other activities has to be increased and constantly sustained. The strategies that can be adopted in this connection are numerous – fishers as trainers; local villagers as agents (para teachers), site visits, technical back-stopping, training of participants, and community education. Through such strategies, information gathered on the resources can be fed back to the community.

4. *Habitat rehabilitation*

Destruction of the habitats that support fisheries may be caused either by thoughtless fishing practices or by other uses of the resource (e.g., clearing of mangrove forests for fish ponds or infrastructure or cutting of branches for firewood). To rehabilitate these areas, a strategy should be developed with the community and carried out with technical support from resource managers or scientists. Benefits from rehabilitation have to be monitored and the results fed back to the communities. The monitoring of the benefits (e.g., increase in numbers of species, individuals of plants and animals), is more beneficial if conducted by the community members with the assistance of a resource manager or scientist.

5. *Technologies for increased fish production*

Another strategy to reduce fishing effort is to engage fisherfolk in mariculture or aquaculture. Implementation of technologies for increased fish production must be done jointly by fishers and experts. The technology to be transferred in the venture should be simple, compatible with and appropriate for the community. The materials used should be local and readily available. It is important to select species that can provide visible short-term benefits from culture activities.

6. *Protected area management/marine sanctuaries*

Another strategy for conservation and management of marine resources is to establish protected areas. These areas are closed to fishing and are sometimes described as marine fisheries reserves or marine sanctuaries. Before encouraging a community to develop a marine protected area, a survey of the resources must be conducted using rapid resource assessment techniques. Plans for resource management and enforcement must be discussed and developed with the community. Parallel to this, there should be a continuous campaign for environmental education. It must involve all sectors of the community.

7. *Other lessons*

Participatory research helps build rapport and trust and develop a knowledge base in the community. This approach can be implemented in assessing and monitoring resources, also in resource management and planning.

## Conclusion

Marine resources are no longer as abundant as they were during our forefathers' time. Management of coastal resources is an urgent need. The partnership between resource managers in government and scientists in universities with resource users is a strategy of smart partnership for nearshore fisheries management in the Philippines. It is hoped that with this partnership, coastal resources recover from over-exploitation, are managed sustainably, and conserved for the future.

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### ***Country Paper: India***

## **17. FISHERIES AND FISHERIES MANAGEMENT IN INDIA**

**by G D Chandrapal**

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***General Trends in the Fishery Sector:*** India is the seventh largest producer of fish in the world and ranks second in the production of inland fish. Fish production has increased at a cumulative growth rate of 4.2% per annum since 1950-51; this represents the fastest growth of any item in the food sector except potatoes, eggs and poultry meat. As a powerful income and employment generator, fisheries stimulates the growth of a number of subsidiary industries. Various production-oriented, input supply and infrastructure development programmes, as well as a number of welfare measures, have been promoted by government. The main objective has been to increase production.

***Background and Problems:*** Past development plans in fisheries aimed mainly at increasing production. Subsequently, the top priorities were improved socio-economic conditions of fishermen/fish farmers, higher productivity, and increased export of fish and marine products. The emphasis on 'production oriented' programmes was replaced by a focus on sustainability in production. This is because exploitation of coastal fishery resources had reached saturation point, leading to growing unemployment and social conflicts in artisanal fisheries. In the absence of resource management measures, rivers, lakes and other impounded waters started losing their fisheries wealth. Further, the construction of numerous dams and bunds altered the ecology of inland waters, obstructing fish migration and depleting aquatic life.

Coastal aquaculture, which was considered an alternative to higher fish production in bridging the gap between demand and supply, faces opposition from environmental activists as well as from some coastal communities. It is in this context that the concept of sustainable development of fisheries and of responsible fishing assumes significance, taking precedence over the goal of augmenting production. There is greater appreciation of the fact that the future of both marine fisheries and aquaculture depends on sound management of production and resource eco-systems.

India's share in the world production of fish has increased from 3.2% in 1981 to about 4.20% in 1992.

***Share of fisheries in the country's economy:*** The share of fisheries in India's gross domestic product (GDP) has increased from 45,580 million rupees during 1990-91 to Rs. 115,540 million during 1995-96. According to quick estimates made by the Department of Statistics, the contribution of the fisheries sector to India's net domestic product at current prices has increased from Rs. 39,440 million in 1990-91 to Rs. 101,500 million in 1995-96 (i.e. from 0.93% to 1.16%). The percentage contribution of fisheries to the agriculture sector (net domestic production) has increased from 3.10% to 3.94% during this period.

***Resources:*** India has a coastline of 8,041 km with a continental shelf area of 0.5 million sq.km. The Exclusive Economic Zone gives India jurisdiction over an area of 2.01 million sq.km. The estimated marine fisheries potential is 3.9 million tonnes. The resource position in aquaculture is as stated below:

(Million ha).

|    |  |       |
|----|--|-------|
| 1. | Area under tanks and ponds                   | 2.855 |
| 2. | Area under reservoirs                        | 2.050 |
| 3. | Beels, oxbow lakes and derelict water bodies | 0.788 |
| 4. | Area under brackishwater                     | 1.422 |

The resource potential in inland waters is estimated to be 4.5 million tonnes. At present only 1.481 million ha are under freshwater aquaculture and 0.121 million ha under brackishwater aquaculture (1995).

*Fishing Population:* The total fishing population in the country is about 9 million according to 1994 estimates. The break-up of employment in the fisheries sector is as follows:

|  | 1994<br>(in millions) | 1991<br>(in millions) |
|--|-----------------------|-----------------------|
| 1. No of full- time fishermen<br>(primary) | 2.39                  | 1.87                  |
| 2. No of part-time fishermen               | 1.44                  | 1.33                  |
| 3. No of occasional fishermen              | 2.12                  | 2.42                  |
|  | <hr/> 5.95 <hr/>      | <hr/> 5.62 <hr/>      |

### **Fishing Craft**

According to the information received from States and Union Territories, the number of traditional fishing craft in the country as on 1994-95 was 19 million.

There are 0.32 million motorised traditional craft and about 0.47 million mechanised boats of varying sizes. The deep sea fishing fleet (i.e vessels is above 20 m OAL and above) is estimated to be around 120.

### **Sustainability in Fisheries**

Sustainable development is a multi-faceted concept with biological, human and technological dimensions. The rate at which fish resources are harvested should be in harmony with the rate at which they multiply. From the human standpoint, it means that principles of equity and basic needs get a high priority. Technologically it implies using means that 'augment' rather than 'displace' human skills, and utilise renewable energy resources and methods that are environmentally appropriate and less destructive. From the organizational and employment standpoints, it is a policy of increased people's participation and decentralization of investment and planning.

### **Fish Production**

Fish production increased from 2.80 million tonnes during 1984-85 to 5.22 million tonnes (2.87 million marine and 2.35 million inland) during 1996-97, registering an annual growth rate of 5.4 per cent by the traditional sector and 65% by the mechanised sector, the balance being by the deep sea sector.

### **Traditional System of Community-Based Management of Fisheries**

The concept of community-based (people-centred) eco-system resource management in fisheries offers exciting possibilities. The resource users are also the resource managers, and management responsibilities and authority are shared with fisherfolk. This authority is normally vested with the Government, notwithstanding old customs and traditional systems of resource management by fisherfolk, which have been in vogue in different areas at different levels—although a clear picture of management systems is not available.

Small-scale fishing communities in East Godavari and Srikakulam districts of Northern Andhra Pradesh practised management by fixing territories for estuarine fishing. Estuarine and riverine fishing are controlled by hereditary village headmen with a village council to decide on the fishing rights to each family. The nature of the rights varies; in some villages, these rights are hereditary, in some others they are not. Every shareholder exercises his right within the defined tracts of rivers and estuaries. There is, however, no system to ensure equity among villagers. The practice of defining fishing rights with stake nets is reported in the Gangetic delta of West Bengal.

Community-based fisheries management was in vogue in Kerala state, where communities enjoyed extension access to inshore waters. The free entry of capital and outsiders into traditional fishing communities was prevented by such social barriers as caste and the requirement of specific fishing skills. Similarly, lagoon fisheries for prawn and mullet in Tamil Nadu are regulated by community-based traditional management systems based on caste and gender. Among the marine beach seine fishermen of Tamil Nadu and the lagoon fishermen of Pulicat lake, a traditional system of rotating access to a fishery is practised — whereby eligible fishing groups take turns at fishing activities on allotted fishing grounds, with varying fishing rights between different gears.

### **Drawback of the System**

This system, however, gave way to another because demographic pressure led to division of fishing grounds, more crew and higher fishing intensity. Village councils could not contemplate any control or conservation measures to prevent overfishing. Further pressure on the system was caused by the subsequent intrusion of outsiders. Consequent to the growth of the shrimp export market, what was once the exclusive preserve of traditional fishing communities who viewed the sea as their community asset, changed to a virtually open-access resource to any one who could afford to make the necessary investments in craft and gear. These traditional community-based management measures could have succeeded had there been strict regulations with a scientific basis.

### **Present Management Measures for Sustainability in Fisheries**

The policy of sustainable development and environment protection has assumed greater significance as the level of awareness rapidly grows and spreads. Target groups participate, though not directly, in national formulation of policies, laws and programmes relating to resource management. Representatives of fishermen groups are invariably included in various committees and national bodies like the Central Board of Fisheries etc. This involvement led to some of the management measures that have been adopted in recent times in the marine, inland aquaculture and coastal aquaculture sectors.



## **Marine Sector**

In the marine sector, the Government encouraged mechanisation of fishing craft in order to assist traditional fishermen to obtain better returns on their harvest by extending their area of operation. This programme caught on rapidly with the location of prawn grounds and the heavy overseas demand for prawns. The introduction of mechanised boats hit the traditional fishing sector, and also lowered the CPUE. Mechanised boats then started operating close to the shore, and conflicts frequently erupted between these groups.

### **Regulations for Demarcation of Operational Areas for Different Users**

Regulation of coastal fishing activities was stepped up during the late '70s. The Marine Fishing Regulation Act was enacted during this time. It empowers the State Government to regulate crafts and gears in territorial waters in order to conserve fish resources, protect traditional fishermen and bring about law and order. Marine fisheries development was uneven. A state like Gujarat, which can take some more mechanised boats, did not introduce any legislation. In other States, the area reserved for operation of traditional craft varies from 5 to 10 kms. Mechanised fishing vessels operate beyond these areas. Fishing by deep sea fishing vessels within the territorial waters is prohibited. But implementation of these regulations was poor, so they did not accomplish what they tried to do. The Centre assisted the states to procure patrol boats to effectively implement the Marine Fishing Regulation Acts and maintain law and order in the territorial waters.

### **Artificial Reefs**

The idea of artificial reefs was also taken up, so that communities could look after fishing areas themselves. The artificial reefs were expected to serve as a fisheries management tool rather than as a fishing gear. Artificial fish habitats were created by adopting suitable mariculture technologies. These were introduced through a centrally sponsored scheme to help increase catches, enhance fisherfolk incomes and rehabilitate environmentally degraded coastal areas. This programme was based on traditional knowledge and practices, since fishermen had for generations dumped rocks deep into the sea to serve as reefs. This traditional practice, in combination with the experience of hook and line fishermen who increased catches by fishing over sunken structures, provided the impetus for an artificial reef programme. The States have been asked to use their Marine Fishing Regulation Act and issue licences or permits for Artificial Reefs and Sea Farming programmes. These are to be implemented in close consultation with the local users' groups.

### **Closed Seasons and Trawling Bans during the Monsoon**

The problem of indiscriminate bottom trawling was studied in detail. The Government of Kerala introduced a total ban on mechanised fishing during the monsoon in the interest of conservation of resources of bottom living fishes. This was also followed by a ban on deep sea fishing off Kerala coast during the monsoon season. The ban was also adopted by the States of Maharashtra and Goa.

A review of the ban order, in areas where commercial species do not breed during the monsoon, is being considered. The ban is an earnest of the intention of Coastal State Governments to safeguard and conserve their resources for sustainable development. There is little need for more policies and strategies to ensure successful management of coastal fisheries. What is required is effective implementation of

available fisheries management policies, strategies, approaches and methods. Awareness and education on the part of resource users is also needed.

### **Inland Aquaculture**

Traditional fishermen still enjoy fishing rights in river and natural water bodies but these resources suffer from indiscriminate reclamation, siltation etc. Natural waterways have been affected and their ecology altered due to construction of dams that affect fish migration. Pollution of rivers and backwaters caused by incessant discharge of untreated industrial effluents is another hazard, coupled with the large-scale application of pesticides and chemicals.

These hardships apart, traditional capture fishermen are systematically losing their traditional access and use rights over water bodies as their community property. With the growing interests in aquaculture, there is an increasing tendency to privatise water bodies, especially the most productive areas. Traditional fishermen feel they are being alienated from their occupation.

### **Management through Fishermen Co-operatives**

Formation of fishermen co-operative societies and the exclusive fishing rights bestowed on these co-operatives over certain reservoirs, lakes and other public water bodies in some States, have helped protect the interests of traditional fishermen to a large degree. But these water bodies are governed by Government rules and regulations rather than by community-based management systems. The Fish Farmer Development Agencies set up throughout the country have helped in improving inland fish production and productivity through technical and extension support as well as by arranging credit. Groups of fishermen have been selected under this programme as beneficiaries. This may in due course lead to a broad-based management system in panchayat water bodies as well.

### **Auction of Water Bodies**

When water areas under the state and central governments and public sector undertakings are auctioned, instead of being leased out to the poor, they only help middlemen. At present, this policy differs from state to state and is largely guided by elected representatives. A uniform policy in favour of fishery co-operatives for leasing out all water areas on a long-term basis and on nominal lease, would help the co-operatives in proper development of these water bodies. It would also provide the members with the necessary means of livelihood, the long-term objective being sustainable development through community-based management.

At present, no guidelines for regulating freshwater aquaculture are in force, but the government is considering such guidelines. Some possible measures: identifying parameters that have a direct bearing on fish health, optimizing nutrient input and other management practices.

### **Coastal Aquaculture Management**

Fishermen have been pursuing extensive traditional culture of prawns and fish in many brackishwater areas for a long time. With the decline of prawn landings in the marine sector, brackishwater prawn farming has now become all-important. It was once a community-based activity undertaken in a traditional way in estuaries, backwaters and brackishwater lands. But big entrepreneurs with heavy commercial-

scale investments gradually invaded the field. Coastal aquaculture can pose a number of social, ecological and economic problems through its fast growth. The unregulated growth of this sector can degrade the environment and threaten long-term sustainability, leading to disease outbreak.

Social issues in coastal aquaculture relate to indiscriminate conversion of agricultural land, acquisition of land from small marginal agricultural farmers, loss of employment, encircling of coastal villages by shrimp farms, loss of access to fishing areas, flooding by obstruction of natural drains, salinization of drinking water, etc. The clustering of a large number of shrimp farms and related support services may cause environmental degradation in the long run.

***Guidelines for Sustainable Development:*** The guidelines issued by the Ministry of Agriculture to all the coastal States to develop brackishwater aquaculture as a sustainable, eco-friendly and socially acceptable activity are exhaustive and take care of all these issues. To keep the coastal zone free from pollution and to make coastal aquaculture sustainable, the Ministry will ensure that all shrimp farming units coming under the joint sector and meant to be 100% export units, obtain clearance from Pollution Control Boards in the respective states and incorporate environmental strategies. These include the Environmental Management Plan, water treatment systems etc. The government is encouraging expansion of coastal aquaculture only under scientific extensive and semi-intensive systems.

***Aquaculture Authority:*** In pursuance of the directions of the Apex Court, an Aquaculture Authority has been set up to regulate coastal aquaculture. The Authority is to deal with the situation created by shrimp culture in the coastal states and Union Territories. The Authority shall implement the “precautionary principle” and the “polluter pays principle”. Farmers operating traditional and improved traditional systems of aquaculture and shrimp farms already in existence, shall have to obtain the approval of the Authority. State-level and district-level committees will be set up to verify the location of a shrimp farm and other factors before the Authority grants approval for the shrimp farm.

***Coastal Management Plans:*** Coastal States have prepared Coastal Area Management Plans for the balanced development of coastal areas. They are designed to provide the best possible benefits to fishermen and other coastal populations, and the best possible protection to the environment. These plans take into account the possibility of coastal aquaculture activities in the areas, in view of their potential for strengthening the national economy, boosting foreign exchange earnings and helping the rural poor.

Coastal States have also prepared Coastal Zone Management Plans for the approval of the Ministry of Environment. The plans are to be implemented by Coastal Area Development Authority/Eco-Development Councils, with representatives from coastal ***panchayats***. Detailed guidelines will be issued to local panchayats by State Governments.

## **Conclusions**

It must be admitted that community bonds among coastal populations have been weakened by the introduction of modern technologies in the fishing industry and the creation of excess technological capacity to increase fish production, without matching progress in the area of socio-economics. Fisherfolk do not have a feeling of entitlement about their fishery resources. But there is greater appreciation today of the need for coordination among fishing communities, Government bodies and NGOs for a comprehensive ecosystem approach for sustainable development. The methodology adopted should be

be to identify problems, integrate disciplines, skills and knowledge and arrive at decisions through consensus.

Much needs to be done to strengthen the efficiency of the indigenous people's resource management system, by promoting technological innovations and by creating awareness among fishermen/fish farmers about self-regulatory measures that will lead to sustainable development.

***Country Paper: Sri Lanka***

**18. COMMUNITY-BASED FISHERIES MANAGEMENT  
– SRI LANKA’S EXPERIENCES**

**by M T K Nagodavithana, Department of Fisheries and Aquatic Resources**

Sri Lanka is an oval-shaped island in the Indian Ocean, situated between longitudes 80 - 82° E and latitudes 6 - 10°N. It is sometimes described as a “tear drop” to the south of India. It has a land area of 65,525 km<sup>2</sup>. The Exclusive Economic Zone (EEZ), declared in 1976, claimed sovereign rights over an area of 536,000 km<sup>2</sup>. The 1,800 km coastline covers around 1,000 fish landing centres scattered along the coast. The island’s major fishing harbours are Colombo (Mutwal), Beruwala, Galle, Tanalle, Kirinda and Trincomalee (Cod Bay).

The fishing population, in an island with a total population of about 18 million, is about 150,000. They have some 600,000 dependants.

The fishery sector contributes 2-3% to the GNP. Some 65% of the animal protein consumption is from fish. There are no religious or social barriers against consumption of fish.

Coastal fisheries, mainly small-scale, accounts for 70% of the total annual production. In 1996, the total fish production was 228,550 mt: 149,300 mt. from coastal fisheries, 54,000 mt. from offshore and deep-sea fisheries, and 22,250 mt. from inland fisheries and aquaculture. The potential resource is 250,000 mt. from coastal waters, consisting of 170,000 mt. from pelagic species and 80,000 mt. from demersal species, which is presently under-exploited.

The offshore and deep-sea resource is estimated to be 70,000 - 90,000 mt. consisting mainly of large pelagic fish such as tunas, billfishes and sharks. A fair percentage of the present offshore and deep-sea production is obtained outside the EEZ of the country.

The fishing fleet consists of about 27,000 craft. About 55% of these craft are motorized. Of late, there has been a significant increase in the number of deep-sea multi-day vessels.

Inland water bodies constitute 260,000 ha of freshwater bodies. These include 70,850 ha of large irrigation reservoirs, 1,700 ha of medium size reservoirs, 100,000 ha of seasonal village tanks, 39,000 ha of minor irrigation tanks, 4,000 ha of flood lakes called villus, 8,000 ha of upcountry reservoirs, 22,000 ha of Mahaweli reservoirs and 120,000 ha of lagoons. The potential production from these water bodies is estimated at 50,000 mt.

There are 744 fishery co-operative societies with a total membership of 77,656.

The new Fisheries and Aquatic Resources Act of 1996, which replaced the earlier statutes, seeks to introduce fisheries management.

**Challenges for sustainable fisheries management**

Till recently, the country’s emphasis was on fisheries production with arguments such as “Why can’t the country be self-sufficient in fisheries with the sea around it?” The resource picture is still not clear. There is some indication of over-fishing in inshore waters.

The following factors influence the small-scale fishery:

- i Religion
- ii Multiple resource users, a phenomenon that could lead to conflicts (fisheries, tourism, construction etc.)
- iii. Open-access nature of the fishing industry.
- iv. Conflicting gears e.g. light purse seine, trawl net, bottom set net, trammel net etc.
- v. Seasonal migration of fishermen.
- vi. Restrictions imposed on fishing because of the security situation.
- vii. Destructive fishing practices. e.g. dynamiting of fish
- viii. Area conflicts.
- ix. Environmental degradation and
- x. Politics.

### **Some specific areas of conflict**

#### **Light Purse Seine Fishery**

There is a definite conflict between small-scale fishermen and light purse seine fishermen. The light purse seine was tested in Sri Lanka under the BOBP as a method of catching bait for the pole-and-line fishery. But local fishermen used the gear to catch small pelagic fish. On the recommendation of a committee, purse seine regulations were introduced to restrict the area of operation and issue a limited number of permits on a high annual permit fee (Rs20,000). But the number of light purse seines increased considerably, and a conflict arose between traditional small-scale fishermen and the light purse seine (popularly known as light course) fishermen. This became a political issue during the last parliamentary election in the south, and legislation was brought in to prohibit even the possession of purse seine nets and associated accessories without a valid permit. The issue of permits was suspended. Meanwhile, the operation of surrounding nets for schooling small pelagics during the day, using traditional craft with outboard motors, gained popularity.

The targeted species are half beaks, herrings and small tuna. Opposition has sprung up in certain areas against these nets, and legislation is to be introduced to prevent the entry of additional units to the fishery. But scientific evidence is that this type of fishery is not harmful to the resource, since the targeted species are short-lived migratory fish.

#### **Trawl fishery in Chilaw**

The trawl fishery in Chilaw was carried out along the coast off Chilaw area (18 km) for several years. Red prawn was the targeted species. But conflicts constantly erupted between trawler fishermen and traditional fishermen. This conflict peaked in 1992, leading to violence and a law-and-order problem. The Catholic church and the government intervened. and banned trawling. The boats and trawl nets were acquired by the government after paying compensation. Trawl owners were issued with new boats and gear for deep-sea fishing under a loan scheme with a subsidy. The crew members were paid compensation.

But scientific evidence indicated that trawling is the most efficient way to exploit this resource and is not detrimental to the resource. Former trawl fishermen have formed themselves into an association, and are seeking permission to resume trawling. The National Aquatic Resources Agency (NARA) has been directed to carry out trial trawling. Its conclusions will assist an independent commission to be appointed after the trial fishing which will make a recommendation on the subject.

### **Beach seine fishery**

The beach seine fishery is a traditional method of fishing, in which a surrounding net with two wings, cod end and two ropes is drawn from the shore by a group of fishermen. This fishery has a lot of traditions which differ from area to area. Usually, where more than one net operates in a given area called the "padu," a rotational system is adopted. Seiners have formulated their own traditional rules to run this rotational system, and there is harmony among beach seine operators. This is a good example of management of the fishery by stakeholders. In one place on the east coast, as many as 127 beach seines operate from the same padu.

But a clash of interest occurs in certain areas, specially in the west coast, where beach seine operators protest against the surrounding net operators using small motorised craft. Local conflicts are settled with the help of fishery officers and the police, and the rights of beach seine operators are generally protected. The beach seine regulations of 1984 were enacted on the request of the Beach Seine Owners' Association to protect their rights. Generally this is a fishery dependent on community-based management.

Conflicts have occurred at times between the tourist industry, hoteliers in particular, and the beach seine operators.

### **Kattudel (stake net) fishery in Chilaw Lagoon**

A traditional stake net fishery is practised in the Chilaw lagoon. The main species caught is prawns. Fishing rights are shared among three clans, and they have organised themselves into the Traditional kattudel Owners' Association. The three main groups are closely associated with a particular church (parish) and are allocated different fishing days. Entry to the fishery is limited, since only the male descendents of *kattudel* owners can become owners. A Government commission was set up to settle disputes and fix equitable fishing times and areas for fishermen living on the lagoon.

### **Stake net fishery in Trincomalee Harbour**

The stake net fishery operates in the shallow waters of the inner harbour of Trincomalee. The nets are owned by families who function in harmony- there are no problems concerning the site of the net or the time of operation. The nets are periodically removed for drying, and for taking away fouling substances. In recent times, conflicts have arisen between security personnel and net owners. Such conflicts were earlier settled quite amicably.

### **Negombo lagoon fisheries**

The Negombo lagoon is a highly productive shallow estuary, exposed to constant fishing effort throughout the year. At least 22 types or methods of fishing are in use. A majority of the traditional methods are simple and environmentally friendly. The most important fisheries are stake net (*kattudel*) and brush pile (masathu).

According to a recent study carried out by the FAO/UNDP-funded Marine Fisheries Management Project, lagoon fishermen are willing to manage the lagoon. The Negombo Lagoon Management Plan has been formulated and is before legislators. Open access into the fishery will be stopped, and the area will be declared as a management area under the new Fisheries Act. The area will be managed by the proposed Negombo Lagoon Management Committee. A licensing system will be introduced and harmful fishing methods -such as trawl nets and digging out of polychaete worms -will be prohibited.

### **Stake Nets in other Areas**

The stake nets or *Kraals* (jakotu) in Bolgoda Lake (Moratuwa & Panadura Areas) and Madu Ganga (Balapitiya) are a form of traditional user rights fisheries (TURFs) since they are owned and operated by specific individuals. There are no major disputes among these fishermen, though at times they complain of the motorised craft plying down the river carrying tourists.

### **Pole and Line Fishery at Egodaunya (Panadura)**

Egodaunya is an area south of Colombo located near the Panadura river estuary, commonly known as the Bolgoda Lake. The live bait fishery and other fisheries dependent on it, namely the pole and line fishery and the handline fishery, are the traditional fisheries of the area. The live bait fishery supplies red bait caught in inshore coastal waters and prawns caught from Panadura River, using stake nets (Jakotu) for the pole and line and hand line fisheries. A self-management system to manage the bait resources has been developed by the community. The use of certain types of gear is prohibited, and sanctions are applied to those who break the rules. With the prevailing security restrictions on migration to the North and East, certain fishing craft which used to migrate from the western coast (mainly Negombo area) have started to migrate to this area. This has led to seasonal disputes, disturbing the harmony among traditional fishermen of the area. Politicians, fishery officials and the police have to intervene at times to settle such disputes.

Some time ago, fish aggregating devices (FADs) were deployed off the area by NARA to facilitate the line fishery. Though the experiment was a success, the local fishermen have not organized themselves to set up such FADs.

### **Stilt Fishing in Kathaluwa and Ahangama (Habaraduwa)**

Stilt fishing is mainly confined to two villages of Habaraduwa Assistant Government Agent's (AGA) division in Galle District. The two villages are Kathaluwa and Ahangama. The fishing method is rod and line. It is carried out by individual fishermen sitting across the bar of a vertical wooden pole (stilt) driven into the coral reef. Barbless stainless steel hooks (without bait) made by the fishermen themselves are used to catch spotted herring and mackerel. The fishing is highly seasonal, and depends on the arrival of fish to the coral reef. It is done mostly in the early morning and the late evening. Though it is not a very efficient method of fishing, the fishery is managed by the fishermen themselves. The stilt fishery is a popular tourist attraction; every tourist wants to photograph it.

### **Fishery co-operatives and other organizations**

Fishery co-operatives were started in the 1940s, during the II World War, to enable procurement of fish from fishing villages and transport of fish to the metropolitan city of Colombo to meet food shortages



there, specially for expatriate troops. But after the War, and Sri Lanka's independence in 1948, much emphasis was laid on co-operatives to develop village-level fisheries. The fishery co-operatives went through various transformations under different governments. A number of commissions or committees were appointed from time to time to reorganize them. The last one was in 1994. The committee has proposed a working plan to reorganize the co-operatives. The plan is being implemented.

Co-operatives can help manage fisheries effectively, since their members are from the same area and provide a forum to take decisions and resolve disputes. This appears to be a viable local mechanism for fisheries management.

On the west coast, the Catholic Church plays an important role in helping fishermen to resolve their problems.

### **Central Government and the Provincial Councils**

Fisheries is a concurrent subject, dealt with by the Central Government. Though there are separate Ministers for Fisheries in the Provincial Councils (PCC), not a single PCC has been able to enact its own statute for fisheries.

Though there is a healthy relationship between the centre and the PCC, the latter sometimes acts independently when distributing subsidies and welfare facilities to fishermen. A better partnership is essential between the centre and the PCC to ensure streamlined development of the industry. The recent debacle of prawn farming in the North Western Province is a classic example of the need for a better partnership with the centre.

### **Conclusions**

A fair number of traditional fisheries exists in Sri Lanka. Some are widespread (beach-seine), a few are restricted to certain areas, some others – like lagoons – are site-specific.

These fisheries are Community-managed, till disputes arise from time to time. As a result, the Government had to intervene, and a number of legislations were enacted under ordinances existing then, like the Municipal Councils Ordinance, the Village Council Ordinance of 1889, the Small Town Sanitary Ordinance, the Local Boards Ordinance of 1898, Game Protection Ordinance of 1909 and Local Government Ordinance of 1921 for the management of area-specific fisheries. The first piece of legislation meant exclusively for fisheries was introduced by the British Government in 1925 -the Pearl Fisheries Ordinance. The Fisheries Ordinance No 24 of 1940 was the first legislation pertaining to the regulation of fisheries in the entire country.

Though this ordinance was amended from time to time, the need for a new legislation with greater emphasis on management was felt, and the new Fisheries and Aquatic Resources Act No 02 of 1996 was enacted, replacing all the earlier statutes.

The new act emphasises management of fisheries through community participation, protection of fish from destructive methods, management areas, closed seasons, and restrictions on the open access system by introducing a fishing operations licensing system.

In such a system, healthy partnerships among stakeholders becomes very necessary, specially in declared management areas to be managed by local management committees elected by popular vote among registered fishermen of the area. But in a highly politicized society, politics is bound to creep in.

### **Recommendations**

With the introduction of a new Act, there is wide scope to harness community-based management and build up smart partnerships among stakeholders.

Since management is a new concept for fishermen who usually go for higher production and higher short-term incomes, well-guided and long-term awareness programmes for all stakeholders – such as fishermen, officials, law enforcement officers, the general public, politicians and students — will be necessary to make the society management-conscious. Not an easy task. This would be a slow process with a lot of patience and understanding among stakeholders to build up smart partnerships for sustainability in the fishing industry. Hence a well-managed long-term awareness programme is recommended.

***Country Paper: Sri Lanka***

**19. DEVELOPMENT OF AQUACULTURE AS AN INTEGRATED FISHING INDUSTRY IN SRI LANKA : PROSPECTS AND PROBLEMS**

**By Kusul Perera**

*National Organiser, Hariha Darshana*

In Sri Lanka, it's marine fishing that has often received the pride of place in the fisheries sector. Governments, government institutions and other organisations have paid more attention to the marine fishing industry than to inland fishing that could be developed as aquaculture. The reasons for this phenomenon should be discussed, before we discuss aquaculture in depth.

**An overview: coastal fishing vs inland fishing**

The "fishing community," as the fisherfolk are popularly called, have some distinctive characteristics. They are concentrated along the island's coastal belt. They belong to a single social caste, the Kauravas, whether they hail from the Sinhala-speaking south or the Tamil-speaking north. The Tamil-speaking fisherfolk include a gaggle of Christians and Roman Catholics. These factors give the fishing community an identity of its own, within a sub-culture that is both different from others and more effervescent. A collective identity has also meant political relevance through voting power. Therefore the demands of fishermen have always engaged the attention of the country's political and decision-making apparatus. This is amply demonstrated by the fisheries co-operative societies that were formed as early as 1940 in the coastal belt. In 1990, there were as many as 630 co-operative societies of coastal fishermen, as compared to only 91 among freshwater fisherfolk.

On the other hand, there is no significant concentration of fishermen in the interior of the island that can form a pressure group or demand attention the way marine fishermen do, though fishing in tanks and reservoirs was common in ancient times. That being so, most people in Sri Lanka would not think beyond "marine fishing" — everything else is considered marginal.

Yet, as marine fishing could not meet the total demand for fish consumption, and as substitutes for protein consumption did not capture public imagination, attempts were made to increase the production of cultivated freshwater fish. This was done under the auspices of the Fisheries Department, with freshwater ponds built in various parts of the island and imported freshwater fish cultivated in them for distribution.

This project under the Fisheries Ministry was given only a subsidiary status, while marine fishing still held centre stage. Big-time deep-sea fishing, which was totally controlled by private individual businessmen, won financial concessions and subsidies. This loose private sector trade could not improve service to consumers; time and again, there were state interventions through various schemes to expand and increase the productivity of marine fishing. It's these state interventions that led to infrastructure creation in the form of fishery harbours, ice factories and the like. Another approach that flowed from the economic thinking of the 1970s was the development of sales outlets through the state-owned Fisheries Corporation. This was more an attempt at controlling the retail market than an attempt to subsidise the fishing community. But it did not find favour with the free market economy ushered in after 1977 that encouraged fish "*mudalalis*" or private businessmen and reduced the role of state corporations.

### **Ban on Inland Fishing**

Over the years, inland fishing did expand to many geographical areas, even if it wasn't very conspicuous or vibrant. The Accelerated Mahaweli Development Scheme provided new space and infrastructure to re-settle people in colonies, and international agencies like the ADB and the FAO offered assistance for inland fishery projects. Political interest in fisheries continued to be high, so fisher families from Puttalam district got resettled in areas like Minneriya and Maduru Oya to carry out inland fishing in reservoirs.

Just as freshwater fishing was gaining attention as a supplementary source of protein, especially among villagers in the dry zone, the government in power decided to close down all freshwater fisheries in July 1990. This was in response to pressure from the Buddhist clergy, which held that it would not suit Sri Lanka, a predominantly Buddhist country, to "breed fish" for consumption. Some of the inland fisheries were therefore leased out to ornamental fish breeders, as an impetus for export.

The ban on inland fishing had many consequences. First, it provided a bigger market for imported tinned fish. Two, it changed the consumption pattern of the ordinary villager, who became more dependent on tinned sardines for his proteins. Three, it reduced the protein consumption of a sizable percentage of the lower and middle class villagers, because their incomes fell. It is estimated that the inland fishing ban reduced the direct incomes of about 23,000 fisher families, members of fishing societies. It perhaps contributed to the prevailing chronic malnutrition among village children. It is estimated that about 60 per cent of the village women are anaemic. This leads in turn to about 25 per cent underweight births per year.

Another fallout of the closure of inland fisheries: many civil organisations created by state sponsorship of inland fishing disintegrated. There were over 91 active co-operative societies in 1990; these wound up when freshwater fishing was banned.

### **A New Orientation in Aquaculture**

It is important to note that inland fishing was not carried out by traditional fisherfolk, but by traditional farmers. Marginalised as agricultural labourers, they eked out an extra income by fishing in village tanks and reservoirs. It is this scenario in the villages, and the inability of marine fisheries to cater to fish demand, that gave aquaculture projects in the villages some scope.

The government therefore sought ways and means of developing fresh water fishing in the villages, to boost jobs and incomes. Fish hatcheries were built and managed by the Fisheries Department even before the decade of the '70s. New breeds of imported fresh water fish were introduced and cultivated in tanks and reservoirs. The State was more or less the sole authority for fish cultivation; village fisherfolk were allowed to harvest on conditions stipulated by the state. Over the years, this attracted more marginalised farmers to freshwater fishing, though it was one of the less acceptable income options in villages. It is then that fisheries societies and co-operatives were promoted by the state and used as a means to regulate freshwater fishing.

Till 1990, inland fishing continued on these lines, with just a few additions and alterations. Production from inland fishing was about 40,000 mt per year by 1990. Though some claimed that this figure made up 20 per cent of the local requirement of fish, it was disputed — many substitutes had come up, because fresh fish was scarce and dear in the retail market. This was the general situation at the time of the 1990 ban.

But one area of inland fishing was in fact heavily patronised by some in the political hierarchy: aquaculture. The government thought that the Buddhist clergy would not object to big-time farming of prawns, shrimps and crabs promoted by the government for the export market. With the “open” or heavily liberalised economy of the early 1980s, emphasis was laid on export-oriented production in the non-traditional sector. This shift in the economy was supported by the World Bank and the IMF. Aquaculture projects obtained financial concessions by way of tax holidays, loans on easy repayment, state land on lease etc. With the tourist industry catching up again after its crash following the anti-Tamil riots of 1983, and a lucrative foreign market developing for large prawns, shrimps and crabs, a minor aquaculture boom was sustained in coastal areas of Puttalam district in the northwest of Sri Lanka.

This area has a coastline of over 300 km, according to the Coast Conservation Department (CCD) - a coastline considered very suitable for prawn farming, with its abundant mangroves, estuaries, lagoons and marshes. (Table below).

|                     |            |
|---------------------|------------|
| Mangroves           | 3, 210 ha  |
| Estuaries & lagoons | 39, 119 ha |
| Marshes             | 2,415 ha   |

*Source: Coastal Zone Management Plan, 1990*

Another reason for the prawn culture boom in Puttalam district could be the influence the then Minister of Fisheries and Aquatic Resources had in this area. With more than adequate political patronage, the area was exploited to its maximum, with little regard paid to the environment and to coast conservation. The profits reaped were high.

No conservation laws were adhered to if they were in any way considered a hindrance to big-time prawn farming. Meanwhile, pressure mounted from environmentalists and other civil organisations against the severe environmental degradation due to prawn farming. In 1990, the CCD listed aquaculture as one of the reasons for coastal erosion. It laid down a condition that aquaculture projects should obtain clearance from the CCD. This meant that the CCD could grant a licence for an aquaculture project if it was satisfied that the project would take adequate safeguards to protect the environment. But independent surveys carried out later by several environmental organisations showed that most such projects either functioned illegally or obtained a licence through political interference. This, despite the Coast Conservation Act (Amendment) No.1 of 1988, specifying penalties for contravention of the Act’s provisions.

But considering the concessions granted, the shrimp culture industry hardly provided enough jobs for the unemployed in the area. Nor were people who lost their livelihood because of the 1990 ban on inland fishing, given jobs by big-time prawn farms. Most of the labour required for these farms was seasonal or temporary; the owners preferred to employ total outsiders to the area in a few supervisory and skilled grades, because they thought such a policy would be better for their farms’ security. Thus the general perception of these aquaculture projects which sought to be big foreign exchange earners, was that they symbolized the environmentally hazardous and unethical exploits of the new rich and the politically savvy.

The next phase of aquaculture: ban on inland fisheries lifted

With the change of government in August 1994, aquaculture seemingly moved out of the degraded areas of the North West and away from prawn culture farming. The ban on inland fisheries was lifted.

The previous Minister in charge of fisheries in the present government brought into legal effect Act No.2 of 1996 on Fisheries and Aquatic Resources that provided aquaculture with a little more **muscle** than it had previously. The present Minister took a step further and gave the green light to small-scale fish farming in the inlands. It is these changes that have to be dealt with before discussing the possibilities of aquaculture development.

Aquaculture is at present controlled by the private sector under a market economy, with all state departments and institutes playing only a regulatory and promotional role. The Fisheries and Aquatic Resources Act No.2 of 1996 provides the legal base for this system. Its main features:

- i. Policy-making by the Ministry and implementation of such decisions
- ii Registration and monitoring of local fisheries committees
- iii. Licensing of fishing operations **and** aquaculture enterprises
- iv.** Co-ordination and consultation with the Provincial Minister of the Board of Ministers in charge of the subject.

The lifting of the July 1990 ban on inland fisheries did not satisfactorily reactivate local fishery societies and co-operatives that had wound up. This does not mean they functioned satisfactorily before the ban; it only means there are fewer organisations now than before. And at the ground level, the Fisheries Department is not as yet geared to organise and activate co-operatives and societies among freshwater fisher families.

In some districts, three years after the ban was lifted, fisheries officials have still to make their presence felt in providing state assistance for freshwater fishing. Inefficient deployment of officers in districts; lack of transport facilities either to distribute fry for culture or to dispose of the harvest from reservoirs and tanks without delay — all these have stifled the interest of village folk in aquaculture. And in three years, the Ministry of Fisheries has been able to commission just two of the freshwater hatcheries under its authority, out of more than a dozen that were leased out at the time of imposing the ban more than seven years ago. Of these two hatcheries, one is still under-utilised.

Fisheries is actually a “devolved subject” under the Provincial Administrative System. But the Provincial Administrations have not seized the opportunity to develop their own provincial projects on freshwater fisheries, after the Central Government lifted the 1990 ban. Nor **has** the central government shown any interest in handing over responsibility to the provinces.

Perhaps the perceptions of management and implementing agencies about freshwater fisheries have not changed during the past three years. This leads to some assumptions and conclusions about freshwater fishing. Discussions based on them could well provide new perceptions about the future development of aquaculture as an integrated fishing industry.

### Concepts and Approaches

Interest in freshwater fishing has remained low, on account of a few misconceptions and misunderstandings. First, the implementing agencies have not understood what target groups they should identify to culture and harvest freshwater fish, and to develop markets for freshwater fish.

The second is that the political hierarchy suffers from a lack of credibility at the opinion-making and grassroots levels of society. This topic merits exclusive discussion. In Sri Lanka today, every movement

of society is being politicized. This political culture plays a very negative role in social development, as it leaves little room for independent decision-making. It pursues accumulation of power, and leaves civil participation in society almost anaesthetised.

It is common knowledge in Sri Lanka that it is provincial and local politicians, with links to political power at the centre, that decide who controls organisations in their areas – particularly if these receive some state patronage. This sorry state of affairs must change if fisheries co-operative societies are to function effectively. But de-politicising civil society would be a long-term project. Some other forum will have to discuss this subject. But some broad issues must be highlighted for discussion here.

Let's get back to the first issue: identifying target groups for participation in the process of fish culture. It should be mentioned that freshwater fishing should not be what it was in past years. The weather patterns and ground factors in Sri Lanka are favourable for development of freshwater fishing. There are water tanks and reservoirs of different sizes scattered at regular intervals to meet the growing interest in fish culture. Makeshift mud ponds, small, natural waterways and abandoned paddy fields could all be turned into centres of fish culture for prospective fish farmers in the villages.

This type of fish farming is not unknown. There are a few centres run by a few individuals and organisations as isolated pilot projects. But if these are to be attractive and profitable, and worth the effort of villagers, a few things have to be in their right places. One: extension services must wake up from their bureaucratic lethargy and become more efficient. What's needed is a very effective transport service, and laboratory facilities in the regional and provincial centres to train prospective fish farmers for breeding and supply of fish seeds. This means a very fast-moving servicing sector with all the needed infrastructure facilities. Another very important incentive is a subsidy or soft loan to help the villagers to get off the mark.

Two: Where can freshwater fish farmers sell their harvests? This question has never been addressed seriously by those who make policy decisions. We must remember that in our culture, any market purchase carries with it some form of social status or pride. With the market economy, competition is trickling in too. When we are talking of fish for daily consumption, everyone goes for sea fish. And fresh, unfrozen fish. Unfortunately, our local markets have very little fresh or unfrozen fish. We see them only in the "markets" on the open beach. Never in the villages. Hence the demand for tinned fish, and to a certain extent, dry fish.

Where then do the harvested freshwater fish go? In 1990, the quantity did not go beyond 40,000 mt per year. Since the ban, the harvest dropped and now stands around 12,000 mt per year. A little of this goes to the towns. A little more is converted into fish fillets that go to hotels.

If the local market is to appreciate freshwater fish, the catch must be specially treated before it reaches the consumer. This is because our consumer is very choosy about live products, especially when they are introduced as local products. There is also a cultural taboo. In our predominantly Buddhist culture, freshwater fish bred and reared for the table would not be accepted. The case of broiler chicken is a good example.

People who refuse to raise poultry for local consumption in their gardens, buy broiler chicken without any hesitation for their lunch table. They believe that broiling is not tantamount to "killing," because the chicken are merely seen frozen in the shop freezers. This simple habit could be exploited to market freshwater fish, creating a new job-generating industry that would produce not only fish but also by-products like fishmeal.

### Partners in Progress

With this in mind, one would expect market forces to play the right role and encourage the freshwater fishing industry to establish itself. But if this industry is to be sustained, other players are needed. Freshwater fishing cannot be a money-spinner by itself. It has to be integrated with an assortment of animal husbandry and vegetable cultivation practices. This type of integration requires not only checks and balances but support services as well.

First, as required by the Fisheries and Aquatic Resources Act No.2 of 1996, the formation of Fishing Community Societies needs as much participation as possible from those in the fishing industry. This is a serious responsibility that has to be undertaken by the authorities.

Next, very effective consumer societies are needed that would check the products that come to the market, their quality and prices. These consumer societies need not limit themselves to fish products. Getting consumers to play such a “watchdog” role will be difficult initially, because such societies are rare even in urban areas. But if the provincial administration makes an effort, such societies could be established everywhere.

Very important: a regular forum where the village community could air its grievances on damage caused to the environment. This forum would bring all civil organisations together, with regional officials in attendance.

Most important of all is depoliticalisation. **Such** forums should be allowed to organise themselves and function professionally and independently, with politics totally out of the agenda, if they are to develop as an integrated freshwater fishing industry.



## ***Country Paper: Maldives***

### **20. PARTNERSHIP FOR FISHERIES RESOURCE MANAGEMENT IN THE MALDIVES**

**Jadullah Jameel**

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Maldives is an archipelago of nearly 1,200 coral islands grouped into 26 natural islands in the centre of the Indian Ocean. It has an area of about 90,000 square kilometres and an Exclusive Economic Zone of nearly 1 million square kilometres. Only 201 islands are inhabited, and marine resources constitute the country's main natural endowment. Economic activities focus heavily on fishing and tourism. Fisheries currently accounts for 11% of the GDP, 20.6% of employment and 75% of the country's export of commodities (Ministry of Planning and Environment, 1996).

The fish catch at present is about 100,000 metric tons and comprises of tuna and reef fish varieties. Of this, 63 per cent is skipjack tuna, 11 per cent juvenile yellow fin, 10 per cent little tuna and frigate mackerel, and 16 per cent reef fish. Recently the reef fisheries has expanded because of demand from the export market. Fishing has remained traditional and in the private sector. It employs mainly pole and line with live bait for tuna, longlining for shark, and drop line for reef fish, specially grouper. Fishing vessels are under 18 metres in length and powered with inboard engines of not more than 45 h.p. Fish processing and export is done mainly by the Government-owned Maldives Industrial Fisheries Company (MIFCO), which has invested heavily in the collection and processing of frozen and canned tuna for export. The private sector exports mainly reef fish and dried tuna, and its infrastructure is limited. In 1996, export by the Government was valued at US \$28.2 million, while the private sector exported \$20.7 million.

Tuna is the mainstay of fisheries in the Maldives. But reef fisheries have developed during the last decade due to local and foreign demand for food fish. Marine resources management is now a major priority. The sea cucumber and the giant clam have been over-exploited, and there is concern over other reef resources, particularly grouper. The importance of resource management is now recognised, and some steps have been taken by the Government.

The difficulties in implementing those measures and the need for participation by all stake-holders in development has been increasingly felt. Rapid social and economic changes have broken down some of the traditional management systems. Conflicts of interest among resources users in different types of fisheries are increasingly taking place. The problems are further complicated by the fact that resources users, specially those of coral reef, are diversified and are not restricted to fisheries. New attempts are being made to introduce resources management and involve stakeholders at all levels.

Before mechanised fishing vessels were introduced, development of communication and transport in the atolls was slow. Fishermen migrated to other islands and atolls to fish, cementing traditional bonds and relationships developed over years. Fishing was carried out on most islands along with other economic activities. Fishermen focused mainly on tuna in the good fishing seasons, going for reef fish only on rare occasions. No overfishing occurred, as the technology employed was traditional. The main stakeholders in fisheries were fishermen, boat owners, processors, consumers, administrators, marketers and funding agencies.

Management of fisheries resources is quite a complex task. The legal framework of the current management system for fisheries is found in the constitution, the official mandate of relevant ministries, as well as in various laws, decrees and guidelines. The National Development Plan outlines national policies and strategies; these include priority to fisheries management, and long-term fisheries development plans. It covers a wide range of specific issues. These plans are developed by various government-related agencies, the most important being the President's Office, the Fisheries Advisory Board (FAB) and the Ministry of Fisheries and Agriculture (MOFA).

- A) **The President's Office** : plays an important role in generating and implementing fisheries policies. It provides policy directions through decisions based on the recommendations of the Fisheries Advisory Board (FAB), policy statements and laws including Presidential Decrees.
- B) **Fisheries Advisory Board (FAB)** : The FAB provides a mechanism for high-level consultation among various ministries and agencies concerned with fisheries development to ensure a more co-ordinated approach to decision-making. It is chaired by the Minister of Fisheries and Agriculture. It guides the President on matters that require major policy decisions.
- C) **Ministry of Fisheries and Agriculture (MOFA)** : The Fisheries Law of Maldives (Law No.5/87,24 August 1987) empowers MOFA to "formulate and administer regulations on matters relating to fisheries", to "explore responsibilities for the development of fisheries" and carry out the "research needed for such development" (Gozun, 1992). Hence it can be seen that MOFA bears the responsibility for proper and efficient management of the fisheries resources. It has to provide a framework for efficient resource management and collect and analyse statistical information on fisheries necessary for development and management of the sector.
- D) **Surveillance, monitoring and enforcement** : The National Security Service (NSS), coast guard section, provides monitoring and enforcement measures to deter infractions of law. It tries to ensure that nationals and foreigners honour agreements. It collects information on fishing agreements to facilitate strategic and tactical decisions about enforcement.  
  
The modes of enforcement are air patrols, sea patrols, special observers on fishing vessels, and harbour inspection. The enforcement modes used depend on the resources available, the nature of the regulations and the characteristics of the fishery. Due to the openness of the seas where traditional fishing for tunas take place, NSS is well-equipped for search and rescue activities as well.
- E) **Other responsible bodies** : Besides the above, various other institutions are concerned directly or indirectly with fisheries. They play an important role in their respective areas of responsibility and have supportive functions in the sector. These institutions are;
  1. Maldives Industrial Fisheries Company (MIFCO)
  2. Ministry of Trade and Industries (MTI)
  3. Ministry of Planning, Human Resources and Environment (MPHRE)
  4. Ministry of Atolls Administration (MM)
  5. Ministry of Transport and Shipping (MTS)
  6. Ministry of Finance (MOF)

Ministry of Education (MOE)

Maldives Institute of Technical Education (MITE)

Maldives Monetary Authority (MMA)

Ministry of Foreign Affairs (MFA)

#### **F) Atoll and Island Administration**

Fisheries catch and effort data are collected by the island office and sent to the Ministry of Fisheries and Agriculture through the respective atoll office regularly.

Island offices regulate fishing in the island lagoons.

The fish catch share system is determined by the fishermen communities.

Registration for reef-fish holding cages is made at atoll offices.

Fishing communities contribute to the fishery and other development projects on the islands

Fishermen voice their concerns through Atoll offices to the Ministry of Fisheries and Agriculture.

Non-compliance with laws and regulations is reported by the fishermen to the island offices.

Requests for installation of navigational aids and fish aggregation devices and for deepening the harbour are made to the Government by island offices.

#### **Management measures in use**

- Export of certain marine species and products is prohibited.
- <sup>1</sup> Export quotas have been fixed for certain types of tropical aquarium fish.
- Certain marine species are protected through bans on fishing.
- Cages for holding reef fish are registered.
- <sup>1</sup> Prior permission is needed for use of any non-traditional fishing gears.
- A research phase is needed prior to any new fisheries or aquaculture project.
- Resource assessments are made, and fisheries information collected and analysed, for management and policy formulation.
- Consultations are held with the industry before regulation relating to fisheries management and development is introduced.
- Restrictions are in force for fishing gear types that fish under licence in the EEZ.
- Fisheries sector plans are integrated with those of other development sectors.

#### **Main Fisheries Regulations**

1. No person may fish in the lagoons of inhabited islands or tourist resorts without permission from the respective administration office.
2. Fishing is permitted from lagoons that have no islands or sand bars.
3. Nets for fishing are prohibited in the Male lagoon.

4. Any traps or weirs fixed by fishermen must be registered at the atoll office. No person may remove fish from traps or weirs, or fish within their immediate vicinity, when the traps/weirs are in operation.
5. Any new type of fisheries, or use of non-traditional gears, requires permission from the Ministry of Fisheries and Agriculture.
6. For any fisheries research to be carried out within the EEZ, permission is needed from the Ministry of Fisheries and Agriculture.
7. EEZ fishing licences are issued by the Ministry of Trade and Industries.
8. Statistical and other fisheries information must be submitted in the form required by the Ministry of Fisheries and Agriculture (MOFA).
9. MOFA is empowered to make regulations for management and development of fisheries resources within the Maldives EEZ.
10. MOFA may take conservation measures by banning fishing for different species, or by declaring closed fishing areas or seasons.
11. Penalties are imposed according to law when regulations are violated.
12. Any foreign vessel needs permission from MOFA to cross the EEZ. It should provide notice 48 hours in advance.
13. Information on any fishing vessel sighted within the EEZ should be given to the island office or Coast Guard.

### **Prohibitions in Fisheries**

The following actions are prohibited :

1. Interference with pole and line fishing in the vicinity by trolling, long line or drop line fishing.
2. Removal of any drifting objects on fishing grounds.
3. Use of any dynamite or explosive in fishing.
4. Use of any poison to catch fish.
5. Use of any spear guns for fishing
6. Fishing for lobster by diving with deep-diving equipment.
7. Going fishing so as not to be able to attend the Friday prayers.
8. The following marine species are protected:  
Dolphins, turtles, whales, whale sharks, Napoleon Wrasse, giant clam,  
Triton Shells, black corals, lobsters less than 25cm in length or Berried female lobster.
9. Only bait fishing for traditional pole and line is permitted in 15 protected marine sites.
10. Wherever fish aggregating devices (FADs) are installed by MOFA, drop line fishing using live baits, shark fishing, trolling or use of silver side as bait, is prohibited within three miles of the FADs.

11. No foreign vessels or foreigners may engage in fishing within 75 miles of the coast without approval **from** MOFA.
12. Long line operations should not be carried out on the banks (shallow areas of the sea) in the southern zone as notified by MOFA. .

**Sources of information:**

**Latheefa, A.** (1997) *Fisheries management system*, Male, MOFA.

**Statistical Yearbook.** (1996) *Ministry of Planning, Human Resources and Environment*

***Country Paper : Bangladesh***

**21. POVERTY ERADICATION AND SUSTAINABLE FISHERIES  
DEVELOPMENT IN COASTAL VILLAGES OF BANGLADESH**

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**Introduction**

Bangladesh has a coastline of 480 km. Fisheries activities extend over the entire coastline and offshore island. The coastal fisheries are exploited mainly by mechanized and non-mechanized fishing craft with traditional fishing gears operated by traditional fishermen known from time immemorial as “Jele”.

The trawl fishery, which includes shrimp and fish trawlers, constitutes the industrial fishery. It is operated by businessmen.

Marine fisheries accounts for 22.07% of the country's total production of 1.264 million mt. Coastal fisheries is responsible for 95% of the marine sector output.

Fisheries contributes about 4.7% of the GDP and about 60% of the animal protein consumption of Bangladesh. The country's fish production went up from 644,000 m.t. in 1975-76 to 1.17 million m.t. in 1994 -95. Though the production increased, per capita consumption went down from 34.49 gm in 1975-76 to 20.5 gm. in 1995-96, because of the increase in the human population.

Bangladesh has a typical multispecies fishery. Some 185 species of fish are exploited by fishermen operating in estuarine waters, while some more species are caught by different gears operating in coastal waters. Coastal fisherfolk can carry out activities in depths up to 40 meters in estuaries of the Bay.

The export earnings from fishery products also increased, from 171.96 million taka in 1975-76 to 1340.9 million taka in 1995-96. Fisheries accounted for 9.12% of the export earnings in 1995.

**Coastal fishing community of Bangladesh**

Coastal fisherfolk live in all the coastal areas of Bangladesh (Fig. 1). The estimated number of fishermen: about 1.25 lakh. A majority of them belong to the socially neglected “Jaladas” Hindu community. Social relationships in these village communities are governed by solidarities, prejudices, superstitions and territorial affinities.

The coastal fisheries range from localized subsistence fishing to intensive mobile fishing operations that entail the use of simple crafts and traditional gear with great skill. Seasonality and unstable catch composition are prominent characteristics of these fisheries. The majority of fishermen rely on fish traders or middlemen to meet their subsistence needs, and are eternally indebted to them. They are not organized. The fishermen lack Government services. Both birth rate and death rate are higher among

them than among the general population. The average size of the fishing households is 6.5. Facilities for primary level education exist, secondary schools are located nearby.

A 1991 survey of six coastal zones revealed a high degree of illiteracy in the fishing villages — 63% overall. Illiteracy among women (75%) is higher than among men (about 50%). The study revealed that 37% of the women are under the age of 10, while 4% exceed the age of 60. About 59% belong to the age group 11-60. They constitute the village's potential work force. More than five million people including 1,25,000 fishermen live in the 869 coastal villages of Bangladesh. Their houses are temporary huts, with pole and leaf thatching and tin roofs; or mud houses with leaf thatching; or wooden houses with leaf thatching; or wooden houses with tin roofs and tiles; and a few cement houses of concrete with more than one room.

With the increasing commercialization of marine fisheries and decreasing land assets due to population pressure, a large number of people from the Muslim community have taken up fishing as a full-time occupation. Most of the motorized small-scale fishing boats are now owned by these groups. They hire the traditional fishermen as fishing crew, mostly on a catch-share basis.

### **Economic conditions**

The livelihood of coastal fisherfolk is based mostly on fishing and fishery-related activities such as traditional fish processing and marketing. A few fishermen also serve as daily wage labourers in agriculture, livestock, construction, and petty trades, and work in private and public companies and the government. But such income-augmenting opportunities are not accessible to all fishermen. A survey reveals that 34% of the fisherfolk community depend only on fishing, 41% depend on fishery and fishery-related activities. Only 3% depend exclusively on non-fishing activities.

The annual average household income from all economic activities in six representative villages from six coastal zones was found to vary from 48,827 taka to 238,611 taka per household. Non-fishery activities contributed only 5% of the household income on an average. Nearly 400 households lived below the poverty line, only 12.7% above the level of subsistence. Female participation in fishery-related and non-fishery activities was low.

### **Fishery resources**

Three recent surveys involving the Norwegian research vessel Dr. Fridtjof Nansen (FAO/BGD 1979-80) and R.V. Anusandhani (BGD 1983 and FAO/BGD 1984-86) provide estimates of standing demersal standing stocks that are very close — between 1,50,000 and 1,60,000 mt. Different authors estimated the shrimp stock at between 2,000 and 4,000 mt. The MSY of the penaeid shrimp was estimated at 6,500 - 7,000 mt (Table 1).

A pelagic resources survey that will provide a reliable estimate of the standing stock is still to be conducted. An acoustic survey by Dr. Fridtjof Nansen was recently undertaken by the DOF Marine Survey Wing, with technical assistance provided by the FAO/BOBP. Results are provided in BOBP's Working Papers 89,90 and 94.

The total production of marine fisheries in terms of landing from all fishing gears / craft was estimated to be 2,64,650 mt in 1994-95. The drift gill net fishery and the set bagnet fishery take the bulk of production, followed by the trawl fishery, accounting for 1,34,308 mt drift gill net, 75,910 mt and 11,715 mt respectively (Table 2).

**Table 1 : The marine fisheries resource**

| <i>Resources</i> | <i>Stock (metric tons)</i> | <i>M.S. Y. (metric tons)</i> |
|------------------|----------------------------|------------------------------|
| Shrimp           | 4000                       | 6500-7000                    |
| Demersal Fish    | 1,50,000 - 1,60,000        | 50,000 - 85000               |
| Pelagic          | 90,000 - 1,20,000          | Not determined               |

**Table 2 : Production by different gears in the coastal and marine fisheries sector**

|                | <i>Source</i> | <i>1990-91</i> | <i>1991-92</i> | <i>1992-93</i> | <i>1993-94</i> | <i>1994-95</i> |
|----------------|---------------|----------------|----------------|----------------|----------------|----------------|
| A.             | Trawl Net     | 8,760          | 9,623          | 12,227         | 12,454         | 11,715         |
| B(Mechanised)  | Drift gillnet | 1,21,966       | 1,22,935       | 1,23,680       | 1,25, 107      | 1,34,308       |
| Non-mechanised |               | <b>19,983</b>  | 20,078         | 20,210         | 19,247         | 19,602         |
| C.             | Set bagnet    | 68,481         | 70,035         | 71,208         | 73,578         | 75,910         |
| D.             | Longline      | 9,521          | 1,743          | 9,890          | 10,104         | 10,368         |
| E.             | Trammel Net   | 3,630          | 3,715          | 4,027          | 4,330          | 5,312          |
| F.             | Others        | 9,197          | 9,045          | 9,250          | 8,224          | 7,435          |
|                | <b>Total</b>  | 2,41,538       | 2,45,474       | 2,50,492       | 2,53,044       | 2,64,650       |

Among penaeid shrimps, the trawler fleet accounted for 76.9% of brown shrimp, 15.7% of tiger shrimp, 1.9% of white shrimp, 2% of pink shrimp, and 3.5% of mixed small shrimps. Shrimp trawlers throw **away** the major part of white fish as trash - to the extent of 35,000 - 40,000 mt. annually. If this were included in the catch figures, the trawler production of white fish would exceed 50,000 mt.

Brackishwater estuaries are the meeting points of fauna from three different ecosystems. Brackishwater species live, grow and spawn in the same environment; the marine fauna use the brackishwater area as nursery ground and pay short visits. Some fresh water fauna e.g. *M. rosenbergii* and *P. styliferus*, visit the estuaries for either spawning or nursing. Fishing in this area is very intensive. The set bag net is the most extensive capture fishery.

It can be seen that with estuarine set bagnets, almost all of the marine and freshwater animals are over-exploited, a majority of them very severely, while the brackishwater species are either under-exploited or exploited at the optimum level. Penaeid shrimp, e.g. *M. monoceros*, usually does not show signs of overfishing in the trammel fishery, while *P. monodon* shows little sign of overfishing in the trawl fishery.



**Table 3 : Number of gears in the coastal area and their contribution to fisheries**

|    | <i>Name of the Gear</i>     | <i>Number</i> | <i>Percentages of Exploitation</i> |
|----|-----------------------------|---------------|------------------------------------|
| I. | Trawl Net                   | 201           | 4.88                               |
| 2. | Gillnet                     | 6,889         | 57.44                              |
| 3. | ESBN                        | 12,561        | 9.66                               |
| 4. | MSBN                        | 3,852         | 18.77                              |
| 5. | Trammel Net                 | 1,400         | 1.61                               |
| 6. | Hook                        | 3,000         | 3.95                               |
| 7. | Other gears                 | 3,000         | 3.69                               |
|    | Net for shrimp larval catch | 1,98,770      |                                    |

**Table 4 : Exports (quantity and value) from coastal and marine fisheries sector (including shrimp)**

| <i>Year</i> | <i>Quantity (m. t.) of exports</i> | <i>Value of exports (earnings in crores)</i> |
|-------------|------------------------------------|--|
| 1990-91     | 26,109                             | 526.62                                       |
| 1991-92     | 22,080                             | 524.35                                       |
| 1992-93     | 26,607                             | 700.29                                       |
| 1993-94     | 31,835                             | 920.96                                       |
| 1994-95     | 41,686                             | 1306.94                                      |
| 1995-96     | 38,929                             | 1340.94                                      |
| 1996-97     | 41,549                             | 1457.41                                      |

*Source: Department of Fisheries*

The largest numbers of *P. monodon* are exploited by ESBN and push nets (larval fishery). According to one estimate, the population at this stage is 33 billion post-larvae. The ESBN takes the largest population (one fourth of the larval catch), followed by the trawl fishery post-larvae, while other gears take relatively negligible numbers.

The larval fishery takes 20% of the brown shrimp population. The size of the population on entering the ESBN fishery would be around 2,190 million post-larvae. The larval fishery exploits around 10,706

million *P. indicus* (white shrimp) larvae, which is almost five times the catch of the target species. The number surviving after the push net is about 11,700 million. Of these, 18 million are caught by the ESNB.

### **Area and Depth of Operation**

The ESNB fishery is spread throughout the channels, canals, tributaries and estuaries of Bangladesh, wherever a brackishwater environment prevails. The gear is operated at less than 5m depth, more or less throughout the year. The MSBN is generally larger than the ESNB and is operated around 20m depths, at three locations : Sonadia, Mohipur and Dubla, from October to March. Some of the large MSBN are used as ESNB during the other months.

Trammel nets are operated off the Teknaf - Cox's Bazar coast, at 5-10 m depth. The trawl fishery operates in the 40-80 m depth ranges. Beach seines are operated from the shoreline and cover depths of up to 8-10 m. This gear is operated in the Cox's Bazar, Chittagong, Noakhali, Barisal, Patuakhali and Khulna areas, but 62 per cent of the units are located in the Cox's Bazar area alone. Shrimp Fry-collection gear are widely used in the estuaries and river mouths along the coastline (Table 3).

### **Interactive fisheries - their effect on recruitment**

All the selected species are exploited at different stages of their life cycles by the ESNB, also by any other gear that interacts with the species. Sometimes, at certain stages of their lives, the species may be exploited by more than one type of gear, depending on seasonal availability and size ranges of the species in different ecosystems.

It appears that tiger shrimp, brown shrimp and ribbonfish follow two distinct cohorts a year. It appears that all selected species enter one fishery or the other at each stage in their life cycle starting with the PN. The overlapping nature of fisheries is either due to different fisheries occurring in the same fishing ground or the same size of shrimp and fish occurring in a wide range of depths.

### **Resource-related problems**

Coastal aquaculture for tiger shrimp has so far consumed about 1,40,000 hectares of land. More land is being utilized for the purpose. Almost the whole industry now depends on the wild source for seed supply – so far more than 200 crores of tiger shrimp post-larvae and another 20,000 crores of other species which are discarded.

The plan for transition to semi-intensive culture to boost production and enhance foreign exchange earnings will need at least 10 times the present quantity of seeds. Farmers would have to depend on natural sources of shrimp in the absence of commercial hatcheries. As a result, aquatic organism other than tiger shrimp post-larvae would also be killed.

Such uncontrolled harvest of seed stock has dire consequences for the country's marine fisheries.

### **Present fishing system in coastal waters**

#### *Fishing Gear Used in the Coastal Zone*

Coastal fisheries includes a number of different types of fishing gears and crafts. Some of the gears are operated by mechanized or motorized boats, some by country boats (row boats or sailboats), and some

without any boat. These include five different types of gillnets (drift gill net, fixed gill net, large mesh drift gill net, bottom set gill net and mullet gill net), three types of set bag net (estuarine set bag net, marine set bag net, large mesh set bag net), trammel net, bottom longline, beach seine and many others scattered throughout the coast and estuaries which confine their operations to waters up to a depth of 40 meters. (Fig.2).

According to the frame survey of traditional and mechanized boats carried out by the FRSS (Fisheries Resources Survey System) of the Department of Fisheries in 1984-85, a total of 17,331 boats were in operation in the marine artisanal fishery. Of these, 3,317 boats were reported to be mechanized while 14,014 boats were non-mechanized. According to the Marine Wing of the DOF, about 6,000 mechanized boats are currently in operation in the Bay, of which about 4,000 are registered with the MMD (Mercantile Marine Department). According to another estimate (Nuruzzaman, 1991), the number of traditional and motorized boats in the estuaries and coastal waters of Bangladesh is 20,000 and 12,700 respectively.

The following nets are used in marine and coastal waters. They need special mention because of their major contribution to production or their major role from the management standpoint.

**a. Drift Gill Net (DGN)**

Drift gill nets are operated at depths varying from 20 to 40 m, exclusively for pelagic fish. The principal catch is *Hilsa ilisha*. Skipjack tuna, mackerels and sharks are caught as by-catch. The nets are made of nylon twine or tire cord. The nets are operated by motorized boats. The mesh size is around 100 mm. Hilsa drift gill nets are operated during the period March - October, other gill nets between November and February.

**b. Estuarine Set Bagnet (ESBN)**

This is a trawl net-type bagnet fixed at the bottom in canals and estuaries all around the coastline. It is the most widely used net in Bangladesh. The net operates throughout the year. Depth of water varies from 3 to 10 meters. This is very effective for catching juvenile/undersized species of fish and shrimps of marine origin. This gear is therefore destructive. The cod-end mesh size varies from 5 to 18 mm, and the nets are operated mainly by row boats.

**c. Marine Set Bagnet (MSBN)**

This net is almost similar to ESBN but the mesh size is a little bigger. It is operated in winter during mid-September to February in deeper waters from the island base e.g. from Dubla island, Sonadia island and Mohipur at 10-30 m depth. This net is operated by mechanized boats.

**d. Trammel Net (TRN)**

This is a three-fold bottom drifting gill net targeted for penaeid shrimps but also to catch valuable fin fish species. The net is comparatively new in Bangladesh and is concentrated along the Teknaf - Cox's Bazar coast. The mesh size at the inner wall is 40 - 45 mm.

This gear is operated almost throughout the year by country rowing boats within a depth of 5- 15 meters. The sizes of the species caught are biologically sustainable. Expansion of operations, both horizontal and vertical, could be encouraged.

**e. Bottom Longline (BLL)**

Bottom longlines are operated in winter between mid-August and mid-February at depths of 20-30 meters i.e. beyond 20 km from the shoreline, mainly from the Cox's Bazar base. These are operated from 6-14 HP mechanized boats. They target jewfish / croakers and also catch Indian salmon, catfish, threadfin bream etc.

**f. Beach Seine (BS)**

Beach seine are semi-encircling nets operated between November and February from the beach and from March to November in the estuary by country boats. These are concentrated in the Teknaf - Cox's Bazar coast, but are available throughout the country. Since the mesh size is small, i.e. 12mm in the middle, and the area of operation is very shallow, these nets catch the young and juveniles of jewfish, anchovies, clupeids and small shrimps.

**g. Shrimp Seed Collecting Gears**

Fine-mesh push nets, fixed bagnets and dragnets are used throughout the coastline in creeks, canals and estuaries for harvesting the larvae of *P. monodon*, the tiger shrimp. These nets are operated almost throughout the year with seasonal variations from region to region (such as January to October in Cox's Bazar, February to April in Patuakhali, January to April in Khulna, November to August in Satkhira). The catches contain larvae and juveniles of other shrimps, fin fishes and zooplanktons. The tiger shrimp larvae constitute less than 1% of the total catch. The remaining 99% are destroyed by seed collectors. This means serious damage to the resource and to the ecology. But the practice cannot be stopped because of the demand for shrimp fry from the shrimp culture industry. Monitoring and control measures are, however, being taken — including development of hatcheries for seed supply.

**Present management system**

The present management system focuses largely on the industrial trawl fishery. The other brackishwater and marine fisheries are not part of the management system.

In 1983, the Government of the People's Republic of Bangladesh enacted the Marine Fisheries Rules, 1983, in accordance with the provisions of the Marine Fisheries Ordinance, 1983.

The marine fisheries rules amended in 1993 provide for licensing and monitoring of artisanal and mechanized fishing boats. The monitoring of fishing vessels is done only by the Marine Fisheries Surveillance Checkpost at Patenga, Chittagong.

The main features of the ordinance are as follows:

1. Every fishing vessel should take a licence from the Department of Fisheries.
2. Every fishing vessel should supply catch and effort data regularly to the Department of Fisheries.
3. The following methods are prohibited:
  - a. Fishing by any gear with a mesh size smaller than the mesh size mentioned in the rules.
  - b. Fishing with any kind of explosive, poison or noxious substance.
  - c. Fishing with electro-lighting.

4. Mesh size : All licensed fishing vessels shall use nets of mesh size with the following dimensions:
  - a. For shrimp trawl net (boom) with low opening, the minimum mesh size shall be 54 mm at the cod-end.
  - b. For fish trawl net, mesh size at the cod end shall be 60 mm.
  - c. For large mesh drift net (MP), the minimum mesh size shall be 200 mm.
  - d. For small mesh drift net (SMD), the minimum mesh size shall be 100 mm.
  - e. For set bagnet (behundi **net**), the minimum mesh size at the cod-end shall be 30 mm.

### Area for fishing

Area up to 40 meters depth is reserved for artisanal fishing gears. The industrial fishery is allowed to operate beyond 40 meters depth.

### Marketing

In Bangladesh, fish marketing is handled almost exclusively by the private sector, the only exception being the limited fish marketing activities carried out by BFDC. A group of intermediaries known as *aratdars* (commission agents) and *mohujans* (money lenders) control and finance fish marketing operations. *Aratdars* who dominate wholesale markets have a chain of suppliers (traders) who regularly bring in catches.

To ensure regular supplies, advance payments are regularly made to catchers and suppliers. These “Aratdars” charge 3-6% commission and take 2-4 fish for every 80 fish sold (World Bank, 1991). Most fishermen operating traditional boats bring their catches directly to landing centers / wholesale markets where the catch is taken over by traders (Fig-3).

BFDC’s entry into fish marketing was primarily to develop a modern fish marketing system and provide market stability to help both consumers and producers, However, the BFDC has not been able to fully achieve these objectives, because of certain limitations.

In the coastal region, fish is landed and distributed through a large number of landing centers located in Chittagong, Cox’s Bazar, Barisal, Bhola, Patuakhali and Noakhali. BFDC operates a number of wholesale markets and landing centers in Chittagong, Cox’s Bazar, Khulna, Kheppupara and Patuakhali.

Traditional boats which fish inshore and carry out day fishing do not use ice to preserve catch. Fishermen operating small traditional crafts usually land their catch on beaches, river banks and landing places. The quality of fish landed in this way often deteriorates. The fish harvested commands a low price. Of the fish harvested, about 85% is consumed fresh; the remaining 15% is dried, dehydrated, salted or frozen.

Almost all mechanized boats which undertake trips of four to six days in coastal waters carry ice in insulated fish-holds. After landing, the fish is auctioned at landing centres and transported to different markets. These landing centers have facilities for ice boxes where re-icing and packing is done for long-distance transportation by trucks or insulated vans. Fish traders who own motorized transportation boats carry ice and collect catches from fishermen operating in rivers and estuaries.

Fishermen operating in offshore areas land their catches in temporary island camps. The catches are sun-dried. BFDC operates a number of refrigerated vans for long-distance transportation, particularly in Dhaka city.

All freezer trawlers process their catches on board for export. Some fish trawlers land their catches for further reprocessing in shore-based fish processing plants. Poor-quality fish and small shrimps are converted into fish meal at fish meal plants in Chittagong and Cox's Bazar.

Bangladesh also markets coastal and marine fisheries products including shrimp to various international markets. The export trend is strengthening. (Table 4).

#### **Organizations and agencies concerned with management of coastal fisheries**

The DOF marine wing is located at Chittagong. In 1983, the Government of Bangladesh enacted the Marine Fisheries Rules 1983 in accordance with the Marine Fisheries Ordinance, 1983. According to these rules, the DOF marine wing issues licences and monitors operation of fishing vessels. It is the Ministry of Industry, however, that is authorized to accord permission for acquisition of fishing trawlers in consultation with the Ministry of Fisheries and Livestock.

The Marine Fisheries Rules, amended in 1993, provide for licencing and monitoring of artisanal fishing boats. The rules also regulate mesh sizes, fishing areas and fishing methods. Movement of fishing trawlers, and general surveillance of the area, is carried out from a checkpoint located in the Bay. For patrolling of the EEZ, the DOF procured two ships and placed them under the operational control of the Bangladesh Navy.

Besides the Ministry of Fisheries and Livestock, other Ministries / Agencies directly or indirectly concerned with fisheries management are the Ministry of Land (for leasing of public open water bodies or Jalmahals); the Ministry of Industries (for licencing and promotion of fish processing industries, trawler industries etc.); the Ministry of Commerce (for export of fishery products and import of fishery and fishing inputs); the Ministry of Irrigation, Water Development and Flood Control (for developing embankment and water control structures); the Ministry of Local Government and Rural Development (for registration of fishermen cooperative societies); and the Ministry of Environment and Forests (for management of water bodies within the Sundarbans reserve forests and conservation of the mangrove ecosystem).

#### **Bangladesh Fisheries Development Corporation (BFDC)**

The BFDC was established in 1964 with a view to promoting the fishing industry, particularly in the marine sector. The BFDC's major functions are:

- a. Develop infrastructure for preservation, processing, distribution and marketing of fish and fish products.
- b. Undertake a survey of fish resources in the sea.
- c. Acquire, hold or dispose of fishing boats, fish transportation carriers / vans
- d. Establish units for capture of fish and promote an organization for exploitation of fish wealth.

#### **Fisheries Research Institute (FRI)**

The **Fisheries Research** Institute was established in 1985 as an autonomous body under the administrative control of the MOFL. Prior to the establishment of the Institute as an independent autonomous body,

fishery research activities used to be carried out by the DOF in its own research stations. Research stations and ancillary facilities of the DOF were subsequently transferred to FRI to plan and undertake adaptive research.

### **Marine Fisheries Academy**

The Marine Fisheries Academy was established by BFDC in 1973-74 in the fish harbour complex at Chittagong to create a core of qualified skippers, engineers and crew for operation of trawlers. The subjects taught are navigation, marine engineering, electronic engineering, refrigeration engineering and operation of trawlers. The Academy currently works under the direct control of the MOFL.

### **Universities**

The Bangladesh Agriculture University (BAU at Mymensingh) has a faculty of fisheries for awarding B.Sc (Hons) and M.Sc degrees in fisheries. The University of Dhaka, Chittagong and Rajshahi, have their own academic programmes in fisheries. The University of Chittagong has an Institute of Marine Science that awards degrees in marine biology.

### **Fisheries co-operatives and associations**

There are five fishermen organizations in Bangladesh :

1. Bangladesh Jatio Matshyajibi Samabay Samity (BJMSS), established in 1960
2. Bangladesh Jatio Matshyajibi Samity (BJMS), set up in 1986.
3. Bangladesh Jatiotabadi Jele Dal (BJJD), set up in 1993.
4. The Bangladesh Marine Fisheries Boat Owners Association.
5. The Marine Fisheries Association.

The BJMSS is the apex society registered with the Department of Co-operatives. It has 88 central and 4,243 primary societies. As of June 1983, the primary societies of BJMSS had a total of 537,244 individual members (BOBP, 1985).

### **Non-Government Organizations (NGOs)**

There are several fisheries NGOs in Bangladesh. But only a few of them are active in coastal areas and work with coastal fisherfolk communities. These are:

1. Community Development Centre (CODEC), operating in Chittagong, Noakhali
2. CARITAS Bangladesh, operating in Chittagong
3. “Deep Unnayan Sangstah” operating in Hatia and Noakhali
4. “Uddipan” operating in Sandwip (Chittagong).
5. Bangladesh Samai Unnayan Samity (BSUC) in Baskhali, Satkhania (Chittagong).
6. Association of Zonal Approach Deveiprment (AZAD) operating in Cox’s Bazar.

7. “Gona Unnayan Prachesta” (GUP Madaripur and Chittagong).
8. “Bandhujan Parisad” operating in Bhola.
9. Proshika Manabiuk Unnayan Kendra (Proshika-MUK) in Bhola.
10. Grameen Bank.

### **Dynamics of the fishery**

Fishing operations in estuaries and coastal waters used to be carried out by traditional craft until the mid-1960s. From 1966, two organizations — BFDC and BJMSS — started the process of mechanization by importing and introducing marine engines and nylon twine. A frame survey of traditional and mechanized boats was carried out by the Fisheries Resources Survey System (FRSS) of the Department of Fisheries (DOF) in 1984-85. According to that survey, a total of 17,331 boats were in operation in the marine artisanal fishery of which 3,317 were reported to be mechanized boats.

### **The problems in coastal fisheries :**

1. High dependency on fishing on the part of the fishermen community.
2. Low catches and incomes from the most common gear.
3. The multi-species and multi-gear character of the fisheries.
4. Lack of access to formal credit.
5. Dependence on the Aratdar or the local money lender.
6. High interest rates payable charged by the informal system (money lenders etc.)
7. Little control over the marketing system.
8. Fishermen unable to charge market prices for the fish, since the fish are sold to money-lenders.
9. Lack of organization in the fisherfolk community.
10. Lack of proper marketing chain.
11. Lack of post-harvest facilities at landing centres.
12. Lack of knowledge in post-harvest handling of fisheries products.
13. Lack of knowledge of modern fishing technologies
14. Lack of storage, preservation and processing facilities during the peak season.
15. Fishermen do not react promptly to warnings about natural disasters.
16. Lack of shelter for fishing craft when natural disasters strike.
17. Loss of crafts and gear, both from natural phenomena and from piracy
18. Lack of facilities to mend nets, and high prices of fishing equipment, gears and accessories.
19. Lack of knowledge about health care, education, family planning, and a hygienic environment.
20. Fishermen lack understanding about fisheries management, though they are aware of decline in fisheries resources.
21. Fishermen are not pro-active about taking up alternative income-generating activities.



22. Conflicts in fishing grounds between mechanized and country boats and trawlers
23. Fishermen lack awareness about the need to save for the future.
24. Lack of trained manpower at the managerial level.

#### Measures taken by the Management Authority Association/NGOs

1. A project was undertaken to identify stakeholders in the estuarine set bag-net fishery and the shrimp post-larvae fishery. The perceptions of stakeholders and their modes of communication were analyzed at meetings of fishermen, Government staff and NGOs.
2. Intensive consultations were held with fishermen communities to mitigate fishing problems in the two villages of the coastal belt
3. The views of stakeholders at the highest level — national political leaders – were obtained for managing coastal fisheries, marine fisheries and development of the fisherfolk community.
4. The concept of participatory management was initiated in 1996 by the Government and BOBP.
5. A project was undertaken by the Government in 1995-96 to eradicate poverty among fishermen communities. Fund for both fishing and non-fishing activities provided from the government's own resources.
6. To ensure security of the fishing industry as well as of resources, the Government has engaged the Coast Guard and the Bangladesh Navy in carrying out surveillance of coastal areas.
7. Scientists have identified the ESNB fishery and the shrimp larval fishery as destructive fisheries.
8. A programme has been undertaken to find out alternative fishing and non-fishing activities to rehabilitate fishermen using destructive fishing gear in case these gear are banned.
9. Various NGOs have been allowed to take up projects to solve social and economic problems among the fishermen community.
10. A small project has been undertaken by the Government to mitigate managerial problems in fisheries, motivate fishermen to take up participatory management, and raise awareness-building about resource limitations and destructive gear.
11. A Marine Fisheries Ordinance is in force to conserve coastal resources for the benefit of fishermen.
12. A programme of motivation and awareness-building among fisherfolk has been launched under the auspices of a BOBP-supported project, to improve participatory management of coastal fisheries.
13. A system of joint ownership of mechanized fishing boats is being promoted whereby the boat owner provides investment, the fishing crew contribute labour, and 50 per cent of the catch earnings go to the crew. This system will provide the incentive for higher catches and better boat maintenance. It will improve the living standards of the crew, who will regard themselves as joint owners of the mechanized fishing boat.

### Recommendations

1. Mechanized and non-mechanized fishing boats should be issued licences for a fixed duration. When that expires, no new licences should be issued; only old ones should be renewed.
2. Hatcheries should be established to ensure regular supply of low-cost post larvae shrimp and stop collection of wild seed.
3. A rehabilitation programme should be undertaken for users of destructive gears before the gears are banned.
4. Under-exploited and unexploited resources such as tuna and tuna-like fishes, mussels, squids, octopus, crab, lobster etc. must be assessed through scientific surveys. Initiatives must be taken up for exploiting these resources, with strict monitoring and control programmes. A project in this connection should be undertaken.
5. The feasibility of extending the trammel net fishery into deeper waters should be studied. The possibility of ESBN fisherfolk engaging in viable fishing methods such as longlining should be studied in detail.
6. The government, NGOs and international donor agencies should undertake a motivation and awareness-building programme to improve the quality of life of fisherfolk, take up income-generating activities, and introduce participatory management.
7. Facilities should be established for secure shelters for fishing boats during a cyclone.
8. Restrictions on trawlers preventing them from trawling in depths below 40 meters should be implemented strictly.
9. Discharge of poisonous wastes, insecticides, and other chemicals harmful to the coastal environment should be stopped.
10. Training needs for marine fishery officers and fishermen should be identified and addressed, so that they are capable of encouraging participatory approaches to fisheries management that will prevent resource depletion.
- II. Deforestation of mangroves for any purpose should be banned. The concept of Integrated Coastal Zone Management must be put into practice for environment- friendly development of coastal zones.
12. A database management system should be established in industrial and marine artisanal fisheries, in order to bring the entire coastline under a computer network system.
13. Insurance for vessels and group insurance for all the crew should be compulsory.
14. Low-interest credit should be made available without collateral for registered craft.
15. A policy should be formulated by the Government for conservation and exploitation of coastal fisheries.

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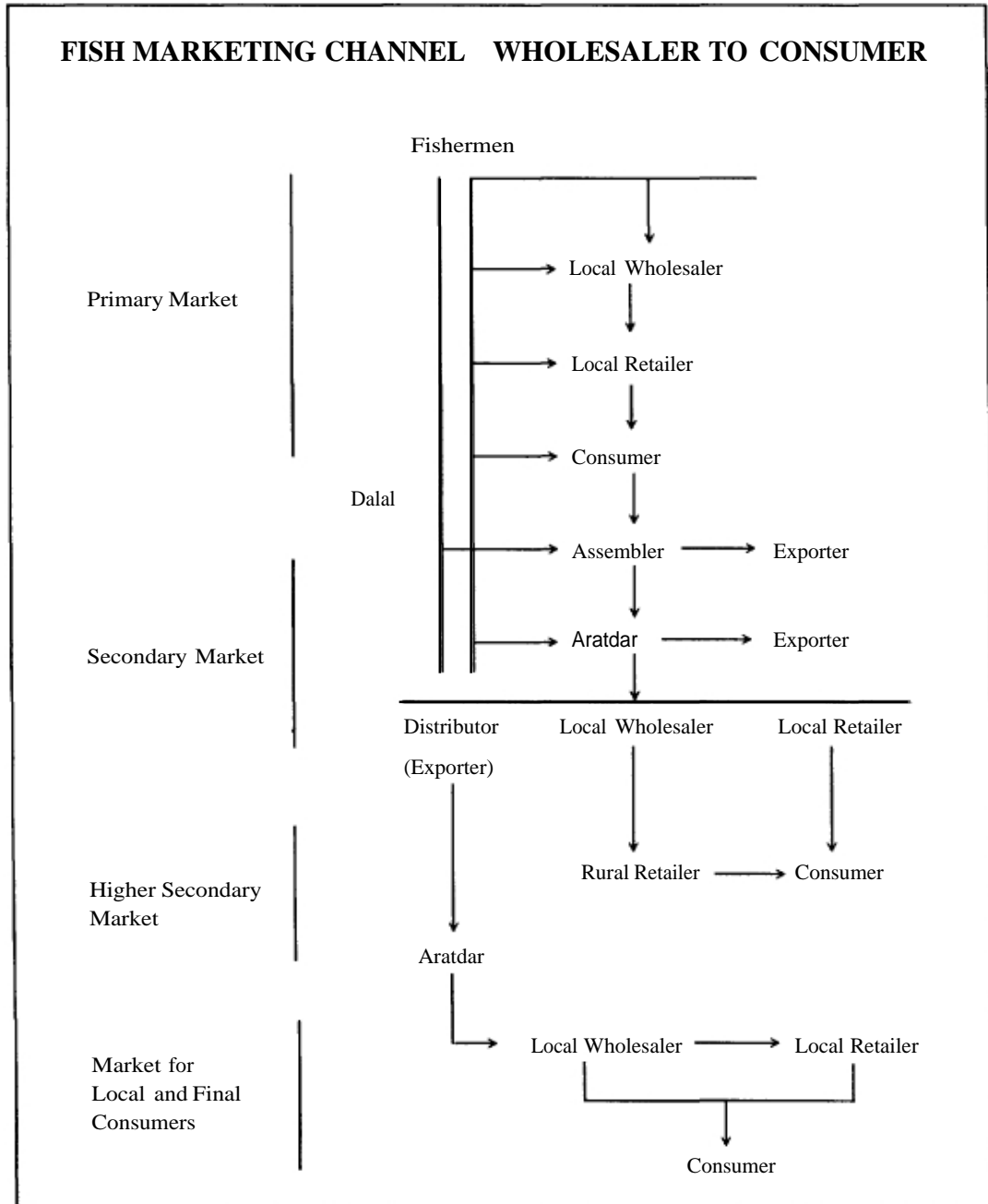
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Source Based on JR Coulter and J.G. Disney

Figure 1: Coastal Zones of Bangladesh

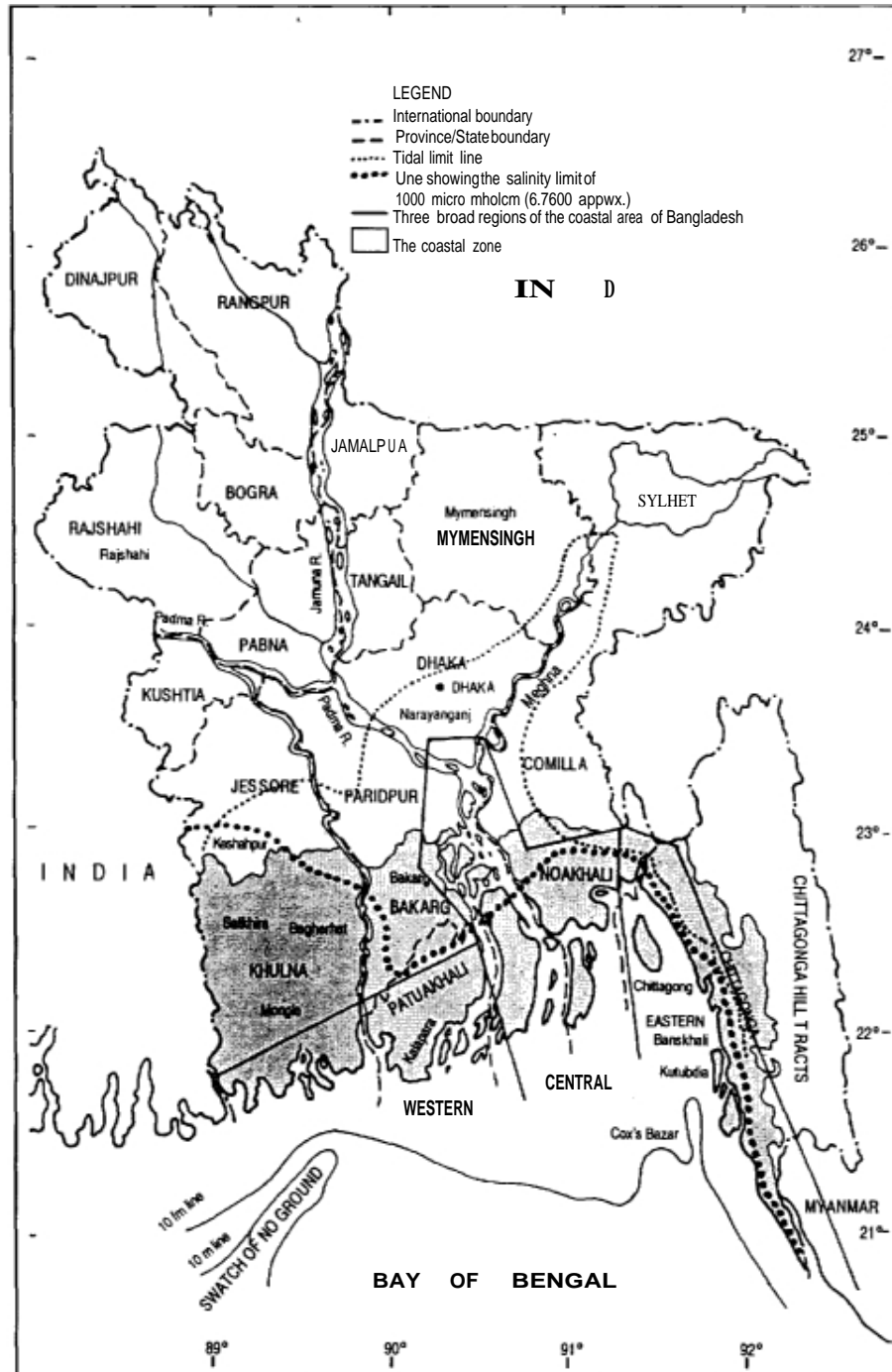


Figure 2 Area of operation of different fishing grounds

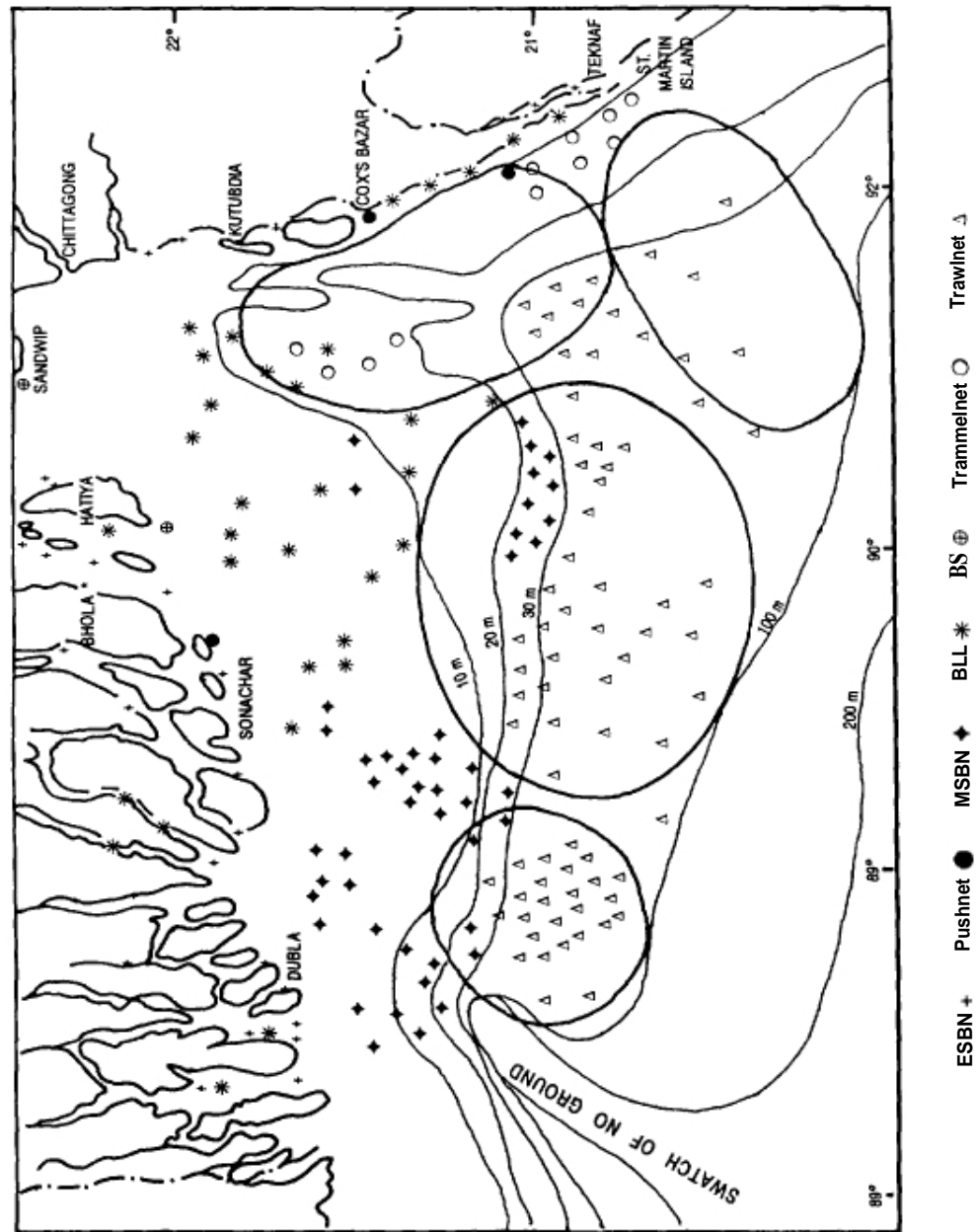


Figure 3 : Marine and Coastal Waters of Bangladesh

