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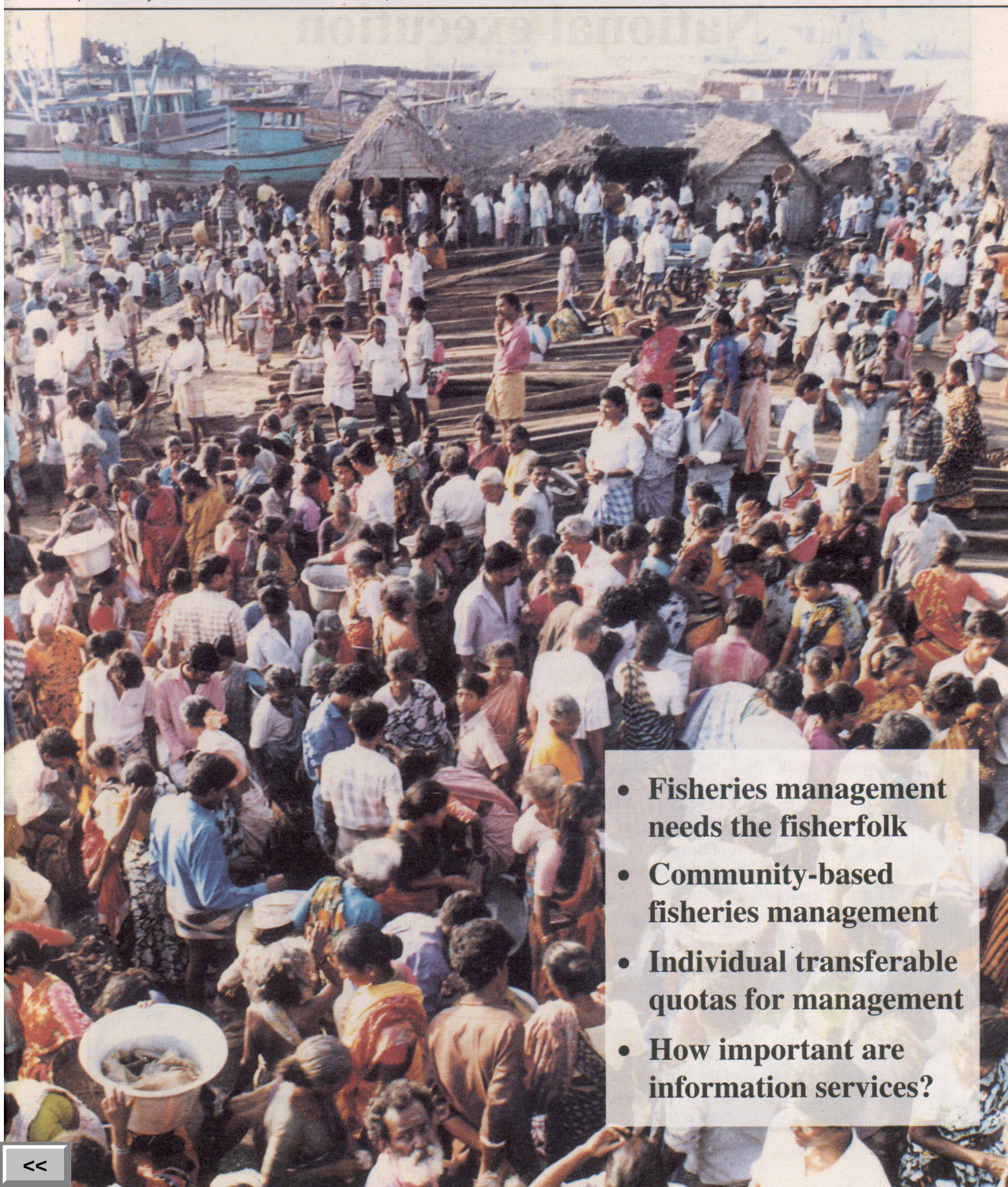

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National execution is the only way now

Project activities during the first and second phases of the Bay of Bengal Programme (BOBP), from 1979 to 1994, were aimed at improving the living standards of the coastal fisherfolk. These activities included:

- Development, demonstration and extension of new technologies.
- Support and assistance to national research efforts.
- Assistance to institutional strengthening and local capacity-building.
- Assistance in evolving improved fisheries plans and programmes.

Project activities in those years were usually a result of the felt needs of the Ministries of Fisheries in each country. Many of those activities were born out of the needs expressed by fisherfolk and some due to assessments of Project staff. Some were technology-oriented, others were extension- and people-oriented. But in the case of ALL the activities, **lack of funds and/or lack of national expertise** were the reasons for requests for external assistance. These shortages naturally made nationally executed efforts more difficult. But times have changed.

After 40 years of technical assistance and human resources development (HRD) in the region, more so during the span of the Bay of Bengal Programme, more than adequate human resources have been trained in the Departments of Fisheries of the region to implement projects and management activities. The time is ripe to encourage local capacity utilization from the HRD critical mass built up over the years in the course of local capacity building and institutional strengthening. As important is the fact that many of the national or state governments in the region are increasingly able to shoulder the burden of financing many of these activities. This healthy trend has already taken root in many of the newly emerging industrial economies of Asia, such as Malaysia, Thailand and Indonesia.

The BOBP in its Third Phase, a new BOBP, is now committed to working with endeavours which have moved from externally-funded and international project staff-implemented projects to nationally-funded and nationally-executed project management regimes. To bring this about, reliance on local management models will be necessary, aided as it were through TCDC mechanisms, whenever such opportunities present themselves.

National execution alone will achieve sustainability of the development process as it will build in the institutional capacity to carry projects forward, beyond the time frame of each. There is, simultaneously, increasing concern among the donor fraternity that money and effort expended should not result in project-induced changes coming to an abrupt halt at project termination, as has often been the case in the past. A changed outlook, a national commitment, ensuring the continuance of a project after training and implementation, is seen as essential.

BOBP will collaborate with national governments throughout its Third Phase by offering technical assistance, guidance and any further training necessary for national staff to implement in a sustainable manner projects their governments have committed themselves to. But Ministries and Departments of Fisheries in the respective member countries will have to now view projects as **their own** and not as FAO/UN's and donors', **National sustainability will come only with national execution** and this needs getting used to the changed outlook sooner than later.

— Kee-Chai CHONG

Fisheries management needs the fisherfolk

by

Kee-Chai CHONG

Programme Coordinator, BOBP

Introduction

Of the 200 fisheries monitored by the United Nations Food and Agriculture Organization's (UN/FAO) Fisheries Department, a third has been overfished or depleted, mostly in the developed countries. This alarming situation is not entirely different in the developing countries where there are generally no restrictions on the number of fishing boats/fishermen entering the fisheries. There is general consensus among all the countries that overfishing should be avoided, but very little is done to prevent it, with both developed and developing countries acknowledging that fisheries management is not easy to implement and enforce.

Our present state of scientific knowledge, statistical databases and lessons learned from past management of fisheries, as well as indigenous knowledge passed down through generations of fisherfolk, are adequate to manage our fisheries. Fisheries management, however, cannot take place in a vacuum. It has to have the active support and commitment of the people, the fishing communities and industry as well as the public at large. Without such support, fisheries management will remain a widely accepted goal and not a reality. Unfortunately, implementation and enforcement of fisheries management mean different things to different people.

In business, management is considered necessary and is, therefore, a **benefit.** In fisheries, however, management is viewed as a **cost.** In fact, the lack of management in fisheries has led to overcrowding, overinvestment and overcapitalisation, leading to excess capacity in the industry. This excess capacity is

How crowded fishing is getting! This is Phuket Fisheries Harbour, Thailand

Even a rural landing centre, this one in Indonesia, demonstrates that too many are chasing after ***too few fish***

costing the industry billions of dollars each year due to gross inefficiencies, mostly in terms of redundant labour and capital. This cost is met through government assistance in the form of subsidies and other assistance to the industry. Consumers also pay more for the fish they eat. In this context, fisheries management should be viewed as a **benefit,** for such management not only benefits the fisherfolk, but the whole economy. In fact, the UN/FAO shows that industry rationalization through fisheries management would produce a benefit of US $ 80 billion a year.

Gains from fisheries management are clear. Yet, fisheries management has not had the impact desired or expected. With one or two notable exceptions, as in the herring fishery off Norway, the world fisheries situation and outlook, especially in developing countries, urgently call for immediate intervention to slow down and prevent further depletion of fisheries stocks.

Growing demand

World fish output has grown fivefold since 1950 through the introduction of modern fishing technology and discovery of new fishing grounds and new species. The total world marine catch has stabilized at about 85-95 million tonnes since the 1970s. In spite of growing effort and new investment, the marine catch has not fluctuated widely, as catch statistics from different countries, such as India, have shown over the last few decades. But demand for products from the sea is projected to grow to 130 million tonnes by 2000 and fishing pressures will increase. Any increase in landings beyond 100 million tonnes would, however, decimate the parent stock.

With increasing demand and declining catch, the per capita availability of fish has been steadily falling, from about ***43*** kg in 1988 to 40 kg in 1992. Those species of fish in greatest demand are subject to the greatest fishing effort and pressures. Consequently, such fish face the prospects of rapid overexploitation and, thus, depletion.

Consumers and seafood connoisseurs also share the blame in bringing about overfishing because they are willing to buy fish which are under-sized, non-adult or immature. Fish roe are a delicacy among certain groups of consumers. So, frequently, a premium is paid for gravid fish. Because of their willingness to buy and pay for such fish, market signals are being sent to fisherfolk that there is a demand for such fish.

Fishing pressures on fisheries resources can be eased by reducing the demand for fish. This, however, is not likely to happen as seafood is a much sought-after item of food and contributes significantly to a healthy diet. As a result, it is crucial that strict fisheries management be urgently brought to bear on fisheries which are being overfished.

Overfishing

The quality of capture fisheries has been steadily deteriorating globally, stemming from 'too many tisherfolk chasing after too few fish', habitat and environmental degradation caused by pollution, and indiscriminate use of modern technology. Particularly since large-scale commercial operations started, fisheries worldwide have been under continuous stress.

Overfishing also takes place where unwanted species caught by indiscriminate fishing technology are discarded overboard. It is estimated that for every tonne of fish landed, about 325 kg are discarded or thrown overboard. Capture of unwanted species affects the complex food chain/web and such bycatch also results in the loss of a valuable food resource.

The failure or lack of success of fisheries management stems from the confused or muddled understanding of what 'overfishing' means, particularly in terms of quantifiable measures. There are, at present, 117 definitions of 'overfishing' in use by different fisheries management bodies or authorities (Rosenberg *et al.,* 1995). An ideal working definition of 'overfishing' is perhaps one that provides for a threshold not to be crossed or exceeded, rather than a target, and should be based on sound theory, be biologically sensible, operationally unambiguous, measurable and linked to management actions that tackle today's problems.

Today's problems

Today, unfortunately, fisheries, whether capture or culture, are dominated by non-***bonafide*** fishers and fish farmers. Fishing used to be a low-status occupation which no one would take up if they had an alternative; today, ***bonafide*** fishermen are unable to compete with the 'new' fishermen who have more capital or financial resources. This influx of additional 'new capital and labour' is because fish as a consumer food item is much sought after due to its health attributes. And, as a result, fisheries management today is increasingly being dominated by these ***non-bonafide*** fisheries interests.

Further, we continue to allow, and even encourage, the construction of small fishing boats, **not** as replacements for ageing boats but as new entries, when it is known that nearshore fisheries can no longer support additional fishing effort. Even more ironic is the fact that fisherfolk continue to learn, adopt or are

taught new fishing techniques or are provided with new fishing gear or technology which are more and more efficient.

Another disturbing trend is the unrelenting promotion of offshore fisheries. Even though there already exists surplus capacity in the fisheries, many countries are still pushing for offshore fisheries exploitation. Malaysia has recently licensed 600 new boats for offshore fisheries. In India, there has been expanded investments in offshore and deepsea fishing.

The fisherfolk

Whatever the problems they face, fisherfolk continue to fish in spite of the fact that many of them do not even earn enough to stay in fisheries and continue fishing. Part of the reason is that they do not have any alternative to fishing. This means that the opportunity cost of their labour is effectively zero, or almost zero. Because there is no labour market where they live (that is, organized labour market or otherwise) for them to hire themselves out for a wage, they turn to fishing as the employment of last resort. Practical solutions must be found to **add** value to this redundant labour and capital, whether within fisheries or outside fisheries.

Attracting such redundant labour and capital out of fisheries not only adds value to these redundant inputs but also directly reduces fishing pressures on an already stressed stock. Reduced fishing pressures on the fisheries makes the fisheries management effort more manageable, because there are less fisherfolk and boats to manage.

Management benefits

From the above, it can be concluded that managing, and therefore conserving, fisheries resources is in the definite interest of not only the fisherfolk *per se* but, equally, of 'others' in the entire market chain: market intermediaries (middle-persons), consumers and non-consumers of fish alike.

Management of fisheries in the past has not made any appreciable, let alone lasting, impact because such management was generally hastily put together and not well thought-out. More fundamentally, enforcement was lax or weak.

For fisheries management to work, efforts must be aimed at both the pre- and post-harvest sectors within the entire marketing chain

Further, many management plans did not benefit from the R&D findings available nor were they based on the analysis of generations-old indigenous knowledge.

More discouragingly, there continues to be a lack of appreciation of the process of legislating fisheries management in developing countries. Politicians, policy-makers and planners have been conditioned to the notion that legislation of any kind has to be carefully thought through before proposing it to the highest governing body for its approval. Legislation need not be so. Ample room exists for revising, amending or even voiding legislation already passed. But for fisheries management to work and succeed, fishermen must not only derive 'promised or expected' benefits in the 'future', but they must see immediate, direct, tangible economic benefits.

Resource users as resource managers

In harnessing the bounty of the sea, or more specifically fisheries exploitation, who should decide:

- What to catch and harvest?
- Where to catch?
- How to catch?
- How much to catch and harvest?
- When to harvest?

For fisheries management to work and succeed, it is the fishing community, in particular the fisherfolk, who should answer these questions and, thereby, buy into the concept and practice of fisheries management. They must first understand and appreciate the need for and benefit of managing the fisheries resources on which their livelihood and future well-being depend. In order for them to accept fisheries management, it is important to describe and explain to them what fisheries management is all about. If the community accepts the concept, there is then no need for enforcement. Compliance will be automatic.

Fisheries management must also have the support of the political machinery to succeed, as fisheries issues have been and are highly politicized.

A great deal of work on fisheries management, including formulating management policies, laws, regulations and measures, has been done, experience accumulated, and lessons learned. There is therefore no need to re-invent fisheries management, but to build on the foundation already in place. However, new ground needs to be broken in terms of approaches employed.

Participatory approach

Although there has been some effort at fisheries management in different countries, and widespread call for more management of the environment and natural resources in general and fisheries in particular, little or no attention has been given to its implementation at the local, grassroots, or field, level.

Fisheries management at work. Fish catch using a TED/BED (turtle/by-catch excluder device) with shrimp trawling gear at Paradwip, Orissa. (Photo : Rakhal Mishra, DOF, Orissa)

The participatory approach is one BOBP has encouraged for better fisheries management

One innovative approach can be to decentralize management responsibility and authority and make the fishermen resource managers. The idea of resource users as resource managers makes sense because it is in their interest to ensure that the fisheries resources' long-term productivity, stability, sustainability, equity and biodiversity are looked *after*.

Many fisherfolk feel that government intervention in fisheries had lacked commitment and sustained effort, with many fisheries policies and assistance programmes lacking consistency and continuity. In Malaysia, in spite of opposition to some of its unpopular fisheries policies and programmes, the Government of Malaysia stuck to its guns and strictly enforced its policy. As a result of this persistence and value addition before the fish changes hands from the fishermen to the middle-person, Malaysian fishermen are reaping the benefits of such intervention, most notably in the form of at least 50-60 cents of every consumer dollar going to them, compared to 20 cents in the past.

Another lesson is that fisheries management should be personalized and individualized to the extent possible. In other words, management must be custom-tailored to suit the situation at hand. Management of fisheries carried out so far has been very impersonal. Fishermen are individuals in their own rights. To 'lump' them together and enact a programme to cover all of them has angered and caused frustration among many of them. They complain that one fisherman is different from another and another. The key is to 'humanize' and individualize fisheries development assistance and fisheries management.

This fact has been well brought out by the fisherfolk surveyed by the Bay of Bengal Programme (BOBP) over a period of 15 years in Southeast and South Asia. In addition to management, BOBP found that the other important concept is the need for grassroots 'participation'; indeed, participation is a prerequisite to self-improvement.

Fisheries management strategies must be worked out not only in close consultation with the scientific community but equally with the fishing community. After all, it is seldom the scientific community who discover new fishing grounds or stocks of fish; usually it is the fishermen themselves.

BOBP, in close consultation with its member countries, has been and continues to assist in the development of knowledge-intensive fisheries management measures or packages to be implemented in the field. The key emphasis has been on field or grassroots implementation and enforcement through community self-policing.

Conclusion

It will be seen that fisheries management should be well-formulated as well as well-articulated for it to be fully understood and appreciated by fisherfolk. To work, fisheries management calls for strong public and political support and commitment. Fisheries management rules, regulations, laws and measures, however, can be formulated, legislated and passed, but unless these so-called guidelines are respected by the fisherfolk, they will be fruitless. It is therefore crucial to bring in and actively involve the fishermen and their communities into the management process to ensure success of fisheries management.

• *Our COVER is of a typical day at Madras, India's fishing harbour as the crowd awaits the landing of the catch. That crowd reflects clearly how there are too many people after too few fish.*

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Community-Based Fisheries Management:

Government, BOBP, NGOs, Community Leaders and Fisherfolk in Partnership for Phang-Nga Bay

by

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Thirtyfive fisherfolk and community leaders arrived early one morning during the neap tides of February onto a small island in the Andaman Sea coast of Thailand to participate in the Government of Thailand/BOBP Community-Based Fisheries Management Workshop*. For the next three days, they would be working together with Department of Fisheries (DOF) representatives, social and natural scientists, University professors, NGOs, FAO and BOBP to build a common understanding of the importance, benefits and constraints, roles and responsibilities, and needs for flexibility in undertaking the new approach of 'partnership in management', an experiment in coastal fisheries resource management for Thailand. The experiment they came to be a part of is the DOF/BOBP Third Phase Project on 'Community-Based Fisheries Management in Phang-Nga Bay'. The earnest expressions of the fisherfolk and govemment officials reflected the commitment that each brought to the Workshop, dedicated to plotting a new course towards the sustainable management of Phang-Nga Bay's coastal resources.

Geography of the Bay

Phang-Nga Bay is on the western coast of Thailand, protected from the rough waters of the Andaman Sea by the island of Phuket. Its geographic characteristics has rendered it one of the most biologically productive Bays in the Andaman Sea. It is also a recognized area of global significance. Phang-Nga Bay will be proposed as a UNESCO World Heritage Site. Nutrient-rich rivers flow into the Bay, and dense mangrove areas provide nutrients and estuarine habitat which support its rich aquatic life (Limpsaichol *et al* 1996). The major river system contributing to the high primary productivity is the Phang-Nga River, which serves as a spawning and nursery ground for many of the important food fishes and invertebrates of the Bay (Pimoljinda 1996).

Institutional arrangements

Not only is geography on the side of Phang-Nga Bay. Institutional features will also benefit the Bay and its fisheries communities under the Community-Based Fisheries Management (CBFM) Project. The Phuket Marine Biological Centre (PMBC) is right at the Bay's doorstep, and as the lead BOBP national implementing organization, brings to the Project its scientists and its organizational coordination with other government agencies and scientists throughout Thailand and abroad through its international reputation in marine scientific research.

An equally important implementing agency is the Andaman Sea Fisheries Development Centre (AFDEC). It holds the extension link with the Bay's fisherfolk, and has long been assisting the fisherfolk through many ongoing projects, including artificial reefs, finfish cage culture and mussel culture rafts. AFDEC has also been working in cooperation with the Italian NGO Africa '70 to provide new oyster and green mussel culture techniques to fisherfolk in Ban Hin Lom, and other villages in the Project site. Extension workers organized the fisherfolk to work together and cooperate in the culture of oyster and mussel.

The organizational structure of DOF is very progressive and optimal for the coordination needed to implement coastal resources management. The jurisdiction and responsibilities for restoration of coastal resources is under the same umbrella as smallscale fisheries within PMBC and AFDEC.

These two branches of the Department of Fisheries complement each other in order to provide the wide range of organizational coordination, support, information and services to the community required for the CBFM Project. In addition, PMBC and AFDEC will coordinate with not only other government agencies such as the Forestry Department, Harbour Department, Health Department and the local government and provincial agencies, including *Changwat* (Provincial), *Amphor* (District), *Tumbol* (Town) and *Moo Ban* (Village), but also area Universities and NGOs including the Prince of Songkla University, Kasetsart University, Chulalongkorn University, World Wildlife Fund of Thailand, Raindrop Association, and the central stakeholder, the fisherfolk, to ensure the cross-sectoral coordination necessary for all concerned to be a part of the fisheries management process.

Socioeconomic characteristics

The DOF/BOBP CBFM Project in villages along the western coast of

* The Government of ThailandlBOBP Community-Based Management Workshop was supported by the FAO Japanese Trust Fund.

Fisherfolk presentations on resource management initiatives underway in Phang-Nga Bay. Mangrove rehabilitation on Ko Yao Yai and Ko Yao Noi Islands

Phang-Nga Bay is one of the three CBFM pilot projects to be implemented in Thailand. AFDEC has good reason for choosing this site. Besides being of ecological importance, socioeconomic conditions of the area indicate a strong need for the Project. Living conditions of smallscale fisherfolk in Phang-Nga Bay is the lowest relative to those in the Gulf of Thailand and Andaman Sea. Fishing is the main source of income for smallscale tisherfolk. In the Gulf of Thailand, fishing contributes 80% of the income, in Andaman Sea it is 77%, and 78% in Phang-Nga Bay. Therefore, the conditions and health of the fisheries and its habitats are critical for the long-term welfare of the smallscale fishing communities.

Recent reports indicate that the numbers of fishing households and fishing boats are increasing throughout Thailand. Commercial fishing households have the highest increase, with 15.3%, compared to 9.5% increase in small-scale households. The increase in the commercial fishing households has brought about a break-up of the 'family fishing structure'. Women's roles have become limited by this change in the fishery. Women do not go out on commercial boats and have taken on tasks that take them away from the family, including work in canneries and large-scale processing plants.

Smallscale boats have increased in number by 6.6%. The implications for community-based fisheries management was discussed, and it was noted that a major factor in increase in smallscale fishery households and boats was the success of artificial reefs and the idea that communities can look after fishing areas themselves. As community-based management becomes more successful, smallscale fisheries may increase in popularity as a profession, and communities should be prepared for additional management considerations this may imply.

Earlier efforts paved the way for CBFM in Phang-Nga Bay

In addition to AFDEC's work with Africa '70, a diversity of experiences in Phang-Nga Bay have helped to provide a firm foundation for CBFM. These experiences were described and presented by the fisherfolk during the Workshop. The work has been at the initiative of many of the communities in the Bay, particularly in Ko Yao Yai and Ko Yao Noi Island of Phang-Nga Province. The community leaders expressed their concern about the pollution problems in the Bay, and stated that they are aware of the problems and general environmental effects. They feel the direct effects particularly in Trang Province from shrimp pond effluent, and believe that the water discharged may destroy their environment. Sediments and other pollutants are found in the effluents, and it is felt that it will be more of a serious problem in the future. The fisherfolk have long recognized the relationship of the Bay's healthy habitat to their fisheries resources, and facing an increasing loss of mangrove areas from aquaculture and other land-use changes, and a declining catch and smaller fish over the last ten years, initiated a mangrove reforestation programme in 35 villages of Phang-Nga Province.

Early success in this initiative helped support the idea of community-based management in the area, and paved the way for a later undertaking that brought

Panel discussion of fisherfolk from four provinces in Phang-Nga Bay and surrounding areas

the concept even greater influence. In April 1995 the Governors and village leaders from the three provinces of Phuket, Krabi and Phang-Nga signed an agreement to ban pushnets and trawlers within the 3-km zone reserved for smallscale fisheries and in particular within Phang-Nga Bay. Both fishing practices are some of the most destructive fishing gears practised in tropical waters. The fisherfolk voiced their commitment for sustainable resource use and responsible fishing with this fisherfolk-led initiative. What's more, the larger community of Phang-Nga Bay responded by supporting the ban and ratifying it as a Bay-wide policy.

Highlights of the CBFM workshop

In the spirit of cooperation and consensus prevailing at the Workshop during the identification of problems and potential solutions, the fisherfolk asked for greater support from the government agencies, and particularly the Department of Fisheries to help continue implementation of these initiatives in moving to a more comprehensive community-based management structure. DOF support was needed to enforce the ban on pushnets and trawlers. Until the Fisheries Law is revised, communities will not have the enforcement authority to arrest or detain illegal fishers. This now lies with the Department of Fisheries. DOF has already placed an enforcement officer at the Project site in Phang-Nga Bay to work with the fisherfolk as a first year activity of the CBFM Project. Discussions during the Workshop also revealed that existing penalties were not a strong enough deterrent to the commercial trawl fishers. The Workshop recommended that government impose stricter penalties for violations. The commercial trawl fishery was seen as a primary area for government attention, through a combination of increased enforcement and awareness-building. Additional enforcement activities in cooperation with the fisherfolk community will arise out of future management measures developed during the Project.

Such cooperative management efforts between government and the public are a sign of the growing trend in coastal resource management for many parts of the world. Governments have recognized that there is a big difference between 'jurisdiction' and 'real authority'. When 'push comes to shove', real authority is actually with the users of the resource who impact the resources through their daily activities. No matter what the legislation may say, if there is not a strong motivation to comply, convenience and immediate benefits dictate actions and behaviour out in the open sea. Legislation is only a collection of words and paper gathering dust on a shelf until it has meaning and purpose to the resource users. Legislation is given meaning once its benefit to the resource and its users is clearly understood. herefore, motivating resource users to follow legislation means imparting a enefit that they can see in following hese regulations. One of the best ways to accomplish this is for these users of the resource to be a part of the management process to accept, understand and help develop effective management measures. Community-based management is acknowledging this 'real authority', and giving or sharing 'jurisdiction' with the local community that has the daily impact on and influence over their resources.

The Workshop was informed that the government has recently initiated a number of mechanisms for introducing a fishery rights system to strengthen community-based fishery management. The government in reviewing the fisheries legislation found that additional conditions will be required for full-scale implementation of community-based management in Thailand. At present, a cooperative management system will be employed. Until communities will be given enforcement and 'ownership' rights of the coastal waters, the govemment will be assisting in enforcement problems.

An additional mechanism to strengthen community-based fishery management will be through the Sea Rehabilitation Project that is at present being prepared. This Project is proposed to the Ad-Hoc National Committee, of which the DOF Director-General is Secretary. This Project will include a Coastal Area Management Sub-Project with a CBFM component. This Sea Rehabilitation Project and Coastal Area Management Sub-Project has been included in the 8th National Economic and Social Development Plan (1997-2001), which guides the future fisheries policy direction for Thailand.

This strong government support was evident at the Workshop by the active participation of the Director-General of DOF, Dr Plodprasop Suraswadi, who encouraged the Workshop to pioneer CBFM in Thailand and to share learnings and experiences with other countries. His personal interest, commitment and dedication to CBFM and the smallscale fisherfolk of Thailand has helped to establish CBFM in Phang-Nga Bay.

CBFM was seen to be an ideal opportunity to use the skills and knowledge of the fisherfolk combined with the ecological science of PMBC and AFDEC, and social science knowledge of area Universities that participated in the Workshop in the development of management measures that would make 'sound common and scientific sense' and therefore be sustainable. In fact, fisherfolk voiced the importance of incorporating cultural values in the CBFM measures they would develop. Discussions also noted that closed seasons have been in effect for more than ten years with some degree of success. Under careful management practices, it was felt that this could be a potential option for the communities to consider.

The Workshop participants agreed that enforcement alone is not completely effective in solving their fisheries management problems. Awareness and education targeted to the users of the resource and 'non-compliers' of the ban is also needed. Participants agreed that the users of the resources must see a benefit to the resources and themselves before they are motivated to comply with any fisheries legislation or initiative. Fisherfolk stated that an approach to 'buying into' the management measure is often to demonstrate the impact to the long-term sustainability of the resources upon which they depend.

Fisherfolk presentations revealed that about ten years ago, their catch of the target species, including whiting, crabs, and shrimp dropped severely. This corresponds with the findings of DOF staff and scientists described on the first day (Chullasorn 1996 and Pimoljinda 1996). Both groups independently came to the joint conclusion that this was caused by a variety of factors all of which combined to alter the fisheries resources to a point from which they have yet to recover. Factors included the use of smallscale fishing gears with smaller mesh size; increased effort by both smallscale fishers and commercial fishing boats; the intrusion of the pushnet and trawler into inshore areas; and environmental decline, largely caused by land-based development.

The sessions presented by the fisher-folk and the resulting active dialogue gave good insights into the interests and motivations of the fisherfolk of Phang-Nga Bay. Discussions revealed that environmental concerns are an important consideration to the Phang-Nga Bay's communities. It became apparent that those closest to the resource were the first to see the link between ecosystem health, resource sustainability, and their livelihood. Environmental concerns ranked high at the Workshop, and this is another area fisher-folk recommended to have integrated into solutions developed under CBFM. Fisherfolk stated that the costs of environmental problems and particularly development of mangrove areas for shrimp ponds, are often suffered by the local fisherfolk communities who do not share in the benefits. A more equitable distribution of the costs and benefits of the environmental services from the resources arose from the discussions as one of the general objectives for the community-based management project.

A continuous exchange of information between the fisherfolk and PMBC and AFDEC was another area of work identified for the CBFM Project. It was noted that the problem in the past was that PMBC did not always know what the fisherfolk needed, but that this would change under CBFM. To continue useful past programmes of DOF and expand into new related areas, a revolving fund for fisherfolk to both further their fishing occupations and develop alternative incomes was prioritized as an early activity of CBFM. In addition to alternative incomes, it was determined that both the government and non-government sectors begin to reconsider their old concept of resource exploitation, and consider a new balanced concept of natural resource use that could balance incomes and ecosystem sustainability. Part of this effort was seen as identifying sustainable occupations for the fisherfolk communities of Phang-Nga Bay. DOF will also help the communities in education on marketing mechanisms targeted towards the fisherfolk and community leaders and to help generate additional family income, assist women in finding adaptable occupations. Children would not be left out either, and fisherfolk felt training to children in awareness of conservation for environmental sustainability should be a part of CBFM.

Workshopconsensusand conclusions

One interesting aspect of the Workshop was that the format for discussion was a truly balanced and interactive dialogue. There was literally no room or interest for a polarized 'debate' or 'negotiation' of views and issues. A debate or negotiation assumes there is a 'right' and 'wrong' and that from opposing positions, one simply chooses who or what is 'right'.

Understanding the complex issues of living marine resources and sustainability of coastal communities is most conducive to a process where the multi-faceted picture can become clear, a thorough dialogue where areas of agreement rather than differences can emerge to help pave the way towards strong and comprehensive solutions and directions for action. In fact, to some degree, the format for discussion actually influences the type and content of the outcome of the discussion. A different kind of decision will arise from an interactive dialogue, and of perhaps equal importance, a different kind of commitment for implementing the decision, than from a debate or negotiation.

Indeed, a success of the Workshop was the establishment of this interactive format for true dialogue on the issues of concern. Participants truly learned from

Workplnn session on the last day, to achieve consensus on programme objet tives. direction and activities

each other and found a surprising amount of common ground, enough to guide the CBFM in its future.

Issues for resolution by early activities of the CBFM Project became strongly focused around the following: how to completely eliminate the two destructive fishing gears of pushnets and trawlers; how to establish the fishermen's group as a local-level management structure; and artificial reef management. In addition, the fisherfolk requested the DOF to consider whether or not the entire area of Phang-Nga Bay could be included in the DOF/BOBP Community-Based Management Project. In that way, the communities of the Bay could perhaps better decide on planning the fishing rights within the Bay and the allocation of areas within the Bay to certain uses, fishing gears, and perhaps zoning schemes within the areas.

Other areas for consensus included setting objectives for multiple use of the Bay's resources and finding sustainable activities and income that would have no harmful or the least harmful effect to the ecosystem. In addition, trawling was seen as an overall major concern for the sustainability of the smallscale fisherfolk. While the general sentiment was not to ban trawling completely throughout all of Thai waters, trawlers were seen to need strongly defined borders between themselves and the smallscale fisherfolk. Stricter controls by DOF of the trawlers was seen as a major part of the solution. These controls would keep the trawlers out of the banned 3-km zone and within the prohibited area of the Bay that had been set aside for smallscale fisherfolk.

These areas of consensus and recommendations serve as a starting point for future elaboration and discussion. The Phang-Nga Bay fisherfolk and DOF will meet again during the next neap tide in mid-March to compose the details and schedules of activities for the Project, and prioritize activities for early action.

The Workshop was a major step towards changing the old course of the past, which ran from 'top' to 'bottom', to a new discipline which shares responsibility and meets halfway: A greater understanding was reached between all the sectors and participants. Both the bottom and the top moved towards the centre in shared learning to figure out how best to manage the resources for the future. The Community-Based Fisheries Management Project became one with a single goal, gaining a more numerous and unified work force for its achievement.

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AN OVERVIEW

The Concepts and Practice of Individual Transferable Quotas for the Management of Fisheries

by

B D Shallard*

Management of fisheries by means of a quota system based on Individual Transferable Quotas (ITQ) is a comparatively recent concept. It has been working with some success in New Zealand since 1986. The countries of the Bay of Bengal region might now like to consider it.

How does an ITQ system operate?

In essence, an ITQ system provides for management of fisheries in the following manner:

- The sustainable part of the fish stock, by species, by area, is determined by scientific stock assessment.
- Based on this sustainable concept, Total Allowable Catches (TAC) are set on an annual basis for each fish stock by area, and allocated to individual commercial quota-holders.

  Allowances are made for traditional, artisanal, and recreational fishing.

  Quotas, once allocated to quota holders, are fully tradeable or leasable as a property right.

  The Government, meanwhile, maintains an efficient monitoring system to allow it to keep track of catch against quota.

  All or most other 'conventional' input controls, such as bag limits, mesh sizes, closed seasons and closed areas can be eliminated or reduced.

  Quota holders have the right to catch **up** to their quota at **any time** during the fishing year, thus discouraging the 'race for fish'.

The Model on the facing page illustrates how individual fish stocks are managed under an ITQ property rights fisheries management system.

What are the problems of conventional fisheries management?

In the middle of the Twentieth Century, many governments encouraged commercial fishing through a range of mechanisms. This, coupled with the vastly expanding options for catching and processing fish, meant that the sustainability of some fish stocks was threatened. While knowledge of the biological profiles of species was poor, the clear indications of overfishing led to the imposition of input controls as a method of management.

Input controls came in many forms, including limits imposed on the size and capacity of vessels or sizes of nets, coupled with closed areas and/or seasons. The problems of input controls were soon obvious:

- Very expensive and in many cases difficult to adequately police.
- The effort and costs of fishing activity increased considerably.
- The yields based on catch per unit of effort declined.
- The industry became over-capitalized and uncompetitive.
- Over-regulation led to inefficiencies and excessive costs, both for the industry and for fisheries management.

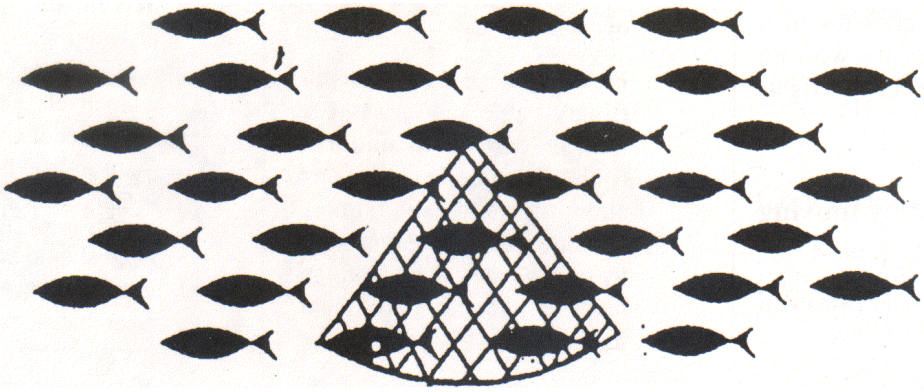
The first step in moving to output controls was to place limits on the total amount of fish which could be extracted on a seasonal or annual basis. The main problems with such blanket limits were:

- The 'race for fish", which has serious economic ramifications.
- The difficulties and costs of policing enforcement.

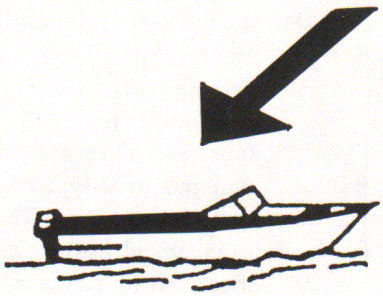
* Bruce Shallard is a Fisheries Management Consultant who has 15 years experience with the New Zealand Ministry of Fisheries and was one of the leaders involved in introducing the concepts of fisheries management by means of Individual Transferable Quotas (ITQ) in New Zealand. Shallard is now working in New Zealand and in a number of other countries giving advice and assistance to those considering developing fisheries in this manner. He is working with BOBP to promote the ITQ approach to fisheries management in this region.

Simplified model of how individual fish sectors are managed in New Zealand

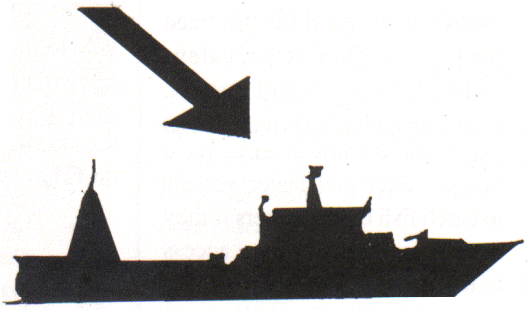
TOTAL FISH STOCK



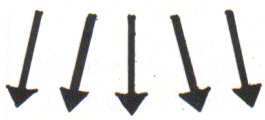
Total Allowable Catch, TAC
(the total quantity that can be sustainably taken each year)



Allowance for non-commercial fishing
(recreational and Maori customary fishing)



Total Allowable Commercial Catch, TACC
(the total amount of fish the commercial sector is allowed to catch each year).



Individual Transferable Quotas, ITQs
(Individual fishers purchase quota, which is the right to harvest for sale a proportion of the TACC)

A second method of restricting output involved making permanent, non-transferable allocations to individuals or separate entities, but this entails:

- Restricting rational economic behaviour.
- Restricting efficiencies of a competitive industry with no market for the trading of rights to take fish.

What can he gained by moving to ITQs?

ITQs **facilitate the conservation** of threatened or depleted stocks by:

Allowing for a direct limit to be placed on the output from the fisheries by the setting of effective Total Allowable Catches (TACs).

- Encouraging, indeed requiring, the fishermen to 'farm' the resources, rather than have the attitude of the hunter/gatherer.
- Reducing the need for the 'race for fish', which is prevalent under an input control system. Over-capitalization is reduced, as fishermen do not need to have larger, better and faster vessels to catch fish before others if they have a guaranteed right of access to the fishery over the year.
- Instilling attitudes of compliance with rules that serve the future interests of industry participants themselves. The high level of self-monitoring and the concept of ownership of fishing rights achieve this.

ITQs **encourage economic and efficient behaviour** to benefit both industry and country by:

- The reduction of costs to the advantage of the fishermen and the economic well-being of the country.
- Allowing fishermen to adjust their role in the fisheries in terms of whether they wish to maintain current levels of activity, reduce to reflect a lifestyle or an economic requirement, or, indeed, to expand rapidly into a particular fishery whilst reducing in others.
- Encouraging the inefficient operator to quit the fishery, particularly if the State concludes that assistance is desirable to encourage the inefficient operators to leave.
- Providing a means of assessing fishery value and an asset for raising capital to underpin fishing ventures. In particular, to allow for more exploration of hitherto underutilized resources by or use of more efficient and technically appropriate fishing methods.

ITQs **reduce the need for State involvement** in:

Setting rules or making arbitrary allocations.

- Maintaining a large and costly policing force.

ITQ implementation issues

While many benefits of ITQs are imrnediate, some facets of implementing such a system require time before the benefits become apparent. Implementing an ITQ system requires:

Increased sophistication on the part of both the government managers and the industry in areas of general management, information systems and reporting.

A higher level of scientific analysis of fisheries capability and sustainability, requiring in-depth scientific stock assessment processes to be developed.

- Retraining and redirection of the enforcement role (and it needs to be noted that it will be some time before this function is fully operational).

The precise nature of the ITQ requires careful consideration. Some of the major issues are:

- ITQs pose some financial risk for the government and the industry if they are effectively guaranteed or not guaranteed respectively. The risks of both options need to be considered.
- Countries that introduce quotas without tradeability have invariably found that they fail. Tradeability of quotas allows people to enter and leave the industry as they wish. It allows industry rationalization to be driven by the market and provides a means for signalling the 'value' of the fisheries both collectively and individually. It also encourages efficiency and innovation, which must go hand-in-hand with an effective fishery.
- ITQs should be able to deal with variability in stocks. It is quite clear that stocks of many species vary greatly from year to year or over a cycle of five, ten or fifteen years. Features such as under- and overfishing rights, the possibility of seasonal adjustments, and some form of trade-off between the species should be considered.
- Consideration of whether quotas are expressed in precise tonnage terms or whether they are in proportional terms (whether they are firm or non-firm rights). New Zealand started with quotas that were precisely defined in tonnage terms, but has subsequently changed to a system of proportional quotas. The latter arrangement has worked more effectively for New Zealand, but it is possible to have in some fisheries a mixture of firm and non-firm rights.

The results of the New Zealand experience

The gains from an ITQ system in the light of the New Zealand experience are many:

- New Zealand's stressed inshore fisheries, which were, in some cases, near commercial collapse in the mid-80's are now showing healthy signs of recovery.
- New Zealand's major rock lobster fishery, brought into the ITQ scheme in 1990, is now showing rapid growth.
- The New Zealand commercial fishing industry has prospered under an ITQ system, with quotas as assets on company

Stacking tuna catch... easy to keep track of the quota

balance sheets allowing companies to expand rapidly. New Zealand's major export fish products, such deepwater fish as *hoki* and orange roughy, have been major contributors to this expansion.

An ITQ system has brought the development of a much more united fishing industry taking responsibility for its share of the management of New Zealand's fisheries.

A cooperative approach between government and industry has been engendered by all participating in the benefits gained by ITQ implementation.

— The ITQ system has allowed New Zealand's indigenous Maori people to become involved in the business and activity of fishing, both at the local traditional level and as part of the larger commercial industry.

— New Zealand has refined its fisheries legislation over this period, but has maintained as a central core the ITQ system and is now in the process of bringing into the scheme the remainder of the commercial species caught in New Zealand waters, over and above the 31 species that are currently covered.

— ITQ allows government to cease intervening directly in the management of individual fishing operations. The government role is to monitor and ensure that the rules are applied fairly and equitably and enforcement is applied where necessary.

— Benefits and responsibilities are placed with the fishing industry.

Conclusions

The New Zealand experience would confirm that ITQs have been of benefit to the economy so:

— The ITQ scheme has assisted the New Zealand fishing industry in enhancing its status within the New Zealand economy and in the international marketplace.

— Fish stocks have been protected and enhanced under the scheme.

— There is never a better time to introduce ITQs than when stocks and the fishing industry are at a level of concern about the future.

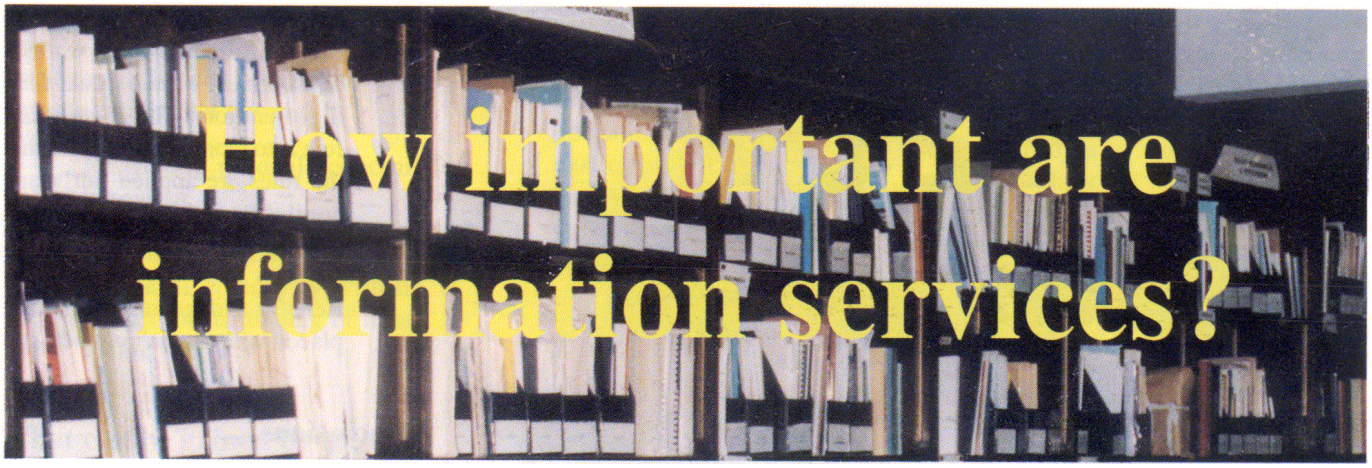
Professor Ray Hilborn of Washington University, Seattle, USA, returned to New Zealand in March 1995 and concluded that

"On economic performance, New Zealand fisheries and fishing industry rated an 'A' in the top 5% in the world."

— "New Zealand was way ahead of most countries in terms of allocating fishing resources through the commercial quota system."

— "New Zealand was one of the few countries which had turned its fishery into a profitable and sustainable system using quota."

Results of the ITQ system have been very favourable for New Zealand in the nine-year period since 1986. The arguments for introducing a quota management system using ITQs are compelling, and the difficulties of conventional Gsheries management will continue unless world fisheries move to some form of quota management system.



How important are information services?

by

G. Lourduswami

Library Consultant, Madras, India

Introduction

Communication between people is basically the sharing of ideas, the conveying of messages, the convincing, converting and influencing of others, either individually or collectively. The actual communication process is the vehicle for the transmission of information. Access to information is an essential pre-requisite for research and development in all sectors.

Information as a resource is sought after by all information seekers, irrespective of whether they are its users or providers, or users who are also providers. Any resource, if available, should be properly managed in order to obtain the maximum benefit from it. Information management, therefore, is all about getting the right information, in the right form, to the right person, at the right time, in the right place to arrive at the right decision.

Planners and managers in any organization often arrive at policy decisions on the basis of marginal or easily comprehended information rather than as a result of a thorough, rational and systematic assessment of available options and possible outcomes. This happens because there is no time available to grasp the full impact of any complex decision-making process. It has been observed that policy issues can change and evolve in less time than is required to generate a balanced synoptic view of the problem at hand, with the result that the information to be fed into the decision-making process becomes obsolete by the time it is made available.

Treating information as a resource means treating it as an input which can be transformed into useful outputs that are beneficial to achieving an organization's goals something that can be capitalized, depending on management purposes, and something that presents to the top management a variety of development options. It is needed to sensitize and educate senior management, policy-makers and decision-takers as to its centrality to an organization's profitability and well-being.

This article is intended to drive home the message that :

- information is essential to effective problem-solving;
- information is the basis of innovation:
- information is essential to long-term planning;
- information is a resource that costs money (to create, to store and to retrieve);
- information has a price in the market-place;
- information is of value to the user/consumer;
- information is correlated to productivity; and
- information sources help to maximize the effectiveness and efficiency of an organization.

Therefore, it is imperative that any organization worth its name should carefully plan for provision of an effective information service.

Need for an information service

The need for an information service arises because:

- There has been a constant doubling of the population of scientists, of scientific activity and scientific output.

  People do not know what information they need until a particular set of circumstances arises, and then they are impelled to demand very specific information instantly.

- It tends to be held in different degrees of up-datedness, at different levels of aggregation, with differing accuracy, in different languages, in different media (paper, microfilm, magnetic tape, optical disks, in people's heads), in different locations, and in different formats (graphs, pictures, words and numbers).

Information is the lifeblood of an information service and the information file is its heart. Unless the heart is sound

and continually pumping a supply of regularly renewed information into the system, it will not function properly. Therefore, it is important to give extra care and attention to planning the resources to either set up a new and sound information system or adequately revamp the already existing one to keep it up-to-date.

Setting up an information service

Before setting up an information service, the basic questions to be asked are: What? Who? Why? When? Where? and How? Otherwise there will arise a situation in which there will be an information service which is not wanted; one which is of the wrong type to meet users' needs; a duplicate of already existing services; and one which is too ambitious for available staffing or resources. Therefore, careful thought and preparation at the outset will help save a lot of wasted effort.

New challenges

A fisheries information unit in the Bay of Bengal region with a long history is the Bay of Bengal Programme's (BOBP) Information Service in Madras, India. Like other information units it is facing a number of new challenges:

- The current economic climate demands clear evidence that benefits derived from any expenditure on information units actually warrant the money spent.
- The lack of means to quantify the actual utility of information units.
- The difficulty in assessing the true value of information provided.
- The fact that arguments based on cost-benefits do not readily accommodate considerations of quality.

Let us look for a moment at the BOBP's information unit which, in the Third Phase of the Programme, needs to help in improving fisheries management by co-ordinating national and regional information exchanges, and at the same time collate information from the fisherfolk at the local grassroots level.

Information Activities of BOBP

The roots

The Bay of Bengal Programme (BOBP), which started as a regional programme in 1979, now includes seven countries bordering both sides of the Bay of Bengal, i.e. Bangladesh, India, Indonesia, Malaysia, Maldives, Sri Lanka and Thailand. Three strategic elements for setting up an effective information system were identified at the BOBP's 4th Advisory Committee meeting held in Phuket, Thailand, from 27 to 30 November, 1979. They were:

- Disseminating technical information on the Project's own activities to fisheries experts.
- Disseminating non-technical information on the Project's own activities and on smallscale fisheries to the mass media and to select groups in the Project areas.
- Setting up a good library on smallscale fisheries.

BOBP Information Service

There are two sources of information that BOBP has access to:

- **Document sources:** Which include publications from the Departments of Fisheries and research institutions, status study reports, dissertations and theses from university research departments, consultancy agencies, etc.
- **Human sources:** Experts/ specialists in fisheries science/ technology, especially where published sources are either non-existent or not readily available. (A fishery scientist/technologist who had worked, or who is still working, in specific areas could provide firsthand data or refer users to other obscure sources/ grey literature.)

The BOBP Information Service, established to strengthen awareness and encourage debate and discussion on BOBP's work on smallscale fisheries issues among fisheries experts, governments, general public and the fisherfolk themselves, includes the following outputs:

- A quarterly, well-illustrated newsletter, the ***Bay of Bengal News.***

  Technical reports, manuals, working papers and information documents on BOBP's and related activities.
- Audiovisual programmes.
- Photo exhibitions, posters and extension materials.
- Technical drawings and diagrams.
- Comic books.

The ***Bay of Bengal News*** has grown consistently, nourished by very positive response from its readers, from both within the BOBP region and outside it. It is a technical, yet an easily readable, magazine, whose articles about the Programme's work in smallscale fisheries attempt to present the technical components of those activities in a simple language, suitable for a wide audience. The present issue that you have in your hands contains this article, on the need for a fisheries information service, and we hope to receive your considered opinion on the real need of such a service to all those concerned with fisheries.

BOBP library

One of the three strategic elements recommended for setting up a BOBP information system was establishing a good library on smallscale fisheries. The Project's library was initially organized with the help of an FAO Library Consultant.

As a special library, the BOBP library is planned on strictly practical lines, with activities and collection controlled in size and scope, having in view the following four elements of requirement analysis of its clientele:

- **NEED:** what an individual ought to have.
- **WANT:** what an individual would like to have.

  DEMAND: what an individual asks for.
- **USE:** what an individual actually uses.

Library stock

The library contains over 3000 recorded documents, mostly grey literature and a few journals. Besides these, it has around a thousand photographs and transparencies — both in colour and black and white. It also contains a collection of audiotapes and videotapes.

The library, primarily meant for the specialist staff of BOBP, is also used by outsiders, mostly students, fisheries specialists, researchers, planners and policy-makers, who find a veritable treasure trove in its collection — theses and dissertations, translations, newsletters, conference papers, working papers, policy documents, supplementary publications providing statistical data, etc.

A flow chart of the BOBP Library and Information Unit is shown on the facing page.

What BOBP can now do?

Many international fisheries organizations in South and Southeast Asia, such as SEAFDEC, ICLARM, FAO/RAPA, NACA and BOBP, have convened several workshops during the last ten years to identify the various constraints to effective utilization of fisheries information in the region. These meetings have so far identified the malady over and over again and have prescribed treatment.

It cannot be denied that the demand for fisheries information is growing while the machinery to vend such information is being operated on a shoestring budget. The nightmare of financial crunch has now caught up with the funding agencies and it has made them rethink the utility of information systems as catalysts.

BOBP could, therefore, try to design or redesign an information system which will make the existence of the Project a truly effective one. It should aim at the rationalization and optimization of the 'information function'. This is not simply a matter of systems analysis, design and implementation. There is also the matter of determining what information sources are required and are available; how they are to be assembled, processed and exploited; what the needs of the fisheries people at various levels are, and will be, over time; and how information and data of different kinds (transactional, operational, tactical, strategic, published, unpublished, electronic, print-on-paper, internally generated and externally produced) may have to be integrated (at what level and what degree). In other words, the systems design phase has to be necessarily preceded by an information audit to make explicit the present and future requirements of the fisheries organization as a unified, operational entity. Systems design should ideally take place against the backdrop of a coherent and agreed organizational information policy. Management of information is not concerned solely with documents, messages and data, but with the entire apparatus of information handling, which in most organizations today is in a state of uncertainty.

BOB-LIBRECON Project

Against this background, the author suggests the formulation of BOB-LIBRECON (acronym for 'Bay of Bengal - Library Resources Consortium'). Such a resource-sharing scheme may be a solution to the fisheries information needs of countries in South and Southeast Asia. BOB-LIBRECON aims at:

— Promoting overall economy of human effort in information handling, and facilitating the interchange of information with minimal possible delay.

Helping fisheries personnel to save valuable time spent in looking for up-to-date information.

Affording maximum utilization of local information sources, both published and unpublished, and, thus, building up local capabilities.

— Developing a working relationship with the fisheries libraries in the region having similar functions and responsibilities, *i.e.* the dissemination of fisheries information in the countries through sharing a common organizational framework.

— Providing guidance to national fisheries libraries in standardizing procedures involved in the acquisition, technical processing and publicising the availability of documents that are to be collected, managed and analyzed, leading to consistent and coherent dissemination of information thus obtained. The resultant information flow at the respective local and national levels will thereafter be coordinated through:

— Exchange of acquisition lists among fisheries libraries and documentation centres in South and Southeast Asia.

— Exchange of latest additions lists.

Standardization of arrangement of documents on the shelves.

— Setting up a centralized catalogue, listing **all** the documents acquired by **all** the member countries in a database at one place.

— Holding a consultation/workshop of documentalists and information officers to discuss the feasibility of implementing the BOB-LIBRECON Project.

As far as holding a consultation/workshop is concerned to bring together fisheries information personnel/documentalists, the following terms of reference could be considered:

— To exchange experiences, identify common problems and suggest means of solving them through cooperative efforts.

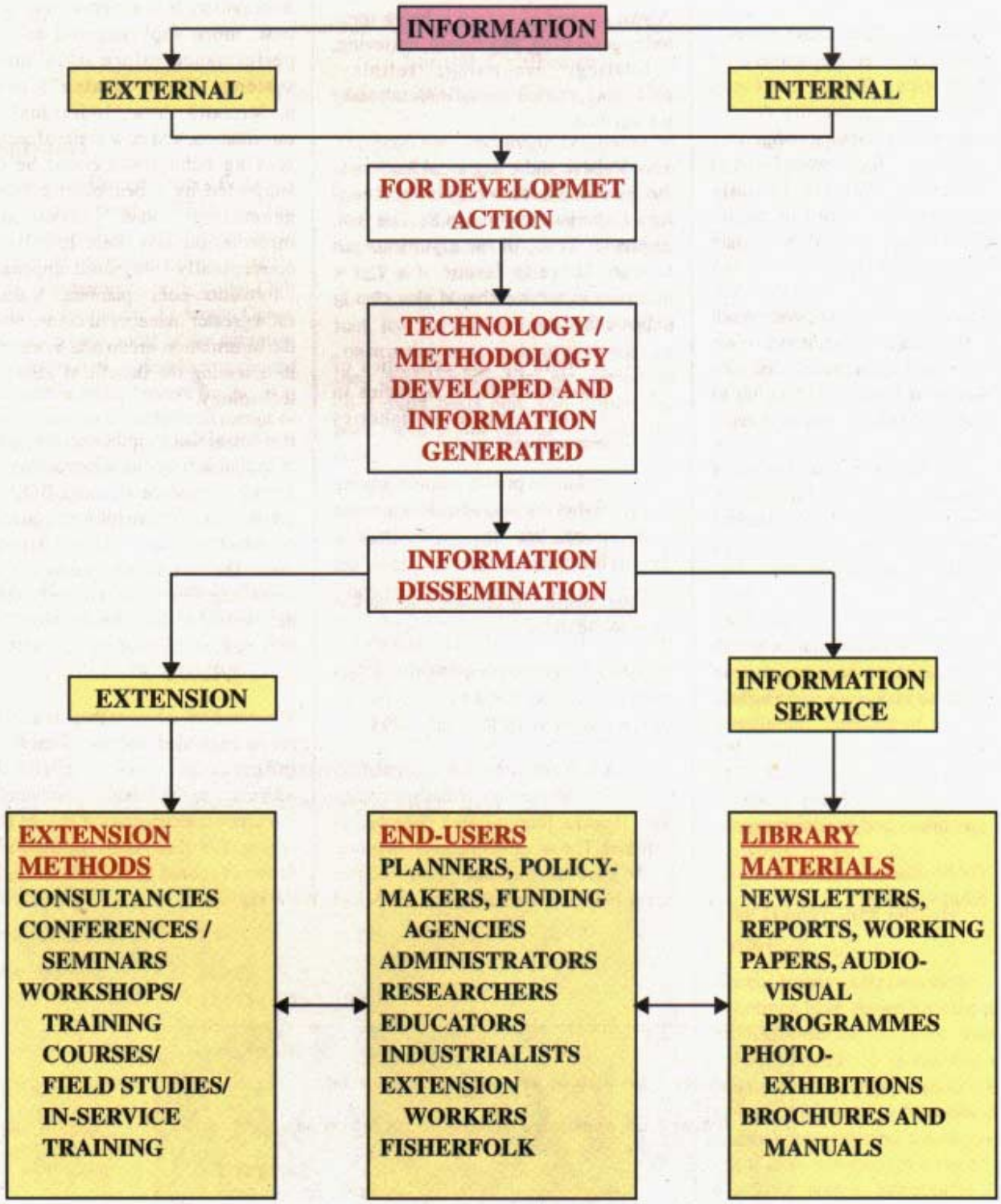
— To review the points discussed during previous meetings and to evaluate the results of implementing the suggestions put forward for the development of fisheries information.

The following points could also be discussed at the consultation/workshop:

— Ensuring greater accessibility to fishery information through exchange of publications, monographs and journals, with effective bibliographical control by the respective national networks.

Standardizing the process of data collection and the means of their dissemination through modem

BOBP INFORMATION AND LIBRARY UNIT FLOW CHART



scientific as well as electronic means.

Organizing staff training programmes in communication, information technology and library methodology, both for those who haveto rely on manual methods and those who already have automated and electronic library procedures.

Bringing about close coordination between Departments of Fisheries, fishery research institutions, university departments etc. in tapping indigenous sources for unpublished materials that are initially originated by word of mouth from village, town, district, state and national levels.

Need for library cooperation not only within the same organization (and its branches) but also between libraries belonging to different fisheries institutions.

Exploring the feasibility of making the BOBP Information Service Unitthe reference centre for all information needs of BOBP member countries and beyond.

Establishing a translation service to translate documents in regional languages into English.

Preparation of national directories indicating the specialties of fisheries planners, specialists and administrators.

Publication of national fisheries bibliographies.

- Identifying, collecting, controlling and processing local! national fisheries information for input into ASFIS.
- Organizing an Expert Committee to recommend a viable and simple classification scheme for fisheries libraries.

Conclusion

A vast amount of money is being spent today generating, processing, retrieving, validating, evaluating, refining, packaging, marketing and disseminating infonnation.

The decisive and categorical answer to the question whether there is a real need for a Fisheries Information Service is an emphatic 'Yes'. All the arguments put forward above in favour of a viable information service should also clearly indicate that

- to build up the capacities of national fisheries agencies in various aspects of fisheries management, and
- to kindle public opinion among fisheries stakeholders on the needs, benefits and methods of fisheries management,

a strong fisheries information network is an absolute must.

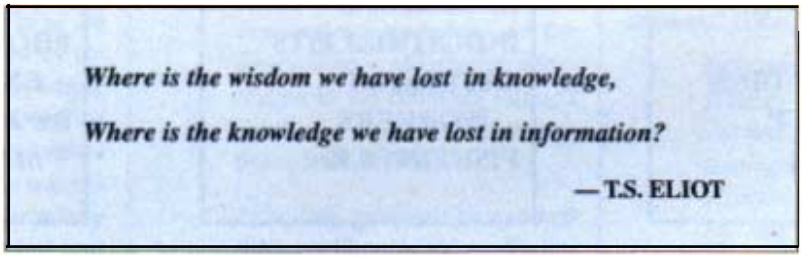
This view is also supported by the project concept paper prepared by Yong-Ja Cho and presented to SIFR in July *1995.*

To start a fresh fisheries information service or develop an already existing one, finance (capital and revenue) is required. The amount of capital invested on its, infrastructure and personnel can never be considered ill-spent. It should be realized that the existing BOBP Information Service was considered necessary in 1979. Nothing has changed since.

Information not only makes an organization more effective but also enhances the working environment for all staffconcerned. We should realize the importance of developing new strategies for the effective management of infonnation. It is not enough to develop new, more sophisticated and high-performance information-handling systems. There is also a need to understand how individuals use information, and how their information-seeking behaviours could be better supported by a bespoken system for generating and disseminating information and data. It calls for a conceptually-integrated approach to information-policy planning. It also calls for a greater managerial commitment to the information-credo and more realism in assessing the benefit of information technology.

It is hoped that by judicious management of available fisheries information sources through resource-sharing, BOBP will serve as an effective information nucleus on which we can build and expand "to meet the emerging needs for more knowledge-intensive intervention in the development and management of the fisheries resources of the Bay of Bengal" (Chong, 1995).

Thequestion, whether there is a real need for an expanded and improved fisheries information service at BOBP, is addressed to the fisheries personnel in all the seven countries of the Bay of Bengal region. On their answers depends the future of shared fisheries information in the region.



Seeking Solutions Outside Fisheries

Integrated Coastal Area Management at work in Thailand

by

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Somsak Chullasorn

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Background

Since 1985, the Department of Fisheries (DOF), Government of Thailand, has been promoting socioeconomic development projects for smaliscale fisheries communities both in the Gulf of Thailand and on the Andaman Coast. In the early phase, most of the activities were concentrated on developing coastal aquaculture as an alternative for income-generation and as an additional means of food supply. Later, the intervention has been expanded to meet the various needs of the social and economic life of the communities which live under the poverty line,

Ban Hin Rom is one of more than a hundred fishing villages in Phang-Nga Bay. The socioeconomic data of this village are given in the box below:

BAN HIN ROM

Some Socioeconomic Data

Number of households	:	100		
Total population	:	627	Male : 320 Female : 307	
Average family size	:	8.3		
Age composition	:	01 - 12 : 38% 12 - 18 : 23% 18 - 50 : 34% over 50 : 5%	Under 18 : 61%	
Main occupation	:	Fishing		
Number of boats	:	106 longtail boats		
Main fishing gear	:	Trammelnet Swimming crab gillnet Fish gillnet		
Average family monthly income	:	3,000 Baht		

The economic and living conditions in Ban Hin Rom are particularly basic, with the villagers fighting a battle for survival. The fishermen do not even have the financial resources to get on with their usual activities. They depend on middlemen, who lend them money for fuel, ice, fishing gear and boat/engine construction and repair, in exchange for their catch. Fishing trips are carried out on a daily basis and, sometimes, the poor catch is not enough to repay the debts.

Most of the fishermen live in muddy and unhealthy marginal surroundings, along the waterways in the mangrove forests. Their huts are just basic shelters roofed with nipa palm leaves, and are exposed to rain and tide. There is neither a stable supply of freshwater nor waste disposal facilities. Usually the waste is disposed of in the mud around, or beneath, the huts.

The children are usually left alone or entrusted to aged neighbours while the parents go out fishing during the day. They leave the school early to help their parents in the daily subsistence activity. The poor living and hygienic conditions of the village, magnified by the lack of adequate clean freshwater, cause many health problems. The children are the most affected.

Ban Hin Rom has been one of the targets of the DOF's smallscale fisheries communities support and development plans. Many activities have been implemented in the village, such as demonstration and extension of fishing gear, training and grouping of fishermen, artificial reef construction and installation, building of a fish landing site, a fishing gear repair building and small rainwater collecting tanks. There has been good cooperation from the villagers in the different activities already implemented by DOF.

The freshwater supply problem

Recent surveys and interviews with the fishermen have shown how the problem of freshwater supply is far from being solved, especially in the dry season. Nearly every household has its own small container of about *1.5* tonnes capacity to stock water during the rainy season, but this is not enough even to supply drinking water, especially for big families. And, of course, the problem is worse in the dry season. Some limited surveys and drilling works in search of underground water have been tried, but only brackishwater has been found: In

other areas, hard rock layer has obstructed the quest for water.

The fishermen must, therefore, buy freshwater. A water-seller comes to the village every day with a truck and they pay 10 Baht a bucket for three buckets of 20 litres each. Each family has to spend at least 30 Baht a day, while the average income of a family is only about 100 Baht per day! This is quite a heavy economic burden on the villagers. Freshwater shortage is also a major reason for health problems.

Many fishing villages along the coast-line have the same freshwater shortage problem, to a greater or less degree, depending on the location. The DOF allocates a special budget amount every year to reduce this problem, but the effort is inadequate to cover all villages. A grant from other national and international institutions is, therefore, badly needed.

Ongoing projects

The DOF, with the PMBC and ASFC as implementing agencies, and with the collaboration of the Bay of Bengal Programme (BOBP), now in its Third Phase, has selected Phang-Nga Bay, particularly the area around Ban Hin Rom, to be the target model area for the development of community-based fisheries management. The activities will be implemented from October 1995 over a five-year period.

The area has been selected for its isolation and the poor living standards of the fishermen. Four fishing villages are situated in the area and all of them are poor, particularly Ban Hin Rom. A good response to development and cooperative activities has already been observed in the past, as mentioned above, and this can be an important factor in the successful implementation of the project.

The joint Thai/BOBP community-based fisheries management project aims to upgrade the standards of living of the fisherfolk in this area by:

- Building awareness among fisherfolk in the area on the need for and benefits and methods of community-based fisheries management.
- Training the fishermen and students.
- Transferring basic technologies for utilization, management and conservation of the fisheries resources, from a sustainable perspective over the long-term.

Windmill pump and water tank help a nearby village in the Same wav as has been proposed for Ban Hin Rom

Conclusions and proposals

To help reduce the socioeconomic plights of the villagers in the area, it is necessary to tackle the water problem, among others. Two solutions have been suggested:

The construction of freshwater collecting tanks to collect rain water from the roofs of the landing site and a fishing gear repair building.

The drilling of a new well in a suitable area within 5 km from the village and the supply of water from there to the village by pressure pump and pipes.

The second solution is, of course, more expensive, but it would have the advantage of solving completely the problem and could also provide a possible service to other villages in the area suffering from the same problem. In fact, the well could be connected in the future to some other villages by pipes and could serve as the Ban Hin Rom area communal water source.

All the concerned organizations from the government and the private sector, together with the relevant international organizations, will need to cooperate to this end and ensure the support of an adequate budget.

BOBP's interest and contribution to solving the water problem in Ban Hin Rom could be an important step towards such cooperation aimed at ensuring the community's self-sufficiency and sustainability.

ABBREVIATIONS

DOF : Department of Fisheries, Government of Thailand

ASFC : Andaman Sea Fisheries Centre

PMBC : Phuket Marine Biological Centre

BOBP : Bay of Bengal Programme

The Needs of Fisheries on India's East Coast

A very useful exchange of ideas marked the Workshop on Coastal Fisheries Management on India's East Coast, organised by the Bay of Bengal Programme (BOBP) at the Hotel Savera, Madras, on July 28 - 29, 1995. The participants included the representatives of FAO and BOBP, representatives from the Departments of Fisheries of the four East Coast States (Tamil Nadu, Andhra Pradesh, Orissa and West Bengal) and the Government of India, and scientists from the Madras Centre of the Central Marine Fisheries Research Institute (CMFRI). The seminar focussed on the need to set up, with advisory inputs from BOBP, pilot projects in the four East Coast States in the areas of

- Coastal trawl fisheries management, and
- Coastal aquaculture management.

All four States have specific needs and problems in these two areas and the seminar provided an apt forum for airing them.

ANDHRA PRADESH expressed the need to promote improved management of coastal aquaculture to ensure sustainability. Their specific interest was in disease management, through the establishment of diagnostic and quarantine services. For the purpose of the project study, Andhra Pradesh was willing to make available a five hectare farm in Polekuru, East Godavari District, with the necessary buildings and staff.

In the area of marine fisheries, Andhra Pradesh's specific need was for promoting new craft and gear. It sought better management of the trawl fishery, by reducing the fishing pressures on the inshore region through promotion of a new craft-gear combination which would give small fisherfolk access to offshore fisheries. It was suggested that an SRL - 15 (a multiday boat developed by BOBP for Sri Lanka and tried in Tamil Nadu) mould, that is with the Kakinada boatyard, be used to build a hull that could be powered by an Indian engine of appropriate horsepower. Andhra Pradesh also felt that modifications to existing small and medium motorized boats could be made, and fisherfolk trained to use them, thereby enabling diversification of their inshore and offshore fleet.

Disease management was the need of **ORISSA,** too, in the area of coastal aquaculture. It suggested that model farms be established to demonstrate sustainable culture practices and to train fisherfolk in them. The sustainability of the confined water shrimp culture system in the Chilika Lake was emphasized as a model for other parts of the country where similar eco-systems exist.

Orissa pointed out a special problem it faced in the area of marine fisheries: the monitoring, control and surveillance of fisheries. It was emphasized that the State needed to strengthen its enforcement system through procuring speedboats and setting up better communication facilities. Like Andhra Pradesh, Orissa too felt the need to develop an SRL-15 type craft to help smallscale fisherfolk tap offshore resources and, thereby, reduce the fishing effort in inshore waters.

TAMIL NADU put forward a proposal that sought to develop an awareness campaign that would help promote sustainable coastal aquaculture. It suggested a detailed study of the political, economic, social and environmental aspects of coastal aquaculture, which, in turn, would suggest remedial measures for the sector.

In the area of marine fisheries, Tamil Nadu's biggest problem seemed to be the conflicts between the artisanal and motorized fishing sectors, and the difficulties in implementing and enforcing the State's Marine Regulation Act. It was suggested that a combination of awareness-building and appropriate modifications of the Act, particularly to incorporate local, traditional management practices, might help in reducing the tensions between the two sectors.

Advice on better managing pushnet fishing, used to collect P. *monodon* and *M. rosenbergii* fry for the culture sector, was requested by **WEST BENGAL.** It was suggested that the development of hatcheries and backyard hatcheries would reduce the dependence of the culture sector on caught wild seed. West Bengal also expressed the need to:

- Improve its methods of handling and transport of shrimp and prawn seed.
- Establish R&D facilities to improve lab-to-land extension of technologies.

  Promote the pen culture of finfish in brackishwater canals and the fattening of mud crabs.

In the area of marine fisheries, West Bengal stated that its need was a detailed survey of inshore and offshore resources (this would require three research-cum-training vessels) and the provision to tisherfolk of training in, and demonstration of, new kinds of fishing into which they could diversify.

Apart from the specific proposals put forth by the four States, the seminar brought forth requests for more general coastal aquaculture and marine fisheries activities that concerned the entire coast. These were:

- Research studies to give direction to coastal fisheries and aquaculture management.
- A comparative study of existing intensive and semi-intensive culture systems, to identify ecofriendly and sustainable culture practices.

  A study to develop a viable mechanism to utilize trawler by-catch and to determine the economic viability of its utilization.

— A study to develop product options to add value to low-value fish. This should include techno-economic and market demand-related feasibility studies.

— A study of shrimp aquaculture with emphasis on seed availability, seed collection and its impact on the environment and on the incidence and management of disease.

The pilot projects that were agreed on at the end of the seminar are:

1. **Management of coastal/trawl fisheries, in Tamil Nadu** (Madras and Kanniyakumari Districts) **and Orissa** (Paradeep and Chandipur Districts). The components of this project are:

— Awareness-building and consultation.

— Diversification of fisheries.

Diversification of fisherfolk's income sources, including non-fishery options.

— Mesh size regulations.

— Introduction of closed seasons and closed areas.

— Selective fishing and introduction of multiday offshore fishing craft/gear.

— Utilization of by-catch.

— Management of fishing effort.

— Value addition, reduction of post-harvest losses and market development.

— Zoning of fisheries.

— Introduction of mariculture, artificial reefs and fish aggregating devices.

2. **Management of coastal aquaculture, in Andhra Pradesh** (Krishna and East Godavari Districts) **and West Bengal** (Midnapore and North and South 24 Parganas Districts). The components of this project are:

— Awareness-building and consultation.

Traditional andmotorized fishing craft in Kanniyakumari Fisheries Harb

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— Social and environmental issues.

— Management of diseases.

— Wild seed collection and by-catch.

— Development of quarantine procedures and systems.

— Integrated coastal zone planning.

— Diversification of candidate species for culture.

— Quality management of seed and feed.

— Improved culture practices and farm management.

— Demonstration of 'ideal' culture/ farm models.

BOBP's role in the proposed pilot studies would be to work in close co-operation with the Departments of Fisheries of the four States and the ICAR institutions (CMFRI and CIBA) to undertake preparatory discussions and studies and evolve, based on priority and availability of resources, detailed workplans for the activities proposed for the remaining four years of the Third Phase.

The seminar also discussed, in some detail, the implementation modalities, including funding and the provision of staff and infrastructure for the pilot projects. Speaking in this context, Dr Y S Yadava of the Government of India suggested that many of the inputs requested by the States could be financed through a variety of existing GOI schemes, and requested the State governments to approach the GOI authorities with their proposals.

Workplans and budgets would be discussed in greater detail and finalized, it was agreed, at a national workshop to be held early in 1996.

— J.V.

The scene is trunquil in this picture . but tensions sometime arise

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Hatching a Success

On a quiet one-acre stretch of beach South of Madras, in Maduvankarai village, Chengalpattu-MGR District, Tamil Nadu, Pavithra Hatcheries and its proprietor, Usha Ranganathan, have been creating waves of their own. Usha was one of the eight-member team that was sent by the Bay of Bengal Programme (BOBP) to the National Prawn Fry Production and Research Institute (NAPPRI) in Kedah, Malaysia, in June-July 1992, to train in shrimp hatchery operations. While the fact that she has been the only one among the eight trainees to set up a hatchery of her own might create some disappointment, Usha's success in her endeavour is a very heartening aspect.

Enthused by BOBP experts, Usha and her husband, an engineer, set up Pavithra Hatcheries in 1993. "We were advised by BOBP to construct boat-shaped ferrocement tanks," recalls Usha. "I feel that these tanks are more efficient than the usual rectangular ones, as there is far less scope for food sediments or dirt collecting in the corners and infecting the water. Also, feed is more evenly distributed in these tanks."

Investment and returns

Usha's initial investment in the hatchery was around Rs. 1.5 million (this did not include the cost of the land, which had been bought much earlier). Roughly half this amount was borrowed from the banks. Production commenced in May 1994. "I did have some initial teething troubles," Usha admits. "For instance, I started with *Scampi* seed which did not thrive in our conditions. Then I switched to *Penaeus monodon* and *P. indicus* and am now very satisfied with the results."

1994 turned out to be a good year for Pavithra Hatcheries. It produced four million fry and these were sold at 60 paise per head. Pavithra made a profit of Rs 12 lakhs that year. "Actually, we were novices in marketing. We had taken advances from buyers in Andhra Pradesh at the rate of 60 paise per seed. But that year there was such a great demand for fry, that prices shot up to Rs. 1.20 per fry! We were, however, keen to honour our commitments and stuck to our original price. We were not too sorry about the monetary loss," recalls Usha.

In 1995, however, owing to the enormous spurt in hatchery farming in both Tamil Nadu and Andhra Pradesh, as well as disease striking shrimp farms in both States, the prices of shrimp fry crashed to 40 paise and less. Pavithra Hatcheries was lucky in getting an average price of 40 paise for its production of six million fry. "We were told that in Andhra Pradesh prices crashed to a totally unviable 20 to 25 paise!" says Usha, for whom the last one and a half years have been, more than anything else, an educational experience.

"I have learnt a lot from my mistakes. And that learning will help, I'm sure, when I increase production, in the coming year, to 12 million fry," she says.

As a small hatchery, Pavithra does not have a big marketing set-up. "In the first year, we had to seek buyers," recalls Usha, "but now the buyers come to us and we have a committed clientele." There's a very good reason for this; Usha has been able to record almost a hundred per cent survival rate for her fry. "One of the crucial lessons I learnt in the Malaysian training programme was to ensure the health of the shrimp fry, by relying less reliance on antibiotics and more on healthy culture practices. I hardly use antibiotics. Instead, I exchange water heavily to flush out infection," says Usha, who is proud of the fact that her *Penaeus monodon* fry have grown to shrimp of 60 g weight and her *P. indicus* fry have grown to shrimp of 22 g weight.

The first essential for building up a healthy stock of fry is, of course, healthy broodstock. Usha gets her mother spawners from the fishing villages along a 25-kilometre stretch of the coast south of Madras. "Sometimes we have gone as far as Poompuhar, for broodstock." This has been necessitated as much by the need for healthy spawners as by prices. The price of a mother spawner has shot up from Rs 70 in 1994 to Rs 350 in 1995. And it is only likely to rise further, Usha feels.

The difficulties

Usha lists the difficulties in starting and running a shrimp hatchery as :

- Disease, which could overnight wipe out the entire stock.
- Fluctuating prices.
- Difficulty in obtaining prime broodstock.
- 'Social' difficulties.

Usha had a taste of what she calls 'social' difficulties when fisherfolk from two fishing villages near her hatchery became menacing, in her first year. "Although our hatchery in no way affects their livelihood, they demanded, and received, money from us for their co-operation. It is easy for a mob of irate fisherfolk to damage the seawater pipe to the hatchery and that could easily wipe out our stock in 24 hours. In fact, this happened to us once." On the whole, however, she has had a good relationship with the village closest to her hatchery. "All our workers, eight girls and four boys, come from the village. We are always ready to help the villagers with transport and other kinds of assistance in their times of trouble." For Usha, a good working relationship with the villagers is essential, as she lives on the farm for nine months in the year, being the chief technician of the hatchery.

Usha firmly feels that the future belongs to small hatcheries run by trained proprietors. "India does not have too many trained technicians and, so, most large hatcheries have to get them from abroad, which sends up their overheads. Moreover, running a hatchery requires a commitment to quality breeding, which is possible only when the extent of operations is small."

In 1992, when the eight trainees were sent for training on shrimp hatchery operations in Malaysia, BOBP spent about Rs. 65,000 or US$2000 on each trainee. This 'investment' in training was well worth it even if only one or two of them successfully set up a hatchery business. Going by this yardstick, Usha Ranganathan has, on an average, given more than an eight-fold return on the investment made on her training by BOBP.

— JANAKI VENKATARAMAN

Traditional Technology in Fisheries neither 'Ignorant' nor Static

by

Janaki Venkataraman

The term 'traditional technology', whether it applies to fisheries or any other area of human endeavour, is often equated with that which is primitive or inefficient. This is, however, hardly the case in reality. The Second Congress on Traditional Sciences and Technologies of India, recently held in Madras, brought this message across clearly, even to lay persons.

Yet, in the wake of Independence, Indian planners have displayed a strong aversion to all traditional practices and methods. As Dr. John Kurien pointed out in his keynote address at the seminar on 'Innovational Technologies by Artisanal Fishermen', one of India's Plan documents says, unequivocally, "though fisheries resources have been exploited, the methods used are of primitive character, carried on by ignorant fishermen. Their equipment is inefficient". Consequently, a three-pronged modernization programme was adopted. This consisted of the introduction of the maritime fishing technology used in developed countries, the institutionalization of fishing techniques, and the setting up of a bureaucracy for fisheries management. A few lone voices of dissent, which urged the planners not to discard traditional technology but to identify its strengths and build on them, were largely ignored.

As it turned out, traditional Indian fishing methods proved to be neither 'ignorant' nor static. In fact, they were so suited to their localities and needs that, even after 40 years of fisheries development, indigenous fisheries practices are still largely in use. As late as the 1980's, 80 per cent of the total fish catch came from fishermen employing traditional methods. One reason for this is, of course, that modern fisheries technology is still out of the financial reach of most Indian fishermen. A blessing in disguise, as it happened. The consequences of wholesale and unthinking modernization would, perhaps, have been disastrous.

Traditional kattumarams *of India's East Coast*

It is interesting to note that the Indian States in which there are no fisheries crises are those (like Maharashtra and Gujarat) in which old fisheries methods have been built on with new technology. Wherever the traditional methods have been discarded and replaced by new methods (as in Kerala and Tamil Nadu), conflicts and tensions mark the fisheries atmosphere.

As E Vivekanandan, Senior Scientist, in his keynote address pointed out, "four decades of fisheries 'development', despite increase in fish production, has created enormous competition for fish resources among various user groups as well as a serious threat to some fish resources close to the shore".

It is only now that the virtues of traditional fishing practices are being realized by scientists and planners. It is being increasingly understood that traditional fishing methods were neither static nor non-innovative. They innovated constantly and subtly, in both craft and gear, to suit changing situations.

The choice of a particular traditional technology in fisheries depends on a number of local factors, such as the profile of the coastline, extent of the surf action, tidal effect, width of the continental shelf, nature of the fish resources, wind and weather conditions, and availability of materials and fabricating skills. For instance, the large teakwood boats of Maharashtra are just right for capturing the large shoals of Bombay Duck which are available close to the shore, as the continental shelf is very wide off this part of the coast. Bagnets are fixed on stakes to capture the shoals of Bombay Duck brought in by the incoming and receding tide.

Traditional vallams *of India's West Coast*

From Ratnagiri to Quilon, in southern Kerala, canoes are the ideal craft for capturing the large shoals of mackerel and oil sardines. Boat seines, beach seines and small gilinets are ideally suited to catch the fish here. From Quilon to Kanniyakumari and further up the east coast to Orissa, *kattumarams* (catamarans) of various kinds are used. The unsinkabiity of the *Kattumaram* makes it the ideal craft for the rough surf and wind conditions that prevail off these coasts.

One important feature of traditional fishing technology is that it is dependent on the traditional knowledge and skill of the user. Traditional fishing craft and gear are, in reality, extensions of the fisherman's body. By themselves they have very little chances of success, without the specific skills of the fishermen who use them. A *vallam* (canoe) fisherman will find it impossible to use a *kattumaram* and *vice versa.* These local fishing skills are passed on from generation to generation by observation and experience.

Contrary to popular opinion, traditional technology evolves and adapts all the time, often borrowing ideas from fishermen from other areas. Even in the same locality, it is possible to see two groups of fishermen using different methods to achieve the same fishing goals. The traditional technology we see today has evolved continuously over the years. Even a simple craft like the *kattumaram* has undergone changes in the number of logs and the kind of wood used in it, to adapt better to local conditions.

The rapidly changing market forces, since Independence, have also caused many innovations in traditional fishing practices: the adoption of motors in traditional craft, larger boats, larger nets, and the use of different materials, such as nylon instead of cotton for nets.

While some traditional fishing methods have disappeared, those which are versatile have survived. The bagnet fishery in Maharashtra continues to be widely used as it is the best way to catch the Bombay Duck. In the *kattumarani* belt, motorization of *kattumarams* is on the increase. In Kanniyakumari and Trivandrum, *kattumarams* have largely been re-placed by marine plywood boats with outboard motors.

Despite the fact that traditional fishing methods are still widely in use, some researchers feel that much knowledgehas already been lost. Dr G Poyyamoli, from Pondicherry University, pointed out that the present generation of fishermen do not have that intimate knowledge of the sea, its moods and the signs it offers, that fishermen over *50* years of age have. "They have a thorough knowledge of star positions, wind changes and cyclones, and the availability of a particular species of fish in a specific area, without any external aids. Much of this knowledge is already lost". Dr Poyyamoli added, "So are many of the traditional methods of preserving fish".

Traditional innovation of fishing methods are subtle, and happen over a period of time. They are easily affordable, and the ineqfialities that such innovations create are not so vast as to cause social tensions. They are also, mostly, environmentally benign. If present-day scientists and fisheries planners and traditional fishermen could work together and pool their information and then interact, fishing methods that are ideally suited to local conditions and profitable without being exploitative, could be developed. For example, traditional fishermen in Maharashtra collaborated with fisheries scientists to innovate a new craft design which has proved highly successful. Similarly, the setting up of artificial reefs along the Kerala coast has been an example of successful interaction between scientists and fishermen. More positive communication between the two is the need of the times.

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