

FISH for the PEOPLE

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Prized Commodity: Trash Fish from Marine Fisheries in the Asia-Pacific region



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Editors in Chief (Fish for the People)



SEAFDEC Secretariat
Kasetsart University Campus
P.O. Box 1046 Kasetsart Post Office,
Bangkok 10903, THAILAND
fish@seafdec.org

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"Fish Meal or Human Food?"

EDITORIAL

When SEAFDEC started to work on the Regionalization of the Code of Conduct for Responsible Fisheries (RCCRF) in 1998, discussions took place on whether it was appropriate to use in the region technical fisheries terms created and used by developed nations without first clarifying their implications in the regional context. As terms were being exported from developed to developing countries, the use of these definitions could be considered part of the ongoing process of globalization.

Throughout the RCCRF exercise, it was stressed that imported technical terms should be carefully examined, understood and, if necessary, rejected or modified in light of regional specificities. Terms like 'by-catch' and 'discards', for example, were of little applicability in the Southeast Asian context, since none of the catch can generally be categorized. Indeed, under the traditional but well developed fish marketing system in the region, fishers bring back all or most of their catch. In the last few decades, such behavior has been further accentuated by the rising need for feed in the booming aquaculture sector. Along this line, the term 'trash fish', meaning the portion of the catch discarded, was likewise deemed not appropriate for fisheries management in the region.

Last June in Hanoi, the Asia-Pacific Fishery Commission (APFIC) organized a regional workshop on low value and trash fish in the Asia-Pacific region. The outcomes of this important event are presented and discussed by Derek Staples and Simon Funge-Smith in this issue of *Fish for the People*. A symbolic yet important achievement from the workshop has been to agree to use the term 'low value fish' rather than 'trash fish' in Southeast Asia. Yet, the most important outcome from this meeting was to signal the need to urgently consider a balanced development between capture fisheries and aquaculture, as the demand for low value fish is building up to unsustainable levels in order to support the fast increasing aquaculture sector.

During the meeting, the question of how the aquaculture industry could be harmonized with the capacity of capture fisheries was discussed. The slow deterioration of the latter has been obvious in the last few decades in terms of quality of catch. While the absolute amount of catch has been maintained – albeit with greatly increased efforts – there has been a rapid shift of catch down the

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food web, with more and more low value fish caught instead of higher value commercial species, which are now much harder to find.

Yet it is likely that in the near future further aquaculture development will be supported by national governments in the region, with aquaculture production shifting drastically from fulfilling domestic food security needs to earning foreign currency. This trend also involves a shift from the culture of herbivorous and filter-feeding fish to the culture of carnivorous species, while at the same time fish farming has tended to become more intensive throughout the sector. Fish farming is increasingly relying on low-value fish, used both unprocessed and processed in the form of fish meal for formulated feed.

About seven kilogram of low value fish is needed to produce just one kilogram of marketable carnivorous fish. Where will the ASEAN-SEAFDEC member countries find such volumes of fish to sustain their ambitious national aquaculture development plans? It is likely that one million tons of additional production in aquaculture for the ten Southeast Asian countries will be the realistic scenario under current conditions, instead of one million tons increase per country, as some have argued to be necessary.

The APFIC workshop was successful in raising these concerns with government representatives from both the capture fisheries and aquaculture sectors. It is now time for ASEAN-SEAFDEC member countries to consider capture and aquaculture sectors together, as closely related and interdependent activities. Efforts in one sector must be followed by appropriate action in the other. In other words, governments must pay serious attention to a balanced development between capture fisheries and aquaculture. If policy and development continue uncoordinated, as has been the case in the past decade, the likely eventual result will be the collapse of a large part of the whole fisheries sector, leading not only to great economic losses but also to a tragedy for many in terms of food security.

Yasuhisa Kato

FISH for the **PEOPLE** is a special publication produced by the Southeast Asian Fisheries Development Center (SEAFDEC) every four months as part of the ASEAN-SEAFDEC Special 5-year Program to promote sustainable fisheries for food security in the ASEAN region.

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Throughout the region, capture and culture marine fisheries continue to play an important role in food security, poverty alleviation and national economies. Marine fisheries resources have now largely been overexploited, and as a result in some countries, development of coastal aquaculture has been encouraged to provide needed protein, income, employment, and export earnings. Such a policy trend implies, however, that sufficient food for this culture will be available. Inevitably, a dangerous spiral has evolved, in which the demand for low value fish, or 'trash fish', has supported increased fishing pressure on already degraded resources. This raises some important questions regarding the social, economic, ecological costs and benefits of this system, its sustainability and future trends.

Defining Low Value/Trash Fish

Once caught, fish are either retained or discarded. Those retained are used either as human food in a range of product forms and markets, or as feed for livestock or fish. In the latter, they are either fed directly or used indirectly by processing it into fish meal and the fish oil used to make pellets). Some of the retained fish might also be used for other purposes (such as fertilisers), though to a much lesser extent.

'*Low value/trash fish*' is a term loosely used to describe fish that are generally small in size (as well as some larger fish of low quality, and waste from other uses), are not highly favoured by consumers, and so have little or no direct commercial value. The term is not really appropriate in many cases, as these fish form the basis of human nutrition in many coastal areas in Asia-Pacific. Fish can be trash for one community but be preferred in another, making a precise definition difficult. In this article, we first define some of the characteristics of low value/trash fish, and compare their usage across a sample of countries.

The use of the terms 'low value' and 'trash fish' varies across the Asia-Pacific region (see Table 1) and can also change both seasonally and with location. However, in the six Asian countries studied, the definition above is generally true. They are usually taken as a by-catch,¹ in the sense that they are caught using non-selective fishing gear. A portion is often thrown away or discarded at sea, although this practice is uncommon in many Asian fisheries.





Prized Commodity:

Low Value / Trash Fish

from Marine Fisheries in the Asia-Pacific region

Derek Staples & Simon Funge-Smith

Country	Low value	Small size	Low consumer preference	Human consumption	Livestock / fish food	By-catch	Target	Discard
Bangladesh	⊗	⊗	⊗	⊗		⊗		+++
China PR								
'Trash fish'	⊗	⊗	⊗		⊗	⊗	⊗	+
'Low value fish'	⊗	⊗	⊗	⊗		⊗	⊗	+
India	⊗	⊗	⊗	⊗		⊗		++
Philippines	⊗	⊗	⊗	⊗	⊗	⊗		+
Thailand	⊗	⊗	⊗		⊗	⊗		+
'Trash fish'	⊗	⊗	⊗		⊗	⊗	⊗	+
'Low value fish'	⊗	⊗	⊗	⊗		⊗	⊗	+
Vietnam	⊗	⊗	⊗	⊗	⊗	⊗		+

Table 1: Some characteristics of low value/trash fish in six countries in Asia-Pacific

+++ = major discarding (confined largely to shrimp trawling), ++ = moderate discarding, + = minor discarding

The main difference in use of the terms depends on whether they include fish eaten by humans or whether they are restricted to fish used in animal feed. In the Philippines and Vietnam, the term 'trash fish' refers to fish that is both eaten by humans and used as feed for livestock or fish. In Thailand and China PR, 'trash fish' is more restricted, where it only includes the livestock and fish food component, while 'low value fish' is consumed by humans. In Bangladesh and India, less is converted into livestock or fish food, and 'low value/trash fish' is mainly directly used for human consumption. In China (and to a lesser degree in Vietnam), it includes a large amount of fish targeted for processing into fish meal or fish oil, such as Japanese anchovy and chub mackerel.

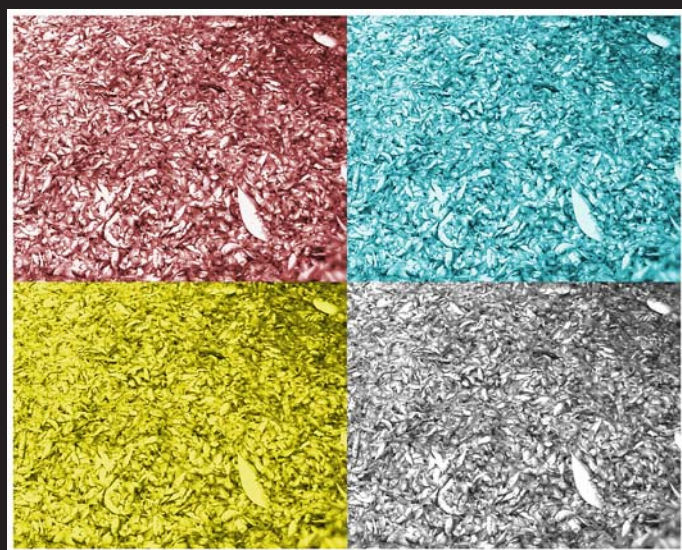
In view of these different uses of the terms in different countries, we refer to all of these as low value/trash fish.

Low Value/Trash Fish in the Context of Asia-Pacific Fisheries

The capture fisheries sector in the Asia-Pacific region can generally be divided into:

1. Large-scale industrial or commercial sub-sector, and
2. Small-scale artisanal sub-sector

Low value/trash fish: A broader definition



For the purpose of this article we define low value/trash fish as:

'Fish that have a low commercial value by virtue of their low quality, small size or low consumer preference. They are either used for human consumption (often processed or preserved) or used for livestock or fish food, either directly or through reduction to fish meal or fish oil.'

Country	Low value/trash fish (tonnes)	% of total catch	Dominant gear	Year of estimation	Source
Bangladesh	71,000	17%	Gill nets (48%)	2001-2002	Uddin et al, 2004
China	5,316,000	38%	Non-mechanised set bags (42%)	2001	Han and Xu, 2004
India	271,000	10-20%	Trawl	2003	Jayaraman, 2004
Philippines	78,000	4%	Trawl	2003	Ramiscal and Chiuco, 2004
Thailand	765,000	31%	Trawl (41%)	1999	Kaewnern and Wangvoralak, 2004
Vietnam	933,183	36%	Danish seine (22%)	2001	Edwards et al, 2004

Table 2: Estimations of annual low value/trash fish production in Asia-Pacific, based on country studies initiated by the Asia-Pacific Fisheries Commission (APFIC)

In 2003, world total fishery production was reported to be 136 million tonnes, representing an increase of some 30% since 1990 (Figure 2). According to FAO FishStat¹, marine capture fisheries production was 85.9 million tonnes in 2003. In 2003, capture fishery production from Asia-Pacific accounted for half of the world production, and the production from aquaculture in the region reached almost 90 percent of the global aquaculture production of fish and shellfish.

It is currently acknowledged, by both scientists and managers, that coastal resources are being 'fished down the food chain' and the percentage of low-grade low value/trash fish has risen considerably in recent years. To estimate this amount is difficult. However, while noting the widely divergent definitions of low value/trash fish across the region and the lack of sound statistics, recent estimates of low value/trash fish production obtained through our reviews are tabulated below for six countries (Table 2).

These countries account for over half of the marine capture fish production in the Asia-Pacific region. A weighted average of low value/trash fish across the six countries is 35% of the total marine catch. Noting that varying amounts are used for livestock and fish feed in the different countries (by definition, 100% in China and Thailand, and little in India and Bangladesh), a conservative estimate for the amount of fish used for livestock and fish feed Asia would be in the order of 25% of capture fisheries production. In a separate study, Malaysia estimates its catch of trash fish (i.e. fish not used for human consumption) in 2003 as 32% of the total marine capture landings.

Major Pathways for the Use of Fish in the Asia-Pacific Region

Using the statistics provided by FAO for capture and aquaculture production in the region, a very approximate 'back of the envelope' calculation can be developed to trace the flow of fish products through direct and indirect (mostly aquaculture) human use. For 2003, the recorded Asian capture fishery landings was about 39.3 million tonnes (for all carnivorous and omnivorous

fish, excluding molluscs and seaweeds) and the latest estimate for discarding is 1.8% (i.e. 720 000 tonnes), giving a total capture figure of 40.0 million tonnes. Applying the 25% factor to the landed catch gives a figure of 9.8 million tonnes being used for livestock and fish feed, and 29.5 million tonnes being used directly for human consumption. The total aquaculture production in Asia for all fish, excluding molluscs and seaweeds, is also estimated as 28.0 million tonnes.

From these figures (summarised in Figure 1) it is clear that the diversion of marine fish via aquaculture is providing a very significant proportion (approximately 50%) of the total fish provided to humans, both within Asia and exported. In addition, an increasing proportion of this is high-valued carnivorous species production is increasingly dependent on imported fish meal and fish oil.

Uses of Low Value/Trash Fish

Low value/trash fish are important food sources for poor people in various community groups in coastal areas. Small-scale fishermen generally keep low value/trash fish for home consumption, after selling other fish with high market demand. Some of the low value/trash fish are consumed fresh, while some are dried or processed into products such as fish sauce. The proportion of low value/trash fish for human consumption can be quite high. For example, in Bangladesh about 60 000 tonnes of the total 71 000 tonnes of low value/trash fish landed are

¹ The term 'by-catch' is a generic term referring to catch that is incidental to the target species. In many fisheries using non-selective gear such as fish trawls, the term is also used for the unwanted portion of the catch that is discarded, and sometimes to refer to the less desirable fish that are landed, i.e. low value/trash fish.

² www.fao.org/fi/statist/FISOFT/FISHPLUS.asp

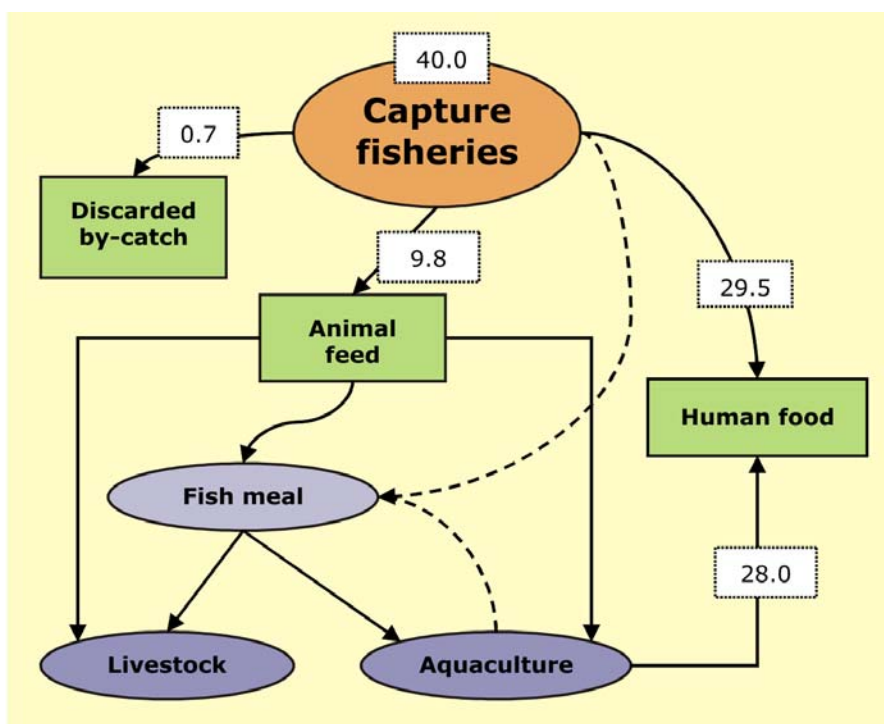


Figure 1: Production flows by major categories of fish in the Asia-Pacific region (amounts expressed in million tonnes)

consumed either directly or in dried forms. In China, low value/trash fish have traditionally been used as a main ingredient to supplement the daily diet with protein. A significant factor that determines how low value/trash fish are used is the location of the landings and the available infrastructure to deal with these landings.

In China, both fresh and frozen low value/trash fish are used directly to feed cultured animals, such as shrimp, crab or fish

species in small farms, especially when formulated feeds are not available or their prices are too high. The Philippines and Thailand use low value/trash fish as direct feeds for grouper and mud crab culture to enhance growth. In the Philippines, some portions are also given to tilapia, prawn and milkfish in grow-out ponds as supplement feeds provided by pond owners.

In Asia, utilisation of low value/trash fish for fish meal production varies between countries. The extent of fish meal production and use is sometimes difficult to estimate, and often, following Edwards et al (2004), the most reliable estimation method is to back calculate from aquaculture production statistics. Large-scale manufacturing of fish meal using low value/trash fish as raw materials is prominent in Thailand and the Philippines. Small-scale and household production is found in Bangladesh, where the poultry sector

dominates the utilisation of fish meal. Currently, there are 35 established poultry feed producing plants, producing about half of the poultry feed used in the country. The other half comes from smaller scale, household level producers located around the country. In India, production has declined due to the increased emphasis on export of high quality fish and fishery products. China, on the other hand, is developing this new industry to respond to the growing demand from aquaculture and poultry sectors.

There has been considerable innovation in recent years in an attempt to utilise previously unwanted by-catch, especially from

Country	Human consumption	Direct animal feed	Fish meal	Fish oil	Other
Bangladesh	Direct consumption, often dried	No record	Poultry feed	Sporadic production for fish feed	-
China	Innovation in new products (e.g. fish meat filling), dietary protein supplement	Poultry, livestock, shrimp, crab and fish	Relatively new, but production has increased dramatically due to aquaculture demand	No record	Some use as fertiliser to enrich primary production in ponds
India	Increasing consumption levels, fresh or dried	Some used for fish and poultry	Poultry feed, production declining due to increase in direct consumption	Shrimp feed production	-
Philippines	Consumed directly, fresh or dried (as much as 50% of low value/trash fish)	Aqua farms (e.g. crab, grouper)	Demand as poultry and animal feed	No record	Fish sauce
Thailand	Some low value/trash fish are dried for human consumption	Chicken, duck and pig feed. Aquaculture (e.g. crab, grouper)	Dominant use of low value/trash fish (as much as 90%), especially poultry feed. Recent decrease due to use of surimi processing waste	No record	Fish sauce
Vietnam	Direct human food (e.g. sun dried)	Feed for pigs and coastal aquaculture	Fish powder, artisanal and industrial processing, mainly for pigs and poultry feed. Increasing demand due to aquaculture	Mostly imported	Fish sauce

Table 3: Examples of low value/trash fish use in the Asia-Pacific region

shrimp trawl fisheries and from finfish trawlers. Many of these activities have been the result of by-catch utilisation programmes supported by governments, research institutes, or development agencies, while some have been driven primarily by the market.

Issues Associated With Low Value/Trash Fish

Overall drivers

The issues related to low value/trash fish landings from multi-species/multi-gear fisheries in the Asia-Pacific region are underpinned by the rapid development of the aquaculture industry and the increasing demand for fish by consumers (see Figure 2). These two pressures represent new challenges for sustainable fisheries management in the region.

Several issues concerning low value/trash fish need to be resolved in order to ensure that fisheries in the Asia-Pacific region contribute more to the region's sustainable development. These issues include the following:

- increasing demand as direct feed for aquaculture and fish meal and fish oil
- food for humans or animal feed
- sustainability of harvesting
- lack of incentives for improved post-harvest
- growth over fishing (catch of juveniles of important commercial species)

- discarding
- environmental impact of direct feeding to aquaculture
- social concerns over use of low value/trash as a major source of animal protein for poor people.

Increasing demand

Recognising the potential effects of declines in marine capture fisheries, many governments in the region have turned to aquaculture as a means to increase fish supply, provide employment and generate foreign income. On the one hand, aquaculture development can be seen as a viable option to utilise low value/trash fish. On the other hand, it contributes to increasing fishing pressure on the already overexploited fish stocks in the region.

Over the last decade, the price of low value/trash fish has risen considerably. It is predicted that it will keep rising over the next few years due to increased demand for fish meal and fish oil to meet market demands for aquaculture of carnivorous fish, while capture fisheries will remain stable. As fish meal is the preferred protein source in most aquaculture feeds, the natural limits of the supply of fish meal and oil will in the future restrict the development potential of global aquaculture, since the culture of many species relies on fish meal and oil for growth.

Some regard this to be only partly relevant in the shorter term, as aquaculture is only one competitor for global fish meal supplies. The demand for livestock is still greater than aquaculture, although this is gradually shifting. A second consideration is that the fish meal component of feeds could be replaced by vegetable protein (e.g. soya) or mono-cellular proteins. An impact in the longer term of such replacement will tend to be lower growth rates of cultured fish (fish-based feed contain higher quality proteins resulting in greater growth if compared to vegetable-based feed). Prices of fish meal and oil will also tend to rise as competition between the aquaculture and livestock sectors increases (it is perhaps worth noting that chicken, cattle and pigs do not naturally feed on fish and therefore the inclusion of fish meal in feeds for these animals is a nutritional/economic convenience rather than absolute necessity – the same cannot be said for carnivorous fish!)

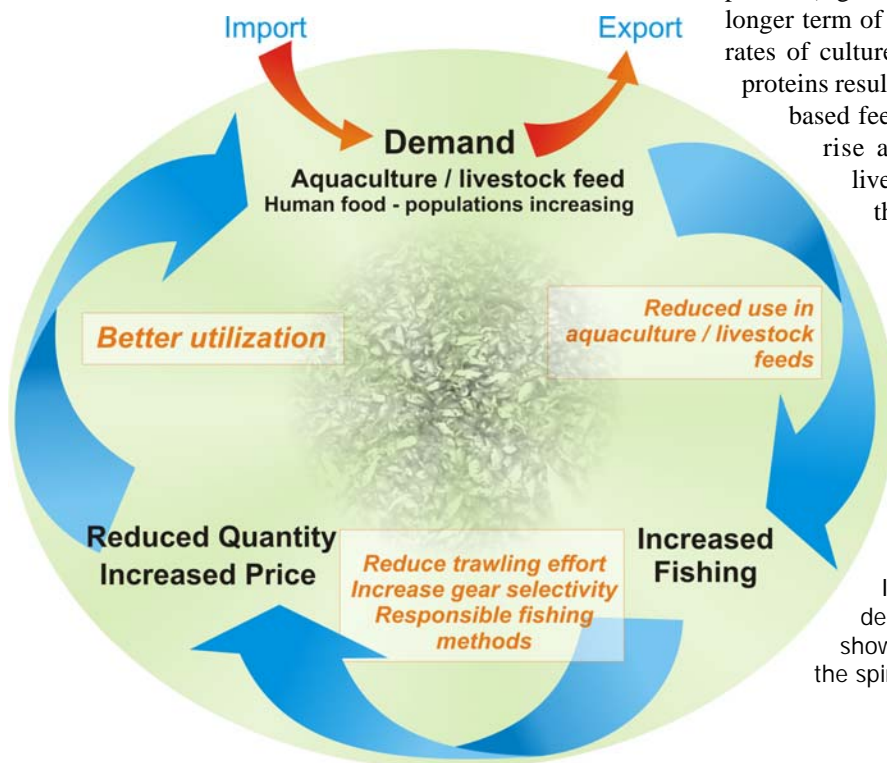


Figure 2: The low value/trash fish spiral. Increasing demand, increased fishing, degraded resources and increased price. Boxes show some actions that might help in escaping the spiralling effect.

Price of low value/trash fish

At the local level, prices of low value/trash fish vary depending on species, seasons and abundance of other fish and fishery products. Prices also fluctuate with the demand for fish meal for livestock and the aquaculture industry, and the availability of raw materials for fish meal production. At the low end, fresh low value/trash fish has been known to fetch as little as US\$ 0.04 per kg (e.g. Thailand), while the price can be as high as US\$ 1.50 per kg (e.g. India). Prices for low value/trash fish at landing places in Bangladesh range from US\$0.08 to US\$0.15 per kg. Fish meal producing industries, however, buy low value/trash fish at higher prices (US\$0.25 to US\$0.35 per kg), depending on protein concentrations of the low value/trash fish, including transportation cost as well as remunerations for fish traders.



FAO³ estimates that an annual global production increase of 3.3% until 2030 is feasible in the aquaculture sector. IFPRI⁴ gives an estimate of 2.8% until 2020. The production of high-value species will increase most, given the rising demand for these fish products. The biggest rise in production is expected to be in China.

Developing countries will continue to export high value products (e.g. brackish-water shrimp, marine finfish and pellet-fed tilapia) and import or domestically produce fish of lower value for consumption (e.g. carp and mussels). Coastal aquaculture, particularly farming of brackish-water shrimp and carp culture

in freshwater ponds, has been rapidly developed. In many areas, these culture practices have been transformed from extensive system to semi-intensive and intensive culture systems, where large amount of feeds are required.

However, if one accepts that supplies of low value/trash fish are declining and prices are increasing, Asia-Pacific countries may need to increase imports of fish meal from the global fish meal market for the aquaculture industry, or replace it with other feed materials, including plants and other protein supplement. The replacement of fish meal in aquaculture diets is hence a major international research priority.

“
For fish meal
or
human food?
”

For Fish Meal or for Human Food?

There is increasing conflict between the use of low value/trash fish for livestock and fish feed and for human consumption. It has been argued that it would be more efficient and ethical to divert more of the limited supply to human food, using value-added products. Proponents of this suggest that using low value/trash fish as food for poor domestic consumers is more appropriate than supplying fish meal plants for an export income-oriented aquaculture industry, producing high value commodities. On the other hand, food security can also be increased by improving the income generation abilities of poor people, and it can be argued

³ FAO (2002) 'The state of world fisheries and aquaculture 2002.' FAO, 2002.

⁴ IFPRI (2003) 'Fish to 2020 – Supply and demand in changing global markets.' International Food Policy Research Institute, Washington.

⁵ WorldFish Centre, Regional synthesis on the analysis of 'TrawlBase' data for low value/trash fish species and their utilization (in press)

that the large number of people employed in both fishing and aquaculture has this beneficial effect, via income generation, rather than direct food supply.

Without external interventions (such as incentives and subsidies), it will be the economics of the different uses of low value/trash fish in different localities that will divert the fish one way or the other. For example, in Vietnam, where the national demand for fish sauce is predicted to double over the next 10 years, there appears to be direct competition for mixed low value/trash fish between *Pangasius* feeds and production of low-cost fish sauce. By contrast, culture operations for high value marine finfish and lobsters can afford to pay more for anchovy than fish sauce manufacturers in central Vietnam.

Sustainability

As a result of the expansion of aquaculture and local livestock production, low value/trash fish has a ready market and can be sold easily in many localities. This can then be converted into higher-grade fish, crustacean and livestock feeds, some of which are sold at good prices. Hence, there seems to be little incentive to discourage the harvesting of low value/trash fish given their important contribution to aquaculture, overall employment and consequent export earnings. Also, the low value/trash fish catch is based on a large number of short-lived highly productive species for which, apart from targeted low value/trash fisheries in China, there is little evidence of current overexploitation leading to reduction in overall fish production. The demand for low value/trash fish has led to increased levels of low value/trash fishing by small-scale vessels in particular, and is now an important reason why many vessels can continue to be economically viable.

The concern, to both fisheries and aquaculture, is that there is no way of knowing how sustainable this system is. The WorldFish Centre⁵ has carried out analyses of low value/trash fish trends in several countries based on past scientific trawl surveys that has shown that many families containing both low value/trash fish and commercial species have suffered severe declines in abundance, whereas families just containing low value/trash fish species have been less impacted. Reduced fishing capacity may, in fact, result in increased catches for a smaller number of vessels, although it will be difficult to reconcile who would be refused access to the resources.

From a socio-economic perspective, the benefit of catching low value/trash fish is obvious. The low value/trash fish are important food source for many people, especially the poor, as well as an important source of income. The range of utilisation of these low value/trash fish for human consumption suggests that very little waste is associated with them. However, serious conflicts over use are common. Trawlers in the region tend to operate close to shore and use very small mesh sizes. They thus cause conflicts with small-scale fishers, and destroy fisheries stock and ecosystem services. Government measures have attempted to eliminate and resolve these conflicts through banning trawling in some areas. The western half of Indonesia is now forbidden to trawlers. There are heavy restrictions in some areas of the Philippines and Malaysia, and a prohibition for trawlers from

within 3 km from shore in Thailand, and within 40 m depth in Bangladesh. Such regulations are unfortunately difficult to enforce and success has been rather limited, unless supported by local communities and administrations. Increasingly, small-scale fishermen are the main champions of responsible fishing practices, through community-based and co-management programmes, often with strong support from local government.

Overall knowledge of the dynamics of these low value/trash fisheries must be enhanced. Serious efforts to improve statistical records, and to identify and quantify where and how these fish are used, are urgently needed. The composition of landings must be identified and probably categorised in the national catch statistical system (certainly for major species), such that groups, like 'other fishes', 'miscellaneous', 'low value/trash fish', disappear. Local communities can assist in recording amounts of catches of these fish at small landing sites. Knowledge about who uses the fish and who benefits from their use, are also fundamental. This will certainly require supplemental information gathering beyond catch records that utilises local knowledge to support conventional statistical approaches.



Another aspect of the sustainability issue is that the low value of these fish does not reflect their high ecological value. These small fish serve a niche in the marine ecosystem and are certainly food to other fish and marine animals. Removing them in large quantities from the environment creates a void in the food chain, and could eventually lead also to the reduction or loss of larger fish species, not just of its own species. Fishing with demersal gears that destroy habitats adds to the overall ecological impact.

Improving post-harvest

Because less money and effort is needed for handling, and because there is a market that can accommodate the catch, some larger fish caught are included as low value/trash fish for fish meal and fish oil. Indeed, it is clear that with high demand and good economic gains from low value/trash fish in the fish meal production sector, many fishers have decided that careful handling and chilling is not essential. According to some reports in Vietnam, 20-30% and even 50-60% of high value fish on some offshore trawlers becomes low value/trash fish because of poor storage.

Even if it was theoretically possible to improve the product, the limiting factor of small-scale and artisanal vessels is the lack of chilling equipment and on-shore infrastructure to access high value urban or export markets. Hence it may be difficult for these vessels to land a high quality product for the human consumption market, without incremental increases in infrastructure and costs. With proper handling, landing and supply of high quality fish to local markets should still be possible, in cases where fishing grounds are close to port. Of greater interest are perhaps the industrial vessels, which with the proper equipment and skills, should be better at ensuring a high quality catch. The underlying incentive for this to materialise, however, is that the economic gains of doing so outweigh the gains of landing fish on the low value/trash fish market. Here it is fundamental that the national authorities establish appropriate policies to help structure the sector, especially in relation to the national goals of food supply to the population and income generation. Indeed, as long the low value/trash fish market is vibrant, fishermen will have few incentives to improve the overall quality of their landed catch.

The quality of low value/trash fish destined for feed-mill factories is also a major concern. Even though it has a high protein content and quality when caught, the quality declines rapidly, as only ice or chilled water is used to preserve it on board ship, especially when boats may be at sea for 1–4 weeks. The resulting quality of the fish meal is often poor by the time it reaches the fish meal plant, limiting its use to lower product-value aquaculture operations.

Harvesting juveniles of commercial species

Another related issue of low value/trash fisheries is the capture of juvenile fish of potentially important commercial species (so-called growth over fishing). Between 18% and 32% of low value/trash fish in the Gulf of Thailand are juveniles of commercially important fish species. Given a chance to grow to a larger size, these high-value species could be harvested much more effectively, both in terms of total catch of these species, but more importantly, in terms of value. However, to increase the catch of these species, a dramatic reduction in overall fishing effort would be required, and the overall lower quantity of catch would then have knock on effects to markets and aquaculture. As with the current system of using low value/trash fish for aquaculture, this higher value catch would still supply the wealthier parts of the population. Social costs in terms of reduction in employment and livelihoods would be large, and the actual economic benefits (and distribution of benefits) need to be studied in greater detail.

Juvenile/trash fish excluder devices (JTEDs) have been trialled in trawl needs in several Southeast Asian countries. However, given the many conflicting uses for low value/trash fish, it is difficult to envisage a management system that optimises the supply of low value/trash fish for both human and livestock and fish feed uses, and at the same time excludes juvenile fish. Socio-economic studies are required to assess the costs and benefits of different management interventions such as juvenile fish excluder devices in nets.

Discarding unwanted fish

Discarding practices are seen by many as a waste of fish and fish protein, but the impact on the species taken is the same whether they are landed or not. In fact, the discarding practice will benefit some species in the ecosystem, such as scavengers, if carried out in large volumes. Obviously the degree of discarding varies according to the market available to the fishermen and can vary considerably by gear type and location. It is nevertheless clear that discarding at sea will decline if unwanted catches can be landed for economic gain.

International instruments, including UN resolutions, the Kyoto declaration, and the Code of Conduct for Responsible Fisheries, have highlighted the need to reduce, or minimise discards. There are two major approaches to addressing the discard problems, namely reducing by-catch and increasing its utilisation. These two harvest strategies may be complementary and in any given fishery, an appropriate balance between by-catch reduction and utilisation is required. Again there is a need for analyses of the trade-offs between promoting by-catch reduction and utilisation. In particular, the balance between highly selective fishing which targets one trophic level (or species) only, and less selective fishing which is likely to impact upon several trophic levels (or species groups), requires further attention so that the best scientific advice can be made available. Examples of by-catch utilisation legislation in Asia-Pacific countries are given in Table 4.

For the Asia-Pacific region, the greater utilisation of low value/trash fish has been of particular importance. Indeed, with some exceptions, discards in most fisheries in China and Southeast Asia are now considered to be negligible. There has been a change in perception of what constitutes a target species. Given the expansion of markets for low-value fish, almost all catches can now be regarded as targeted, meaning that there are no by-catch or discards. Of course, exceptions occur. In Brunei, unlike in other Southeast Asian countries, no low value/trash fish fishing is allowed (for aquaculture or local consumption), and hence a discarding estimate of some 70% is still being quoted.

FAO⁶ estimates that trawl fisheries for shrimp and demersal finfish account for over 50% of total discards, while representing only 22% of total landings. Trawl fisheries and tropical shrimp fisheries⁷ account for over 55% and 27% of the total estimated discards, respectively. In general, small-scale fisheries account for at least 8.5 million tonnes (11%) of discards. In the analysis, most small-scale fisheries in the Asia-Pacific region were assigned very low or zero discard rates, given the supporting expert evidence summarised in Table 5.

Fisheries with high discard rates include the Bangladeshi industrial finfish and shrimp trawl, which has an estimated discard rate of some 80%. Discarding in the Indonesian shrimp trawl fishery in the Arafura Sea is estimated to be over 80%, based on 1998 figures; discards there have remained high, despite the introduction of by-catch exclusion devices, largely due to poor enforcement and the lack of local markets for by-catch.

Country	Legislation or Code	Key strategy
Bangladesh	Marine Fisheries Ordinance	Shrimp trawlers must have at least 30% of their total catch as fish
India	Maritime Zones of India Rules 1982 (amended April 1985), Regulation 5	Crews may not discard substantial surplus catch, catch exceeding authorised quantities shall be retained onboard, recorded, and surrendered as required by authorised officers
Indonesia	Decree No. 561 of the Ministry of Agriculture on the utilisation of the by-products of fisheries	All entities fishing prawns are bound to utilise as foodstuff for the population the fish resulting as a by-product from their fishing activities
	Presidential Decree No. 85 of 1982	All fish by-catch to be handed over to the State owned company

Table 4: Examples of by-catch utilisation legislation in the Asia-Pacific region

A number of national by-catch reduction initiatives have also been implemented. Despite the best intentions, problems with enforcement and user conflicts have been observed.

Action Plan

Current dilemma

Considering the increasing conflict between the use of low value/trash fish for livestock and fish feed and for human consumption, one obvious but important conclusion is that, given the strong interdependency between capture fisheries and aquaculture in the Asia-Pacific region, management of these two sub-sectors can no longer be carried out independently of each other. This interdependency raises many important questions. For example:

- Has the system evolved into a sustainable system, whereby over fishing of more traditional fishery resources has allowed an increased supply of low value/trash fish to meet increased demands?
- What is the impact of harvesting the juveniles of potentially commercial species on the total supply of high-quality fish for human consumption both in the region, and globally?
- From where will the food for the growing aquaculture sector in the region be sourced in the future?
- What will be the implications of an increasing gap between supply and demand – and the resulting increase in the price of fish – for food security and poverty alleviation in the region?
- Will substitute feeds for livestock and fish (if developed) result in a collapse of the existing low value/trash fish markets and impact the livelihoods of Asia-Pacific fishing communities?
- Will current fishery policies that advocate reduction in fishing capacity and rights-based fisheries

management actually improve the overall situation? and

- Who are the beneficiaries and the losers in the current system, and how would that change through management interventions?

There is an urgent need to understand the system better. This report has given some insights into how fisheries are evolving in the Asia-Pacific region, but big questions such as those above remain unanswered. We now have an initial understanding and enough quantitative data to start addressing them, and urge the research community to take up the challenge.

Future prospects

Estimated future demand is expected to rise given the continued growth in the aquaculture sector. The competition between the use of low value/trash fish for livestock and aquaculture production and human consumption will also likely continue to increase.

Reducing the Dependence on Low Value/Trash Fish

Fisheries interventions

1. Reduce trawling and push net effort (and clearly monitor the effect of capacity reduction)
2. Introduce improved selectivity of fishing gears and fishing practices

⁶ FAO (2004) 'International plan of action for the management of fishing capacity: Review of progress in Southeast Asia'. TC IUU-CAP/2004/, Rome, May 2004.

⁷ China, India and Thailand, all with low or negligible discard rates, account for over half of the penaeid shrimp catch.

Country	Landings	Discards	Discard rate
Bangladesh	314,966	64,578	17.0%
Brunei	1,214	3,579	74.7%
Cambodia	49,343	0	0.0%
China	14,777,934	74,261	0.5%
India	2,849,066	57,917	2.0%
Indonesia	3,104,788	270,412	8%
Malaysia	1,027,276	10,377	1.0%
Myanmar	880,594	27,371	3.0%
Philippines	744,583	7,521	1.0%
Thailand	2,752,878	27,807	1.0%
Vietnam	3,547,346	17,826	0.5%
Total	30,049,988	651,649	1.83%
FAO statistical area			
Eastern Indian Ocean (57)*	2,931,174	205,428	6.5%
Western Central Pacific (71)*	9,366,816	407,826	4.2%

Table 5: Landings, discards and weighted discard rate in the Asia-Pacific region (t) Source: FAO (2004a), Note: *excluding tunas

3. Facilitate reduction in 'race for fish', through rights-based fisheries and co-management
4. Protect juvenile nursery areas (refugia/closed areas and seasonal closures), and
5. Provide alternative social support measures (including employment).

Improved utilization

1. Improve post-harvest fish handling, and
2. Develop new fish products through processing.

Improve feeds for aquaculture

1. Change from direct feeding to pellet feeding
2. Reduce fish meal content by substitution of other suitable ingredients in pellets
3. Invest in feed research for inland and marine species, and
4. Promote adoption and change to pellet feeds.



“ Has the system evolved into a sustainable system, whereby **over fishing** of more traditional fishery resources has allowed an increased supply of low value/trash fish to meet increased demands? ”



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What is the impact of harvesting the juveniles of potentially commercial species on the total supply of **high-quality fish** for human consumption both in the region, and globally?

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Notes

The article draws on a range of documents and data sources from the United Nation Food and Agriculture Organization (FAO) to provide insights into current issues surrounding low value/trash fish production in the region.

Readings

A number of comprehensive country studies were initiated by the Asia-Pacific Fisheries Commission (APFIC) and have provided the majority of the information discussed, and include:

Chuenpagdee, R. and K. Juntarashote (2004) 'Regional overview of status and trend of 'trash fish' from marine fisheries and their utilization, with special reference to aquaculture'. April 2004.

Han, J. and H. Xu (2004) 'Overview of status and trend of 'trash fish' from marine fisheries and their utilization, with special reference to aquaculture: China'.

Jayaraman, R. (2004) 'Overview of status and trend of 'trash fish' from marine fisheries and their utilization, with special reference to aquaculture: India'.

Kaewnern, M. and S. Wangvoralak (2004) 'Overview of status and trend of 'trash fish' from marine fisheries and their utilization, with special reference to aquaculture: Thailand'.

Ramiscal, R.V. and M.B. Chiuco (2004) 'Overview of status and trend of 'trash fish' from marine fisheries and their utilization, with special reference to aquaculture: Philippines'.

Uddin, A.M.K., M.S. Iftekhhar, M.J. Abedin and M.S. Islam (2004) 'Overview of status and trend of 'trash fish' from marine fisheries and their utilization, with special reference to aquaculture: Bangladesh'.

Widodo, J. (2004) 'Overview of status and trend of 'trash fish' from marine fisheries and their utilization, with special reference to aquaculture: Indonesia'.

A recent review carried out under the auspices of the Australian Centre for International Agriculture Research (ACIAR) was also used:

Edwards, P., L.A. Tuan and G.L. Allan (2004) 'A survey of marine low trash fish and fish meal as aquaculture feed ingredients in Vietnam'. ACIAR Working Paper No. 57, 2004.



ABOUT THE AUTHORS

Derek Staples is a New Zealander but worked for much of his career in Australia and the Southeast Asian region. His interests include all aspects of the sustainable development of fisheries and aquaculture, particularly small-scale operators in developing countries. He is presently employed as the Senior Fishery Office with the Food and Agriculture Organization of the United Nations, stationed in Bangkok, Thailand, a position that also involves acting as Secretary for the Asia Pacific Fishery Commission. Prior to taking up this post, he was a senior science advisor to Ministers and policy decision makers in the Department of Agriculture, Fisheries and Forestry, in Australia. He can be contacted at Derek.Staples@fao.org

Simon Funge Smith is the Aquaculture and Inland Fisheries Officer, FAO-RAPA, Bangkok, Thailand. He can be contacted at Simon.FungeSmith@fao.org

Development of SEAFDEC Regional Guidelines on Co-Management by Means of Group User Rights

Supaporn Anuchiracheeva



A Co-management Approach for Small-Scale Fisheries

In the Southeast Asian context, small-scale fisheries, which involve either full-time or part-time activities in inland and inshore waters, constitute the major part of the sector. Considering their contributions to local food security, sustainable livelihoods and poverty alleviation, and the fact that the small-scale fisheries sub-sector is generally weak in terms of financial and technical capabilities, substantial, long-term support from the government is perceived as essential. Such support would ensure that social and economic security is maintained even in the poorest and most vulnerable rural areas.

Inshore waters and some inland water areas, where small-scale fisheries are operating, are considered to be critical habitats for commercially important aquatic resources (as spawning, nursery or feeding grounds) and as unique tropical ecosystems as a whole (specifically referred as coral reefs, mangrove forest and sea grass beds). It is therefore crucial to develop appropriate fisheries management systems and conservation mechanisms for these fragile coastal ecosystems.

It is understood that any innovative fisheries management methodology will not be effectively implemented so long as fishing operations are conducted under the current unregulated open access regime. The introduction of rights-based fisheries is therefore considered a crucial innovative step towards the implementation of effective management. With a view to developing and improving the management of small-scale fisheries, 'group user rights' are considered essential under a co-management system.

By adopting group user rights, ownership and partnership of small-scale fisheries in resource management and utilization could be enhanced. If management responsibilities are shared among resource users, the level of compliance to regulations aimed at achieving sustainable fisheries will be greatly improved.

priority actions to achieve sustainable fisheries, which were adopted as the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region. With regards to aspects related to fisheries management, the Resolution and Plan of Action stresses the need to develop innovative fisheries management by decentralizing fisheries management functions to the appropriate local level, introducing rights-based fisheries management through licensing and community fishing rights, and development of supporting legal and institutional frameworks under the co-management system.

Since then, the SEAFDEC Secretariat in collaboration with its member countries has clarified and introduced the concepts of rights-based fisheries and co-management for small-scale fisheries. The development of local institutions has been highlighted as the key element for the effective implementation of co-management systems. It was noted that the establishment of local institutions would provide a solid basis not only for improved management practices, but also for systematic government assistance and supports to small-scale fishers' livelihood. A national network among local fishing communities would contribute towards poverty alleviation, both in normal and emergency circumstances, such as rehabilitation work after the 2004 tsunami.

Developing Co-management Guidelines

In line with the principles set forth in the 1995 Code of Conduct for Responsible Fisheries (CCRF), SEAFDEC initiated a regionalisation process in 1998 to translate the CCRF into actions. As a result of this process, four sets of regional guidelines for responsible fisheries in Southeast Asia were developed through a series of consultations at national and regional levels. The four sets of guidelines deal with fishing operations, aquaculture, fisheries management and post-harvest practices and trade.

By way of follow up, the ASEAN-SEAFDEC Member Countries organized a Conference on Sustainable Fisheries for Food Security in the New Millennium: "Fish for the People" in 2001. The Conference identified important fisheries issues and formulated a regional fisheries policy framework and



To facilitate further development of these concepts, the SEAFDEC Secretariat, through a project under the Special Five-year Program called Toward Decentralized Management for Sustainable Fisheries in the ASEAN Region (2002-2005), developed the Regional Guidelines for Co-management Using Group User Rights for Small-scale Fisheries in the ASEAN Member Countries. This was done through a series of regional consultations. The guidelines are expected to support national efforts in the region to improve the management of small-scale fisheries.

Using the Guidelines

The Guidelines are considered as supplementary directives to the Regional Guidelines for Responsible Fisheries in Southeast Asia: Fisheries Management. They are intended to provide a regional reference for countries that are interested in implementing and improving the management of their small-scale fisheries using group user rights and co-management. The Guidelines generalize regional fisheries issues in the broader context rather than focusing on specific national situations. The actual application of the Guidelines would require appropriate modification, including the terminology used, so as to fit the national or local specifics on social, economic and legal situations.

Content of the Guidelines

The guidelines consist of five key sections:

(1) Supporting national policy

The guidelines encourage Member Countries to formulate fishery policy to support the implementation of co-management of small-scale fisheries by using group user rights. There are two crucial issues which, it is argued, must be stated at the policy level. First, the responsibilities of local institutions must be clarified, with the delegation of management responsibilities to the local level. This policy is needed in order to allow the co-management system to start. Second, regulated entry to common fisheries resources must be put in place. This first step would then need to be followed by identifying and selecting an appropriate number of fishers who will be allowed to fish, which should be carefully considered. The process of selecting fishers is left to the local institutions who are co-managers to particular fishery resources.

(2) Supporting legal frameworks

To implement the co-management of small-scale fisheries using group user rights requires appropriate legal frameworks that will support management at national, local and community levels.





Quick definitions:

Community Fisheries Management Organization

In each of the designated areas, the CFMO is a proposed stakeholders institution whose members are local fishers. The roles and functions of the CFMOs should be nationally designed, guided and supported by an appropriate national policy and legal framework.

Community Fisheries Management Committee

CFMC is the main co-management and decision making body at the community level. The committee is composed of representatives of the CFMO and relevant government agencies.

At the *national level*, the legal framework should cover the identification and delegation of fisheries management functions and responsibilities to local government and Community Fisheries Management Organizations (CFMO) as partners in the co-management process, and the legal roles and functions of the Community Fisheries Management Committee (CFMC).

The legal framework at the local level needs to cover detailed roles and functions of CFMC, designated exclusive areas, and definition of rights coverage, including type of fishing gears and methods, roles and responsibilities of resources users, operating rules for CFMOs, and guidelines for supporting economic activities conducted by each CFMO.

Finally, the legal framework at the community level needs to empower CFMOs to carry out their day-to-day fisheries management actions and enable them to enforce the required management measures through effective operation of CFMCs.

(3) Fishing rights

The guidelines promote group user rights. These refers to exclusive rights of access to fisheries resources, and use of water surface in case of aquaculture, to be given to the resource users within a manageable designated area through the appropriate local organization. User rights are given to a group of fishers, not individuals, and are not the same as property rights – users do not own the area in which they have user rights. As a member of the group, individual fishers are entitled to exploit fishery resources and the sea surface in the responsible organization's designated area.

(4) Mechanisms

The guidelines encourage the development of an appropriate co-management mechanism in conjunction with institution-building initiatives of CFMOs. CFMC are the mechanism through which government agencies and local fishers co-manage coastal fisheries. Their roles cover:

- final allocation of the designated area
- formulation of day-to-day rules and regulation for fisheries management in the designated area
- monitoring of the utilization of fisheries resources and water surface
- implementation of environmental conservation measures and activities
- exit and entry of CFMO members, with the development of an appropriate and simple registry system to keep records of its members
- clarification of responsibilities and privileges of memberships
- local settlement of conflict among members, including appropriate penalties for violation of rules
- review and approval of the fishery management and development plan
- promotion and supervision of CFMO economic activities, and
- financial management and conducting economic activities for financial sustainability.

(5) Institution building in co-management

As the group user rights will be given to CFMOs, these organizations should be equipped with an appropriate number of staff and adequate knowledge and skills to effectively execute their roles and responsibilities, as mentioned above.

A National Technical Consultation on Rights-based Fisheries, Co-management for Small-scale Fisheries and revising Fisheries Strategy organized by Lao DoF, 25 - 29 October 2005, as recommended by SEAFDEC Rights-based Fisheries and Co-management RTC in Jakarta.



In line with the agreement reached at the consultation, the SEAFDEC Secretariat plans to promote and verify the regional guidelines through the implementation of pilot projects in some Member Countries. Considering the urgent need to change the policy and legal framework, in accordance with specific local circumstances of coastal fishing communities, the selection of the pilot projects' sites will have to be done in close partnership with interested Member Countries. This will ensure active collaboration and commitment of involved government agencies in implementing the pilot projects.

Conclusion

A few key elements must be considered in order to sustainably manage coastal fisheries as common pool resources. These are an effective supporting policy and legal framework, strong and motivated local institutions involved in managing their fisheries, and clear boundaries on the resources themselves. Rights-based fisheries and co-management respond to the need for those key elements, and have been introduced by SEAFDEC as innovative approaches for coastal small-scale fisheries management in the Southeast Asian region.

What Next?

The process of publishing the regional guidelines is in its final stage, but how will they be useful for SEAFDEC Member Countries? In the Regional Technical Consultation held in Jakarta, Indonesia, in July 2005, Member Countries agreed that the guidelines should be used to facilitate future promotion of rights-based fisheries and co-management at the national level. Promotional activities may include pilot projects, capacity building, joint research and networking among relevant projects and initiatives. Member Countries were encouraged to conduct appropriate national consultations to enhance awareness, review existing projects and experience related to coastal fisheries management, and investigate the applicability of the Regional Guidelines. The outcome of such a process may facilitate the formulation of national implementation plans.

The scope and direction of the approach has been elaborated in the form of Regional Guidelines on Co-management by means of Group User Rights for Small-scale Fisheries. These are intended to facilitate how Member Countries can improve their coastal and small-scale fisheries management approaches and system. The guidelines need to be adapted to each national management system and to local specifications, in order to build upon experience and existing systems and utilize available resources for the greatest benefit of each Member Country.



Visiting Banda Ache by SEAFDEC' staff, Dr. Yasuhisa Kato and Dr. Supaporn Anuchiracheeva, discussed with the local government authorities and the local fisher organization, *Panglima Laot*, on the impact of Tsunami on coastal fishing communities of the area, and roles of local institutions in post Tsunami activities, 13 June 2005



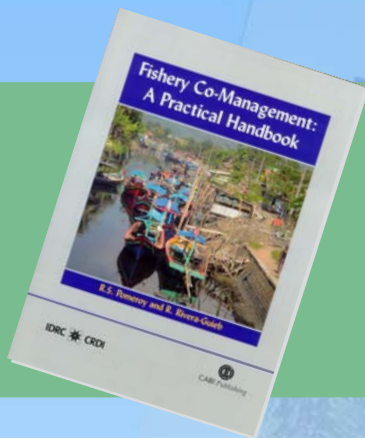
ABOUT THE AUTHOR

Supaporn Anuchiracheeva is a Coastal Fisheries Management Specialist working with SEAFDEC. With a background and long experience in communications, extension, training and organization of communities, she has recently graduated with a Ph. D. on Integrated Tropical Coastal Zone Management. Currently based at the Secretariat, her work focuses on the improvement of coastal fisheries through the promotion of rights-based fisheries and co-management approaches.

The author can be reached at supaporn@seafdec.org

Reader's Review

How to add the "Co" to Fisheries Management



Title: Fishery Co-management: A Practical Handbook
(Paperback, ISBN 0 85199 088 6)

Authors: R. S. Pomeroy and R. Rivera-Guieb

Publication: November 2005 *Pages:* 288

Price: £37.50 (US\$ 65.00)

Published: CABI Publishing and IDRC

Where to get it: www.cabi-publishing.org/bookshop

Co-management of fisheries resources, or the partnership between governments and resource users in managing fish and other aquatic resources, has emerged as a main paradigm of modern and innovative fisheries management. Co-management is indeed the current buzzword in fisheries and environmental management circles. Everybody is talking about it, almost everybody wants to do it, but many are still wondering what exactly it is and how to do it.

A new book by Bob Pomeroy and Becky Rivera-Guieb promises to answer this question by describing and introducing a process of, what the authors call, "community based co-management". By coining this term, they try to bring together the two dominant strands that compose the discourse on common property and open-access resources management. Empowering resource users, to actively take up management responsibilities for the resources they are using, has long been seen as a most promising approach to solve the increasing problems of overfishing and resource degradation. As the communities are not able to control all the factors affecting their resources, the government is still needed to address issues beyond the scope of local management, to provide a legal framework and law enforcement mechanisms, and to guarantee the community's authority in local resource management.

The book outlines the general process of establishing and sustaining community-government partnerships. While acknowledging that co-management can take many forms, depending on the local conditions, culture, social and political conditions, the authors identify three phases, common to all efforts in establishing co-management systems: Pre-implementation, Implementation, and Post-implementation or "turn-over".

The authors provide an excellent, hands-on reference on how to ensure that resource users and other stakeholders – the "community" – are involved in the process from the

beginning to the end. To do so, it will require the reader to have specific skills which cannot be acquired by reading this book, such as community organization, facilitation and mediation, or skills in participatory research and planning approaches. For those readers who have these skills, the book turns out to be an excellent guide where one will find a rich source of ideas, methods, techniques, activities, checklists, examples, and case-studies for the planning and implementing of co-management and participatory coastal resources management processes.

Our only regret is on why the co-management process has been narrowed to a project management one. If we are striving to establish practical and workable co-management systems, to institutionalize co-management of aquatic resources, or to make co-management a "way of life" for all stakeholders, we have to go beyond this project level. The authors are actually well aware of that and point out that a co-management initiative is never completed. They briefly address the question of replicating and expanding successful co-management projects with the identification of factors and ways to make co-management sustainable. Looking at the vast experiences from hundreds of projects and programmes in co-management, the book succeeds in drawing valuable conclusions about workable and feasible approaches, which will contribute to mainstreaming co-management and going beyond pilot projects.

Towards Rights-based Fisheries: **the Case of Bang Sa**

Supaporn Anuchiracheeva, Likit Boonsit, Olivier Delahaye Gamucci





phan Bay

The Failure of Conventional Fishery Management in Southeast Asia

The conventional view of fisheries resources, especially those in marine and coastal areas, is that they are a common resource, belonging to everybody. This understanding presents considerable difficulties for those responsible for controlling the level of fishing effort by placing limits on current or potential resources users. Many coastal fisheries in the world are in fact state property under an open access regime, meaning that no-one controls access to the resource and that anyone can exploit it. Because the exploitation level cannot be controlled, open access typically leads to over-exploitation, as no individual or body, with the exception of a state with the political will and resources to do so, can exclude new users from accessing the resources. Without a sense of ownership and clear responsibilities to manage the resources, fishers see short-term losses rather than long-term benefits resulting from resource conservation and sustainable exploitation. In other words, fisherfolks try to catch as much fish as they can in the shortest time possible, before someone else does the same.

Where access is free to all, increased fishing effort is attracted and encouraged, and fishery resources gradually decline. As this process takes place, conflicts among users over the diminishing resources increase. Improving or enhancing the status of resources makes little sense to fisherfolks as long as there is no mechanism to control the number of users, or to set a maximum catch limit for each individual.

The state's failure as the resource manager to control fishing efforts and the numbers of resource users results in difficulties setting up new management rules and regulations to limit fishing efforts and to compel fishers to follow existing rules. The problem is exacerbated by the limited human and financial resources at the state's disposal to enforce its mandate.

When fishers attempt to sustainably manage and conserve the resource, it is usually on a voluntary basis and can rarely if ever be sustained, as the benefit of their efforts is taken by other less scrupulous fishers. These open access problems are issues of paramount importance for Thai fisheries.

The Bang Saphan Bay Community-based Fisheries Management Pilot Project

Over recent decades, the Thai Department of Fisheries (DoF) has attempted to improve the development and management of its predominantly small-scale coastal fisheries by means of several important projects. One such project, the Coastal Small-scale Fisheries Development Project (CSFD), has provided most coastal fishing communities of Thailand with critical infrastructure. Among other actions, it has provided small-scale fishers with piers, gear storage facilities, maintenance buildings, artificial reefs, and the release of juveniles into the coastal fishing grounds in order to improve fishing efficiency and living standards. As part of the project, fishing or aquaculture revolving fund groups have also been established.

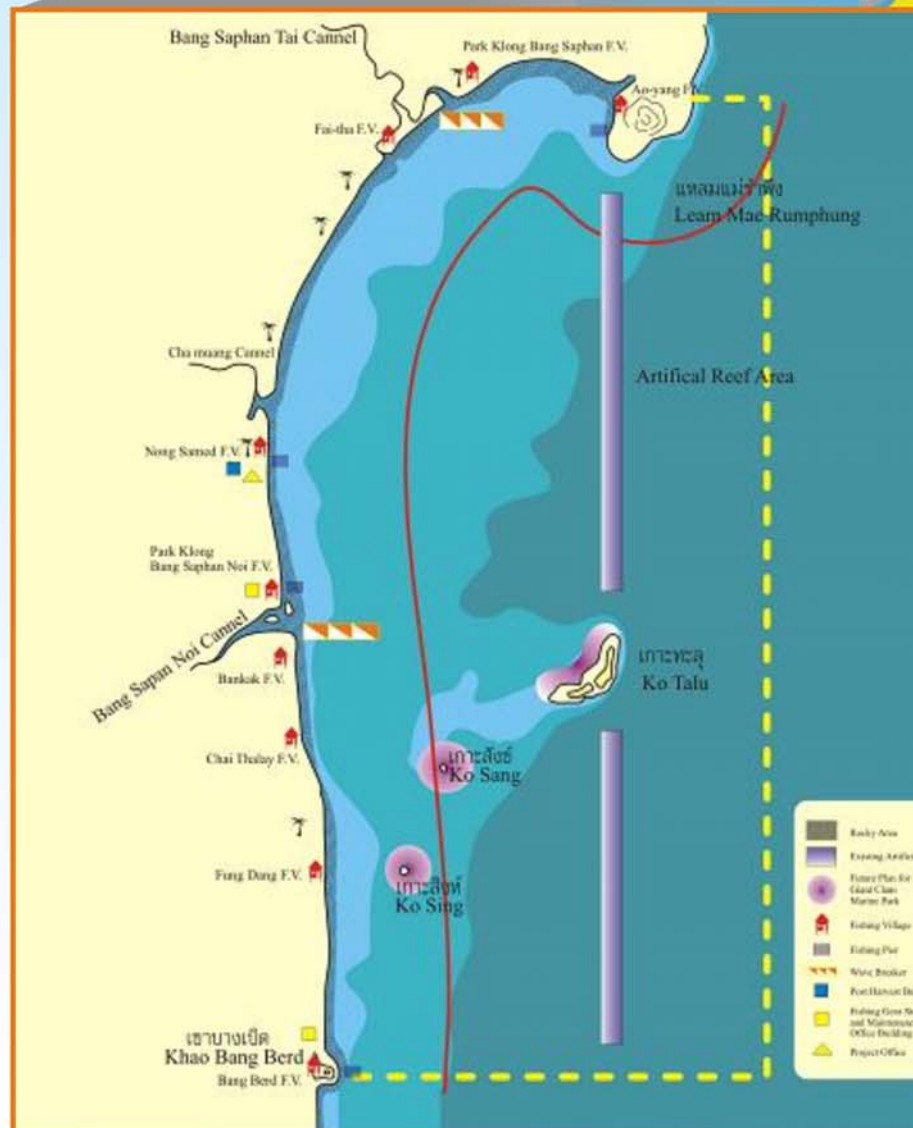
But because the core problems of the fisheries sector have not yet been tackled, these government-supported projects providing fishers with infrastructure and financial help on their own are not sufficient to ensure sustainable livelihoods for small-scale fishers, as an increasing number of coastal fishery resources are damaged or even depleted. The continued depletion of fisheries resources has led to an increasing number of increasingly violent conflicts among resource users. Apart from fighting for fishery resources, another main issue behind the conflicts is damage or even loss of fishing gear by small-scale fishers caused by commercial fishing operations, causing serious financial problems to coastal fishers as they not only lose their direct source of income but must also incur considerable extra expenditure to fix or replace their gear.

Bang Saphan Bay Community-based Fisheries Management (CBFM) is a pilot project that was started in 1999, to deal with the issue of fishery conflicts in the area. The project was backed by both DoF staff and local fishers. This specific project in Bang Saphan is quite different from other CBFM projects which have been implemented in various coastal areas of Thailand. Indeed, it aimed at testing a rights-based fishery management approach.

Before the project started, most fishers in the Bang Saphan Bay area were experiencing serious trouble in maintaining their standard of living. Considering the number and the nature of small-scale fishing operations these days, the three kilometres limit from the shoreline reserved for them, as set by the Thai Fisheries Law, does not grant access to sufficient fishing grounds to sustain a livelihood, especially when the coastline is shallow. Although small-scale fishers are authorized to go fishing beyond the 3-km limit, they rarely do so in order to avoid expensive damage to their fishing gear by commercial fishing operations, especially trawlers and purse seiners, that were often destroying local fishers' nets and traps, as well as damaging the fishing grounds traditionally used by small-scale fishers, notably by

Where is Bang Saphan Bay?

Bang Saphan Bay is located in Prachuab Khiri Khan Province, which is located in the middle of the Malay Peninsular, with Myanmar to the west and its east coast facing onto the Gulf of Thailand. The bay is in the coastal area of Bang Saphan and Bang Saphan Noi districts, which are in the southernmost part of the province, including five sub-districts (tambons). There are nine fisher groups located around the bay. The Bay stretches some 23 km from Mae Ramphung Mountain in the north to Bang Berd Mountain in the south.





catching juveniles of important species. Such commercial fishing operations tend to violate the Thai Fisheries Law: trawlers were coming to fish within the prohibited area of 3 km from the shoreline, fishing operations using purse seine nets were conducted using luring lights, and the mesh size of nets used frequently less than 2.5 cm.

The project planned to deal with one of the most difficult and sensitive problems in fisheries, namely conflicts over the resources, by setting new regulations and ensuring an effective enforcement system. To get consensus on project regulations at the beginning was practically impossible. Fisheries problems needed to be clearly identified, and it took much effort and time to bring stakeholders to an understanding of the objectives, the importance of fishery resources management, and the long-term benefits of the project. Reaching an agreement on a demarcated sea area that would be reserved for small-scale fishers was indeed one of the most difficult and important tasks of the project. The local fishers, who used to moving freely, were afraid that new regulations that also covered gear would have a negative impact on their fishing activities. Several protests were organized by fishers, who considered they would lose their fishing grounds to larger scale fisherfolks, putting a lot of pressure on the project and local government.

Through several meetings and discussion between the project staff, interested and dissenting local fishers, the project concepts, including the idea of demarcating a sea area and the long-term benefit for local fishers, were finally accepted. It took more than one year before a consensus on the project regulations was eventually reached.

As more than 70% of the local fishers in the bay are small-scale, commercial-scale operators finally agreed to move out of the project designated site.

Based on this local agreement, project regulations were ratified. These extended the fishing ground of small-scale fishers to an average of 10 km from the shoreline, giving small-scale fishers the opportunity to catch more fish and earn a better income for their families. This was enacted as a provincial ordinance to be enforced within Bang Saphan Bay, with a demarcated area of about 150,000 rai¹ or 240 square km.

Equally important was the prohibition of some destructive fishing gear. In the case of Bang Saphan Bay, destructive fishing operations are mostly carried out by commercial fishers (namely trawlers, luring light purse seines, clam draggers and push netters), and these were banned from operating inside the demarcated area as a result. Trawlers, push netters, and luring light purse seiners can now operate only outside the project area, while daytime anchovy purse seine can now operate only beyond the 3 km limit.

The fishers of Bang Saphan Bay CBFM pilot project

There are approximately 400 fishing households in Bang Saphan Bay. Most of the local fishers were born in the area. Fishing activities in Bang Saphan Bay are divided by local fishers and fishery officers into three scales of operation.

Slightly more than two thirds of the fishers can be considered as **small-scale fishers**. Small-scale fishers are those who use boats without engines or with long-tail or mid-engines up to 85 hp. Their fishing grounds are mostly within the project-demarcated area. One to three persons, mostly family members or relatives, provide labour for fishing. Small-scale fishers use two or three types of fishing gear in the course of the year, depending on the fishing season. These include several kinds of gill nets, hook and line, squid jigging, scoop nets, anchovy and squid casting nets (all small enough for boats driven by long tail outboard motors), and squid and fish traps, and they also practice diving for sea cucumber and seashell.

Medium-scale fishers comprise about a fifth of the fishers. They use mid-engines of 85 – 165 hp, with a labour force of four or five persons, including the boat owner. Labourers might be family members or people hired in the village. Fishing gear used are larger anchovy and squid casting nets, deep-sea swimming crab gill nets and trawlers (at present, there are no trawlers operating in the bay, because of the project regulations and strict enforcement by the officers and local fishers).

Semi-large scale fishers use larger engines of 165 – 300 hp. Their labour force ranges from 6 to 25 persons per boat, and comes mostly from outside the village and most labourers are Burmese.² The fishing gear employed in this class is anchovy purse seines for those fishing during daytime or purse seines with luring lights for those operating during night time. The latter must be used outside the project area, as it has been prohibited by the provincial ordinance mentioned above.

¹ One rai equals 1,600 square meters.



**Mr. Kittisak Pakdeephachum,
MCS volunteer group**

“As a part of our village fisher group activities, we have a volunteer group to assist officers from the Department of Fisheries in their monitoring, control and surveillance (MCS) tasks.”

“All members from the volunteer group are fishers, and we are concerned that illegal fishing affects us all. We get no pay for our activities, but we don't care, we know we will have indirect long-term profits if we are successful in keeping illegal fishing at bay. What we do is activating a network of monitoring, in which every fisher can report illegal fishing activities. We then call the government officer (who must come from far away, as nobody is based in the bay anymore) and assist him to proceed with the arrest. Operation funds for the volunteer group are borne by the fisher group revolving fund. We use that money to purchase consumables and even sometime fuel for the patrol boat! We really need some support from the government, at least gasoline.

If you ask about my feeling concerning the current situation on MCS in our area, I would say the penalties are not strong enough. In most cases, even if they are arrested, which happens rarely because of the time the officer need to come to our area and political issues, illegal fishers still get profits from their daily catch! The fine is so tiny, and they can still keep their fish. Since the gear and the boat are not confiscated after the arrest, operations can resume a day later, and most of the time this will be illegally again! The law says that recidivists in illegal fishing will go to jail, but in reality they know how to escape that: once a boat is arrested, the owner will be changed quickly, so there will be no problem if caught again. These are serious gaps in the regulations, and it undermines our activities and saps our morale. Our volunteer group is a good thing, but we are tired of the situation... what is the point for all these efforts if they results in nothing in court? Now, we will continue anyway because we can note that the frequency of encroachment by trawlers in the bay has been reduced. Nowadays most of the trawlers we apprehend illegally fishing are newcomers although we know there are trawlers still fishing illicitly in the bay, who know the area very well and can operate without being detected.”

Slightly more than half of the fisher households exclusively depend on fishing for their livelihood, while fishing activities are the main source of income for more than 70% of the fishers in the bay. Other sources of income are from agricultural products, mostly from coconut, rubber and livestock husbandry.

Reasons for the success of the project

Managing fishing activities and monitoring and enforcement on illegal fishing

Some fishers operating destructive fishing gear, especially trawlers and luring light purse seiners, are forced out of the demarcated area by the project's distinctive regulations and local enforcement

devices. Fishers not only contributed ideas and manpower, but also money to support activities. Resource enhancement activities have helped in building up and safeguarding resources, have been critical as a community-building exercise, and have contributed greatly towards strengthening fishers' sense of ownership of aquatic resources in the bay.

Institutional building

Nine fisher groups were already established in the bay before the project started, about eight years ago on an initiative from the Thai Government to establish seed funds. The main activity of these groups was to set up and operate a revolving fund as

system. This gives bigger fishing grounds and hence more opportunities in the project site and vicinity to small-scale fishers operating non-destructive fishing gear. It was clear from the start, in light of past experience, that a strict enforcement system would be needed to enforce project regulations. The project officers and local fishers have been collaborating in this essential enforcement activity since the project inception, and a fishery conservation volunteer group was established to assist DoF officers in monitoring and controlling illegal fishing. In order to do so, the members of the group have been trained on the Fisheries Law and on the project regulations, as well as on procedures for arresting fishers conducting illegal fishing operations. As a result, most of the violation cases were actually reported to the project staff by local fishers, both volunteers and non-volunteers. It is important to note that the a fishery conservation volunteer group or fishers in general have not the mandate to proceed with arrests alone, which would endanger their lives, but do assist the government officials in their duties.

Resource enhancement

Several resource enhancement activities have been implemented since the project started, namely releasing juvenile of aquatic animals, establishing crab banks, installing fish aggregating/enhancing devices and installing an artificial reef. The latter also helps as a barrier against some destructive and illegal fishing gear such as bottom trawlers. There has been very high participation of local fishers in most of the activities, especially in installing fish aggregating/enhancing

² Burmese fishing labourers are found in most of commercial fishing operations in Thailand. Because of a lack of Thai labour in the fishing sector, Burmese labour has become widespread. In Bang Saphan Bay, their wages are about 10% - 30% less than Thai labourers. Work permits are required for legal employment.

well as a money saving scheme for households who are members of the group. Six of the nine fisher groups have been very successful. Two groups have additionally established convenience stores where their members can purchase everyday commodities at a cheaper price, and some groups have also expanded their membership to non-fisher members and have therefore increased group funding.

Having such a strong group basis to start with has been a major asset for the execution of the project. All nine groups have been used by the project officers as representatives of the local fishers in the project area. The leaders of the fisher groups play a very important role as focal points for the project staff and as facilitators for the implementation of the project's activities.

To keep the newly established management system operating effectively, local institutions needed to be established and progressively strengthened. Therefore, existing local fisher groups were further developed, educated, informed of the issues and involved in the project activities. This required a sincere and lasting commitment from the project officers and local fishers, who needed to work hand in hand for many years. As it stands now, they agree that the project would not have succeeded as it has without support from each other.

Achievements: changes to fishery resources and livelihoods

Since the pilot project started in 1999, fishers feel that the project regulations and activities have not only responded to their needs and addressed their fishing problems but have also in many ways improved their livelihoods. The following section and figures present how the project has made changes in fishing activities in the bay from the local fishers' points of view. These are based on a Weight Average Index (WAI), which measure the attitude of fishers in 1999, before the project started, and in 2003, allowing measurement of their perception of changes during the period.

Impacts on fisheries resources

As a result of new regulations set in place in the project's framework, fishers recognize that trawler operations have been greatly reduced in the coastal area of Bang Saphan Bay, the demarcated area of about 10 km from the shoreline of the bay being protected as exclusive fishing grounds for small-scale fishers and a nursing ground for fish juveniles. Fishers believe that this management measure has allowed fisheries resources in the area

Mr. Suntorn Rosdi, Crab Bank Project

"We started the swimming crab bank in July 2005. Technically, it is simple: we use fibreglass tanks and seawater from the nearby canal. The water is first treated with chlorine and then oxygenated for three nights."



"Our members are crab fishermen, who use crab gill nets. Each member will bring one large gravid crab female every day he harvest his nets. That female must have eggs that are going to be released shortly; we can identify these crabs by looking at the colour of the eggs, which must be dark or black. The gravid females are then released in the tanks, which are oxygenated, for one day. Once we have released the eggs, the crabs are sold and the profit is given back to the fishers. The water with the eggs is drained in the canal, which is closely connected to the sea. We got this knowledge from the Research Centre of Samut Sakorn, where there is a hatchery for swimming crabs. It is still early to estimate the benefit of the activity, but the members are all keen to continue, even though there is currently no support from outside for their activities. For example, it is not always possible to get water from the canal, as the sea level can go down and the canal become nearly dry for long period of time. We need a pump and pipes to bring the water directly from the sea but it is not easy to find the money. In the future, we might use the profits from selling the crab to finance our activity. We can already rely on the dividends from our fisher group revolving fund, and that has helped us a lot!"

to increase. Even though they perceive the fisheries resources situation to have improved since 1999, fishermen mention that their catches increase since has not been that significant. This can be explained by the fact that the number of fishermen has been increasing yearly, and so fisheries resources are shared among a growing number of fishers. Several new outsiders nowadays also come to fish in the project area. For example, several boats come from Rayong province, on the other side of the Gulf of Thailand, during the fishing season for cuttlefish. There are also several day-time anchovy purse seiners from other Prachuab Khiri Khan districts, or from nearby provinces coming regularly in the area. This confirms the need to consider some management issues:

1. Whatever efforts have been put into increasing coastal fisheries resources the resources will not be sustainably utilized, or significantly increase without appropriate monitoring and control of fishing activities.
2. One management measure or approach alone does not add up to successful fisheries management. Two types of management measure are needed here: increasing fisheries resources and utilizing resources sustainably, including control measures on fishing efforts.

Fishers also recognize that they have benefited from the project from a socio-economic point of view, with increased income and overall household well-being. This was mostly achieved through a reduction of investment costs in fishing activities through bulk-



Mr. Kritsana Klinnoi, fisher group's revolving fund

"We operate a revolving fund activity. We got the seed money from the government eight years ago – that was about THB 140,000. This sum, through savings, is now THB 430,000!"

"The members of the fisher group must contribute THB 100 per month, as a personal saving. In return, they can borrow from the fund. Basically, we have a monthly meeting during which we allocate loans to those who need money. The maximum amount that can be borrowed by a family is equal to their saving plus THB 2,000, and they have to pay back interest at 2% per year.

Now, we also have emergency loans. Mostly, this is needed if a fisher loses his fishing gear or some other critical equipment, like an engine or the boat. This entitles him to borrow THB 10,000 from the fund, for one year, with no interest at all, so that he can get back his source of income. Another possible emergency can be a health problem or education for children. Again, we will provide a THB 10,000 loan with no interest, but we expect the sum to be paid back in three months. Now, we also have other activities, that we have developed based on our revolving fund. At the demand of our members, we now have a general store that caters to their daily needs at slightly lower prices than other shops. Anybody can purchase goods and fuel here, not just our members. We used THB 40,000 from the revolving fund for creating this store. In return, beside the lower prices, we share the yearly profits among the members. Last year, that was THB 190,000 of net profit! People who are not members of the fisher group can also subscribe to become an extended member of the general store; they just have to pay THB 1,000, as if their were buying stock shares.

The important point, I would say, is that although we needed initial counselling and guidance on how to proceed, we are now completely self-reliant. When we need professional help such as accountants, we hire them ourselves using our own funds. The fisher group organized through these activities is a great thing: it promotes altruism. We work together, fix problems together, talk and share information regularly, and fishers start to think like a group when it comes to fishing, looking at long term impacts and benefits. We can also escape middlemen: our members do not need to borrow from them anymore, and then do not have to sell their fish to them at a very low price to pay back their loan."

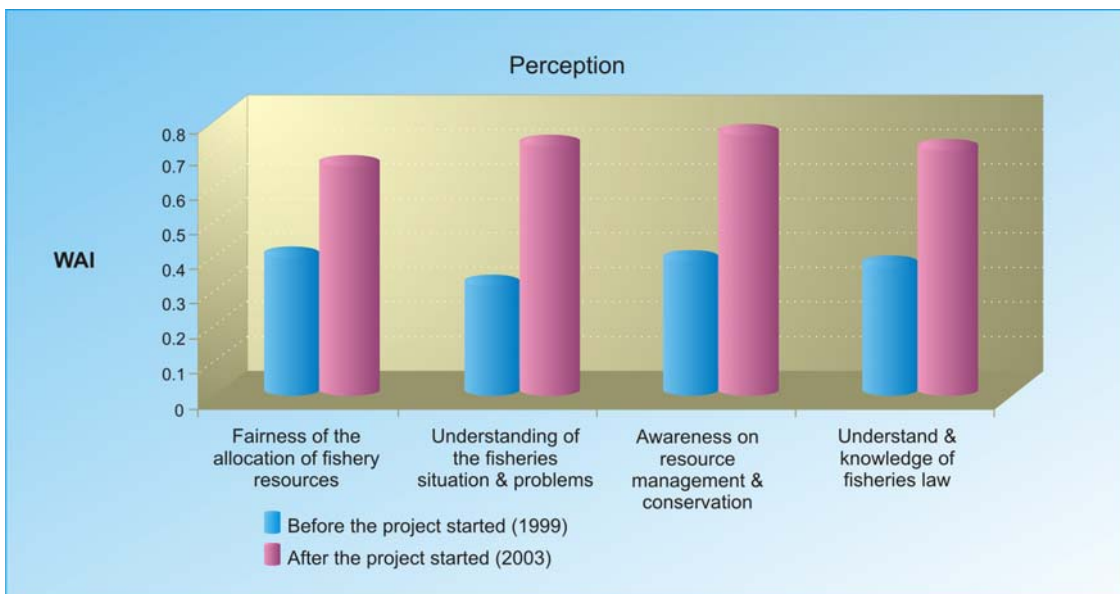
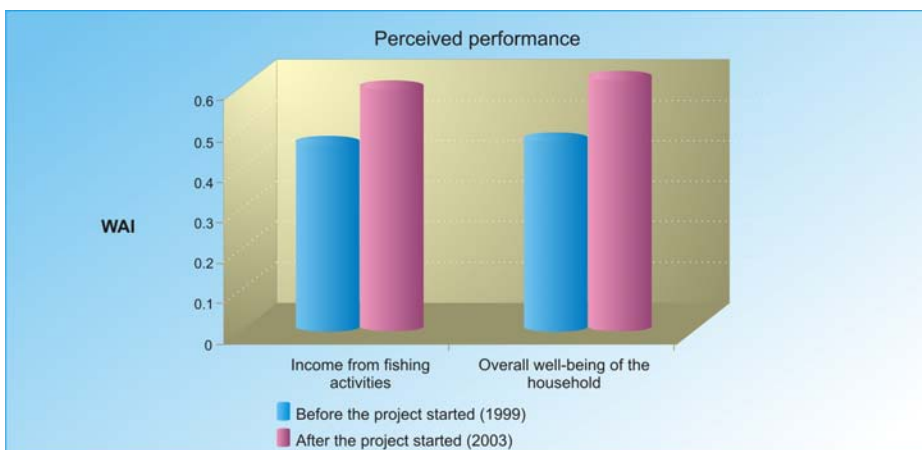
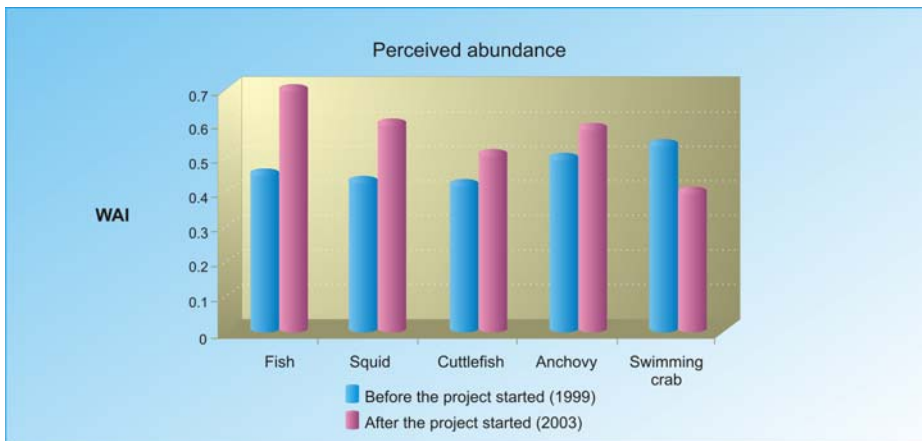
purchase, and a reduced likeliness of having fishing gear destroyed by larger-scale fishers.

Fishers' perceptions and knowledge

Fishers' perception and knowledge of how coastal resources are allocated, fisheries management and the Thai Fisheries Law have improved greatly since 1999. During the regular group talks, it was apparent that the majority of local fishers nowadays have a good understanding of problems related to their fishing activities, both in the past and present. They have become very knowledgeable about the project's regulations, the Thai Fisheries Law and the Closed Areas for Indo-Pacific Mackerel Spawning Season Law. They are also able to assess the advantages and disadvantage of these laws. Fishers express quite well how fishing boats from







local fishers on their problems and concerns, helping fishers to help themselves using a problem-solving approach, strengthening local fisher institutions, and encouraging people's participation. But in order to take over as co-managers of coastal fisheries, fishers still need to be properly equipped with proper knowledge and understanding.

Fishers' participation in fisheries management

The project has significantly improved the participation and collaboration of local fishers in fisheries management. As a result, fishers frequently report illegal fishing activities in the demarcated area to the project office. Several fishers are volunteering to go out with the officers for patrolling and enforcement activities, and so helping to meet the limited capacity of local government enforcement. Fishers regularly and readily come to discuss and exchange their ideas with the project officers on fisheries management issues and activities in the bay.

Most of the local fishers are convinced that their participation and contribution to the activities are necessary for the project's continuity. In return, the success of project activities encourages fishers to be further committed, and to expand the project's activities and their responsibilities for the management of their fisheries resources.

Resolving conflicts

Conflicts between fishers have been drastically reduced since the beginning of the project's activities. Three main types of conflicts used to occur in the bay. The first conflict issue was related to small-scale

outside the bay have an impact on their fishing activities and resources, and often elaborate on how fisheries should be managed in the demarcated area in the future in order to accommodate outsiders. In other words, they not only have a good working knowledge of the project, but also have the skills to analyse events.

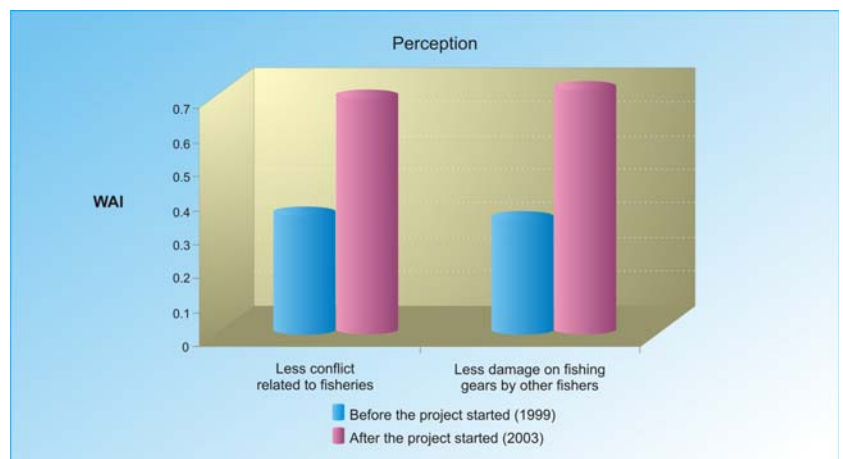
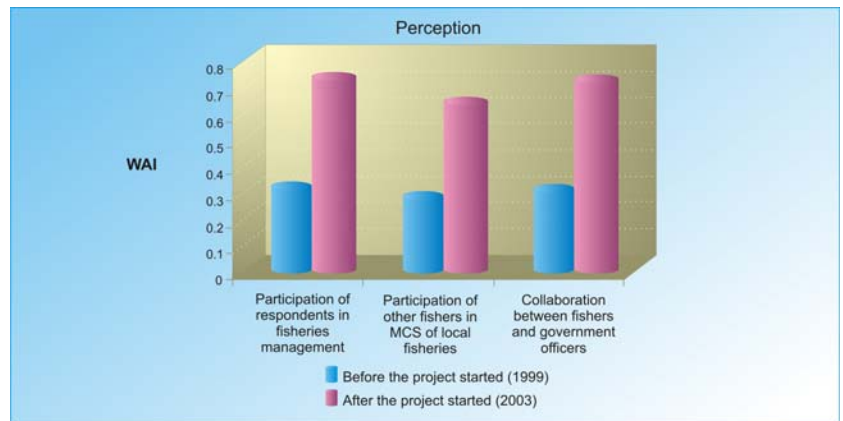
The Bang Saphan project therefore provides a good example of how extension work can strengthen the ability of local fishers to deal with their problems. It is important to understand how the project's extension services have been carried out in order to effect such significant changes in the fishers' knowledge, perceptions and attitudes. The project officer has played a critically important role in providing extension services to the local fishers – working with

fishers' fishing gear being damaged or even destroyed by trawlers, luring light purse seiners or daytime anchovy purse seiners. The second issue was encroachment into the three km zone by anchovy fishing and trawling operations. The third issue was conflict between anchovy cast net and daytime anchovy purse seine operations.

But since the beginning of the project, all three types of conflicts have become less common. Damage caused to small-scale fishers' gear has decreased thanks to the new regulations and stricter enforcement, with daytime anchovy purse seine operations now moved outside the three km limit, and trawlers have been completely eliminated from the project area. Since the management system was established, local fishers have built up a relationship with each other, with more dialogue and a better understanding of each others' needs. Issues that might have caused conflicts in the past no longer do so as a result. For instance, daytime anchovy purse seiners now mention that they are more careful and aware of other fishers' passive fishing gear deployed in the sea, and if they damage them, they agree to compensate the owners of wrecked gear.

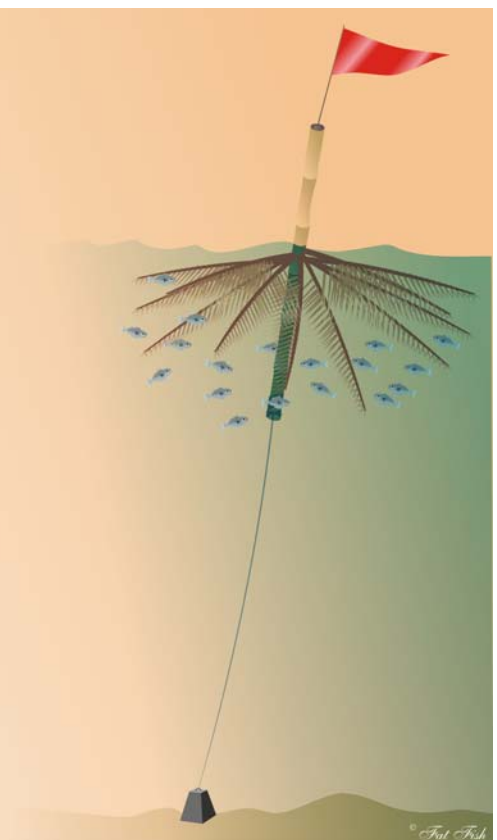
How can the pilot project move forward?

At present, the pilot project has come to a point where it should move forward, or stop. Although enthusiastic about the project's achievements and at being involved in further activities, local fishers are not satisfied with the present situation. The reasons can be concluded from what has been expressed above. It is not just the problem that fishers – like most other human beings – are never completely satisfied with what they have got. Rather, the issue is that the project has not yet



A recent example of fishers' talk

Recently, there was one instance in particular that was very impressive. One evening at the project office, as dinner was taken, a few fishers came to join the officers. Soon, the fishers and project staff started to discuss the potential of deploying fish aggregating devices (FAD) in the bay. The objective was to give shade for fish to lay eggs in the coastal waters. They started to discuss the advantages and the disadvantages of such an activity. Some fishers expressed the fear that the devices would lure fish and fishers, and that the resource would get quickly depleted as a result. In other words, they considered FADs not to be a sustainable way of utilizing the resources as such. Later on, this discussion took place several times with different fisher groups, and a final decision was reached on this activity. FADs would be installed, but to fulfil the objective of the activity – namely resource enhancement – a specific regulation was added: fishing operations must take place at some distance from the devices and are therefore forbidden in the direct vicinity. In this context, Fish Aggregating Devices really became Fish Enhancing Devices (FEDs). The day the FEDs were deployed, several hundred people, fishers and their families, joined in the activity. All the devices, which are made from bamboo and sandbags, were purchased, assembled and deployed by the local fishers.



Apart from the direct impact of the project on local fishers' lives and work, several lessons for future policy formulation on CBFM can be learned from the Bang Saphan Bay pilot project.

The boundary of the project area, and so the common pool resources, is clearly defined, with a delimited spatial dimension for specific resource users.

The project boundary has demarcated a clear area of common pool resources in which management measures and activities take place, such as implementing and enforcing regulations and resource enhancement activities. It also provides a clearer definition of targeted resource users, who in turn need to be educated and empowered to take part in fishery management functions.

The boundary of the project area can provide a clear definition of user-rights and delegation of management functions to regulate fishery activities.

As project implementation took place, and local fishers made many efforts and committed resources, it started to occur to them that they should have some authority and responsibilities to protect the fishery resources in the demarcated area from illegal fishing operations that might put their efforts in jeopardy. At present, local fishers are strongly and clearly suggesting that part of the management functions within the demarcated area of the project should be delegated to them. They agree that user-rights of the resources can be shared between local and outside small-scale fishers, but insist that outsiders must follow the project regulations and contribute to management of the resources in the bay, possibly in the form of taxes, fishing fees, or other kinds of contribution to management activities. The establishment of such user-rights could lead to progressively better control of fishing efforts once the modalities of user rights are defined, such as who is a member of a user rights project or group, types and numbers of fishing gear allowed, amount of fishing effort than can be exercised, where and when to fish, and so on. If such regulations were clearly stated and rights granted to fishers, it would lead to the control, and thus limitation, of the fishing capacity of the bay in the future.

Stop the use of destructive fishing gear in the demarcated area, effectively leading to zoning for different types of fishing operation.

Three layers of fishing zones are defined in the pilot project. First, trawlers, luring light purse seines, push nets, and clam dragger are excluded, and must operate outside the project area, approximately beyond the 10 km. limit from the shoreline. Second, daytime purse seines and anchovy cast nets are allowed to operate within the project area, but beyond the three km. limit from the shoreline. Third, other types of fishing gear, typically small-scale, are allowed to operate everywhere within the project area. In other words, some fishing operations that are more destructive to fish juveniles and coastal habitats are pushed outside in order to reduce the damage they can cause to resources, while less damaging operations will have more opportunity to fish in near-shore areas. This renders the fishery regulations more specific and reasonable, and makes sense to the fishers. Furthermore, we no longer deal with a generic set of regulations, and now have a set of management measures which reflect the reality and problems of a particular area.

Project regulations could back up the initiatives of local fishery regulations imposed by the local fishery management body.

Local fishers appreciate the project regulations, which they think are more adequate than national fishery regulations. They feel that the project regulations respond to their problems and are adapted to the situation of their fishery resources and their utilization pattern.

Although Bang Saphan is a good example of local specifications being considered, there remains plenty of scope for further improvement of the local regulations, based on the fishers' knowledge of the local fishery settings and fishers' willingness to get involved in the process. Yet to get a set of local fishery regulations takes time, and needs a high level of involvement by local fishers. They must provide precise information, and a consensus from them must be obtained before a new regulation is adopted. This is not a quick process.

Learning from the Project's Success

Achievement of the project's prime objectives contributes to a high level of participation by local fishers, and leads to the establishment of a local fishery institution for the management of fishery resources and fishing activities in the bay.

In the co-management context, it might be difficult to implement a coastal fishery management project that has only long-term objectives, because these are difficult to achieve and demonstrate no immediate positive effects. The success of the Bang Saphan Bay project in motivating its fishers can be translated in the following terms: short-term objectives as steps to achieve each of the longer term objectives are necessary to ensure that local fishers are motivated and kept interested in participating to the process. With this short-term progress, fisherfolk feel that their needs are taken into account and that their problems are being tackled gradually.

Greater participation from the local fishers in project implementation leads to the sharing of duties and functions among government officers and local fishers on the management of fishery resources.

There are many cases of local participation in the Bang Saphan pilot project, including the participation of local fishermen in monitoring illegal fishing, several hundreds of fishers participating in the deployment of fish aggregating devices, and fishermen informing and advising on issues of illegal fishing operations. This participation shows the willingness of local fishers to take part in future management functions. This raises many hopes, as we see DoF officers and local fishers working together, a very rare occurrence elsewhere. However, responsibilities and roles to be Learning from the Project's Limitations Failure to support and monitor the project's activities.

Failure to support and monitor the project's activities.

In general, a pilot project is treated specifically and separately from the normal working context of the organization, in our case, the Department of Fisheries of Thailand and the Thai Fisheries Law. The expected life span of the pilot project is strictly a function of the budget, and the timeframe of the donor or implementing agencies. There are very few cases of pilot projects that have actually had impacts on policy implications. This is true of the Bang Saphan Bay CBFM pilot project. It is isolated from the central coastal fishery management body, planning and policy framework. The project did not have any outside funding, and was implemented solely by DoF. As such, the project received very limited support in terms of manpower, technical expertise and funding.

Despite this, the project continues to operate because the project regulations are kept valid and the monitoring and enforcement

need clear answers. Implementing a regulated entry regime must be a forthcoming step in Bang Saphan pilot project's activities, in order to relieve the problems related to over fishing and excess capacity, which in turn jeopardize the whole spectrum of activities.

No delegation of management functions to local fishers.

Even though local fishers have been very much encouraged to participate in fisheries management activities of the project, they still do not have any authority to take action on many crucial management functions. They are allowed to provide information and suggestions but they do not have any part in the decision making process, which is still very much in the hands of government agencies. If it is beyond the project staff authority, if it concerns the legal and policy framework, their initiatives and suggestions are often diluted, and action only slowly taken, if ever.

The co-management concept stresses that fishers should have roles and responsibilities to play in fisheries management, apart from being users of the coastal resources. It is not that they should only participate in management activities, an excellent first step but certainly not a goal. They should also take an active role and be part of the decision making body at the local level. To delegate the management function entirely depends on government will, as it requires full policy and legal support.

Not giving local organization some legitimacy.

At present fisher groups are informally organized to conduct fishery development activities, and actively participate in the project activities. They are recognized by the group members and project staff but are not legitimized by law, thus they are not able to act as formal representative of the local fishers to take authority in fisheries management functions. The day management functions are delegated to the local level, it will require a legitimate organization representative of the local fishers, to act on behalf of these folks. It is necessary to find ways to develop and legitimise these fisher groups, before user-rights and management functions are delegated.



Learning from the Project's Limitations

system, conducted by local fishers and project staff, is still ongoing. The greatest shortcoming has been the failure of the DoF to monitor the project's impacts, with nobody clearly knowing or at least reporting what have been the successes and failures, and what has been learned from this project. In these conditions, it was impossible to see how the project could move forward, and more importantly, how it could contribute to national policies.

This was so until the doctoral research carried out by one of the authors (see Reading), and which is the basis of this article. Research support is clearly essential for any pilot project to have a constructive impact on management policies.

The lack of resources, especially skilled and knowledgeable manpower, makes it very difficult for the project to continue to be implemented properly, and impossible to expand its activities into new areas. Even though the participation of the local fishers has been quite high, there are some functions which can only be taken by authorized and capable government staff, positions that obviously cannot be taken by local fishers.

No regulation of entry to fishery.

The fisheries management measures implemented under this project obviously do not deal with the problem of open access. Local fishers believe that the project regulations stopping trawlers and some other destructive fishing gears do help to improve fishery resources in the bay, but that they do not guarantee an increase in catch. As mentioned above, this is due to an increasing number of fishing boats in the area, mostly coming from outside and attracted by the local abundance of fish. In short, the benefits from the local fishers' efforts in managing the bay's fishery resources accrue to these outsiders. If this situation continues, it will in the long run discourage local initiatives and attempts to sustain the management system. Regulating entry to the fishery, especially by outsiders, is urgently required. Such regulation is in fact essential to managing fishing activities in the bay. Who utilizes what, when, where and how are critical questions that

achieved the aim of reaching some form of sustainable coastal fishery management. After five years of implementation, the fishery situation in the area has been rescued from one problem loop (conflicts), but is now struggling in another – free riders. The problem of free riders is twofold:

- There are an increasing number of outside fishers accompanied with a surging total fishing effort. With no control of the level of fishing effort that can be employed, the problem is becoming critical and urgently needs clear management measures.
- There is no contribution from outsiders to local fishery resource management efforts, which are being undertaken only by local fishers.

To achieve sustainable coastal fishery management, one must not only ensure that fishery resources are exploited sustainably, but must also attain an improvement of the living standards of the local fishers' families. This cannot be achieved by imposing one management measure alone. So far, it seems the pilot project has been moving in the right direction, towards rights-based and co-management approaches. In Bang Saphan Bay, these two approaches are considered to be innovative approaches that can help in moving from open access to limited access.

Towards Co-management through Group User Rights

To further facilitate the development of the co-management concept, SEAFDEC has recently developed a set of guidelines (see the paper on the development of SEAFDEC regional guidelines on co-management by means of group user rights, also in this issue). The Centre plans to promote and verify these guidelines through the implementation of pilot projects in some member countries.

There are several issues in the guidelines that relate to the Bang Saphan Bay pilot project. The guidelines could in fact guide and support how the project should move on from, by setting up a fishery entry policy, legitimising the local organizations, promoting local institution building, and legal support to delegate management functions to the local level. These issues have been long discussed by the project staff and the local fishers, and they correctly conclude that the project cannot move ahead with these issues without support and legal backing from the central government authorities. But it is also not easy for DoF (at the national level) to make a move or to support the project, as changing the policy and legal framework involves others government agencies. This would be a massive undertaking, which would take a lot of lasting commitment, political support, and many years without any guarantee of a positive outcome.

A way out of this stalemate would be for DoF to consider that the Bang Saphan Bay Project could continue with a second phase, this time as a pilot project for the implementation of the regional guidelines prepared by SEAFDEC. It would help, not only to test and verify the guidelines, but also to support the project and DoF in developing a management approach model that could ensure sustainable coastal and small-scale fisheries management in the country. In addition to the similarities between the issues faced in Bang Saphan Bay to those discussed in the regional guidelines, the readiness of local fishers and their groups in participating in fishery management is exceptionally high, making it an extra advantage in selecting the bay as a pilot site.





Conclusion

The Bang Saphan Bay CBFM Pilot Project shows that the potential of local fishers can be developed through their participation in fisheries management activities and by their practicing responsible fishing. This has been achieved by recognizing the immediate needs of local fisherfolks, and by addressing these in an acceptable timeframe. An important action was to clearly demarcate an area from which the most destructive fishing gear operators would be excluded, therefore tackling the most important initial issue – conflicts. The development of a strong understanding and trust between local fishers and project staff combined with these short-term achievements quickly raised the hopes and motivation of local folks, and contributed to a high level of participation by fishers living in the bay in the management of local resources, including the sharing of responsibilities with government officers.

The pilot project has led steadily to the establishment of local fishery institutions for the management of fishery resources and fishing activities, although it still needs legal backing to come formally into existence. The most serious omission while implementing the project has been the failure to establish some forms of regulation to fishery entry. This has led to the current problem faced in the bay, with the increasing number of free-riders coming in to get fish without participating to the efforts done by the locals. This underlines a need for further action if the current situation is to be sustained, not to speak of a sustainable management system.

The presence of strongly motivated and organized fisher groups and a demarcated area with clear boundaries is the backdrop to another much needed potential phase for the pilot project. This would lead into looking at a possible co-management system between local resource users and the government, with actions taken as required from the related national government agencies to ensure an effective supporting policy and legal framework.

This is a colossal undertaking, in which the regional guidelines prepared by SEAFDEC could actually play a role in directing and supporting how the project should move on. If a second phase for the pilot project is agreed, Bang Saphan Bay fisherfolks would see the setting up of a fishery entry policy, the legitimisation and strengthening of their local groups, and the development of an adapted legal support from the government that would delegate management functions to the local level. This could become a stepping stone in the development of a management approach which could later be used as a model for the promotion of sustainable coastal fisheries management across Thailand while the experience accumulated and lessons learned would benefit to all other ASEAN-SEAFDEC member countries.



For further reading:

Anuchiracheeva, S., et al., 2003. Systematizing Local Knowledge using GIS: Fisheries Management in Bang Saphan Bay, Thailand. *Ocean and Coastal Management*. 46 (2003) 1049-1068.

ABOUT THE AUTHORS

Supaporn Anuchiracheeva is a Coastal Fisheries Management Specialist working with SEAFDEC. With a background and long experience in communications, extension, training and organization of communities, she has recently graduated with a Ph. D. on Integrated Tropical Coastal Zone Management. Currently based at the Secretariat, her work focuses on the improvement of coastal fisheries through the promotion of rights-based fisheries and co-management approaches.

Likit Boonsit is working at the Thai Department of Fisheries as the Fisheries Development Section Head of Prachuab Khiri Khan Provincial Fisheries Office. He has been working with small scale fishers more than 15 years and was the Bang Saphan Bay Pilot Project Manager. At present, he is still actively involved in the pilot project activities, especially in the law enforcement and conflict management related activities.

Olivier Delahaye Gamucci is a Fishery Technical Officer working with SEAFDEC. Based at the Secretariat, he is notably responsible for the publication of *Fish for the People*. With a background (M. Sc.) in aquatic resources management, he is involved in various technical activities such as small-scale freshwater aquaculture, coastal fisheries management, as well as fish trade and environment related issues.

The authors can be reached through supaporn@seafdec.org and odega@seafdec.org

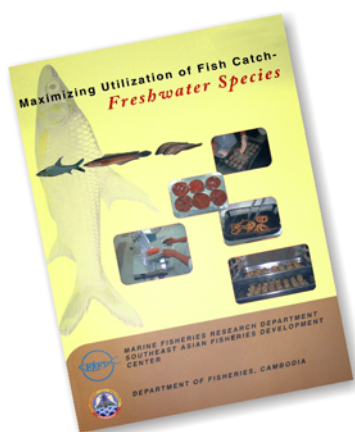
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In collaboration with the Department of Fisheries, Cambodia, SEAFDEC Marine Fisheries Research Department published the publication entitled, "**Maximizing the Utilization of Fish Catch – Freshwater Species,**" in December 2005. In the publication, freshwater fish such as the featherback fish, snakehead fish and soldier river barb fish were used to make value-added fish products such as fish tofu, fish satay, fish cracker and fish bah kwa.

INVITATION TO CORRESPONDING WRITERS

With many issues of *Fish for the People* already published, we hope that we have given you a good idea of the aims and general tone of the publication. Recently, we have been publishing more articles from external contributors. We are further inviting contributions from writers interested in promoting relevant issues on fisheries in developing countries. While the publication will continue to focus on the Southeast Asian region, future issues can address relevant issues from other tropical regions.

Fish for the People is a policy-orientated publication. It is not a forum for publication of research findings, nor is it intended to provide detailed technical information. The publication targets not only experts or scientists, but also other traditionally less technically-oriented fisheries stakeholders, such as policy-makers, donors, government staff, managers, and more generally, an informed lay public with an interest in how our fisheries are managed.

Readable, accessible articles that address the various issues discussed at the ASEAN-SEAFDEC Millennium Conference are most desired. Articles should focus on newly emerging issues relevant to sustainable regional or tropical fisheries management. They should present important issues with clear regional messages, emphases, thrusts, problem areas, and propositions for improving current situations.

Through *Fish for the People*, we hope that authors will gain the attention and consideration of targeted fisheries stakeholders, and contribute to the future achievement of more sustainable fisheries.

Correspondence related to editorial matters should be sent to fish@seafdec.org



Integrating Formal and Customary Approaches to Responsible Fisheries: A Case Study of District Fisheries Services in Nusa Tenggara Barat Province, Lombok, Indonesia

Imam Bachtiar



Introduction

The Indonesian island of Lombok lies 15 km to the east of its more well known neighbour, the island of Bali. A recent law on local government (No 32/2004; previously Law no 22/1999) has given district governments in Indonesia the authority to manage inshore waters within four nautical miles (nm) of the coastline. In the district of Lombok Timur, this means assuming authority for about 1074 km² of coastal waters. This jurisdiction is bordered by neighbouring district waters, namely Sumbawa and Sumbawa Barat to the east, Lombok Barat to the northwest, and Lombok Tengah to the southwest. Of these districts, Lombok Timur has the largest fish production and the biggest fishing port, and the fisheries sector makes a very significant contribution to the local economy. There are two major fish landing centres, Tanjung Luar and Labuhan Lombok, which are among the

biggest in the province of Nusa Tenggara Barat . As such, Lombok Timur District plays a critically important role in the development of fisheries in the province.

The population of Lombok Timur is nearly one million people, of whom about 19% live in coastal villages. Life expectancy is about 54 years, indicative that many coastal communities are generally living below the poverty line. The general level of education in the province is poor, with literacy rates averaging only 73%.

Lombok Timur presently has about 3,000 fishing vessels, 93% of which are used for subsistence fishing (<5 GT). This high number of fishing vessels makes for excessive fishing capacity, which has resulted in the overexploitation of coastal fisheries resources. The District Fisheries Services aims to reduce fishing pressure in coastal waters. One of the options considered is to shift fishing pressure to offshore fisheries. Another strategy to reduce fishing pressure in coastal waters is the promotion of mariculture. At present, growing lobster and grouper are promising activities. There have been many examples in Indonesia that mariculture activities, despite the risks involved, can contribute to reducing

Mariculture rafts for growing grouper and lobster at Ekas Bay was firstly introduced by KPPL in 2001. At present, the mariculture rafts has been growing to about 400 rafts.



overexploitation of coastal resources while providing sustainable livelihoods to coastal communities.

Against this background, typical of many Indonesian districts, Lombok Timur has made notable efforts towards implementing the Code of Conduct for Responsible Fisheries (CCRF). The implementation of the Code described here mostly deals with the management of coastal fisheries resources within the district jurisdiction of 4 nm. In many cases, there have been significant improvements in the reduction of illegal, unreported and unregulated fishing practices. These successes are most likely to be due to the implementation of participative management in Lombok Timur since 2001.

Responsible fisheries in Lombok Timur

'Responsible fisheries' is a new term in the fisheries management of Lombok Timur. However, in practice, responsible fisheries may already have been implemented. For example, the District Fisheries Services has carried out several programs that contribute towards the goals of responsible fisheries, namely:

- Reduction of destructive fishing practices
- Protection of artisanal fisheries
- Conservation of fish habitats and restocking
- Mitigation of the impact of overfishing
- Integration of fisheries management into coastal zone management.

During the 1990s, destructive fishing practices used to be the biggest issue in the District. Blasting and poisoning were common fishing practices in all inshore waters. Although prohibited by various laws and regulations, enforcement of these laws and prosecution of fishers using destructive fishing methods often proved to be almost impossible. Even if brought to police notice, violations were difficult to prove, and



Lombok Island is situated on the southern region of the Indonesian Archipelago, just eastern side of Bali. Seaside of the District of Lombok Timur is covering Indian Ocean, Alas Strait, and Flores Sea.

the lack of witnesses willing to testify meant that violators usually got away scot-free. Small-scale artisanal fishers suffered as fisheries were destroyed, and were unable to stop these illegal fishing practices.

Protection of artisanal (subsistence) fishers and their rights was previously very weak. A ministerial decree issued in 1976 protected the fishing rights of artisanal fishers within three nm of inshore waters, with commercial fishing prohibited in this zone. Implementation of this regulation, however, never took place. There were many conflicts between artisanal fishers using hooked lines and commercial fishers using purse seine net.

Participative fisheries management in Lombok: integrating formal and customary laws

Participative fisheries management is a relatively new approach in Lombok. It was firstly introduced to Lombok Barat, the district neighbouring Lombok Timur, in 1998 by a government initiative known by the acronym COREMAP (Coral Reef Rehabilitation and Management Program). While this short-term initiative failed to establish any effective system of community-based management, it motivated the local community to establish their own community-based management for the program area in 2000. The local government had no power in the process, and was not involved in the community-based management approaches that followed COREMAP.

On Lombok, participative or collaborative management apparently can only be carried out using 'awig-awig', or traditional agreements, as the preferred management tool. The role of the community in co-management is to plan management measures and implement the management plan. The management plan is then declared as an awig-awig applicable to anybody within a defined region.

Awig-awig on fisheries management is believed not to be a recent practice on Lombok, and is similar to 'sasi' in Maluku (Moluccas). In Lombok Barat, several villages in two sub-districts (Kecamatan Bayan and Kecamatan Gangga) had applied awig-awig to fisheries management in colonial times. These laws prohibit fishing during one month every year, although it is unclear whether this is for fisheries management reasons or simply for the safety of fishers. As the authority of formal institutions strengthened during the 1960s, this awig-awig disappeared, perhaps even more rapidly than sasi had disappeared from Maluku.

There were at least three existing awig-awigs related to coastal fisheries management in Lombok Timur before Law No. 22 about Local Governance was issued in 1999. The oldest awig-awig known in the district is 'saving the sea'. It is unclear when it was started, but all villages along the southern coast of Lombok Timur have this customary law. The awig-awig prohibits fishermen from going fishing for three days every three years. During these three days, there is a ceremony to provide offerings to the sea spirits. The awig-awig is strictly obeyed by all fishermen, although its relation to fisheries management is not very clear.

Another awig-awig, in Serewe Bay, was established in the early 1980s, and prohibits the logging of mangrove trees in the bay. This awig-awig was unwritten, like a traditional awig-awig. It is considered to be very effective, as no violation has ever been observed.

A study of these customary laws shows that not all community-initiated agreements can be successfully applied and enforced. For example, the awig-awig of the village of Tanjung Luar, in the District of Lombok Timur, was a written rule, demarcating fishing zones for artisanal and commercial fishers. This more modern awig-awig, created seven years ago, is considered to be a failure, as conflicts between commercial fishers and artisanal fishers continue, with predominantly commercial fishers violating the area demarcated for their artisanal counterparts. One of the probable reasons for the failure of this law is the lack of a clearly assigned authority to prosecute and sanction violators. With the initiative of the Co-fish project, explained below, this awig-awig became progressively more successful.

The Co-fish Project, management areas and committees

Introduced in 2001, the Co-Fish Project was built around a co-management system that involves both local government and the KPPL institution (*komite pengelola perikanan laut*) in formulating and implementing coastal fisheries management plans. This partnership with the district is very important for ensuring that the management plan is within national and international laws, and that the KPPL institution can implement it effectively. Both in Lombok Timur and neighbouring District of Lombok Barak, the management plans have been adopted as an awig-awig for all participating villages.

The government-supported Co-Fish Project started in Lombok Timur in 1998 with a series of consultations about ways to stop blast fishing, and more generally, the numerous fisheries conflicts. It aimed to do so through the introduction of participative coastal fisheries resources management approaches using local laws. Participative approaches and co-management were seen as crucial to address and solve the issues of destructive fishing practices. Under this approach, not only blasting and poison fishing were to be prohibited, but also the trading of fish caught through these methods.

The underlying idea was to make destructive fishing practices economically non-viable.

The Co-fish Project proceeded by initiating the establishment of a committee responsible for fisheries management (the KPPL) in three designed management area on the southern coast of the district (Ekas Bay, Serewe Bay and Jukung Bay). In 2001, KPPLs achieved legal recognition, and received authority from the District Fisheries Services to plan and implement coastal fisheries management in their own area. Committee discussion in each of the three management areas of the District of Lombok Timur took place and each produced a draft of a coastal fisheries management plan. The drafts were then reviewed by the heads of the villages, the head of the sub-district administration (*camat*), and the head of the District Fisheries Services. Finally, the management plans of the three Bays were signed and declared as awig-awigs in their respective areas.

Implementation of these three management plans have been success stories, since their implementation in late 2001. Within each management area, blast fishing has steadily declined (Figure 2). In 2004, no blast fishing was reported in any of the three management areas although in 2005 blast fishing re-occurred in Jukung Bay as a new KPPL committee was elected in the area. The success of the awig-awigs is likely the result of the high commitment of most fishers to stop destructive fishing. The customary laws can also resolve traditional conflicts between artisanal and commercial fishers if properly implemented.

Awig-awigs regulating the management of fish sanctuaries were also established in each of the three management areas. No violations have been recorded on fish sanctuary management at either Ekas Bay or Serewe Bay, but some minor violations occurred in the Gusoh Sandak fish sanctuary at Jukung Bay. It is likely that the distance of the sanctuary from the management committee has been an important factor conditioning the success of these sanctuaries.

Experiences from the southern coast of the District convinced the District Fisheries Services to start a new mission to the north. Three new management areas were defined in 2003 (Labuhan Haji-Sakra Timur, Pringgabaya and Sambelia). These three new

Awig-awig

Awig-awig is a form of traditional agreement among local communities about social values in controlling community behaviours to achieve harmony life within society. These customary laws were intended to reduce conflicts among community members. Although the concept of awig-awig was originally imported from Bali during the colonial era, most villages in Lombok Island have set up their own awig-awigs now. They usually consist of regulations regarding marriage and security. Some villages, however, also have awig-awigs on traditional ceremonies, or even on how animals should be kept. Awig-awigs are usually unwritten. Socialization of a new awig-awig may be carried out after Friday prayer. Traditionally these laws are formulated by a community of an island, village, or sub-village, and can only be applied to that community and people doing activities with the community's defined area. Many villages, however, have the same or similar awig-awigs, particularly those that deal with marriage ceremonies.

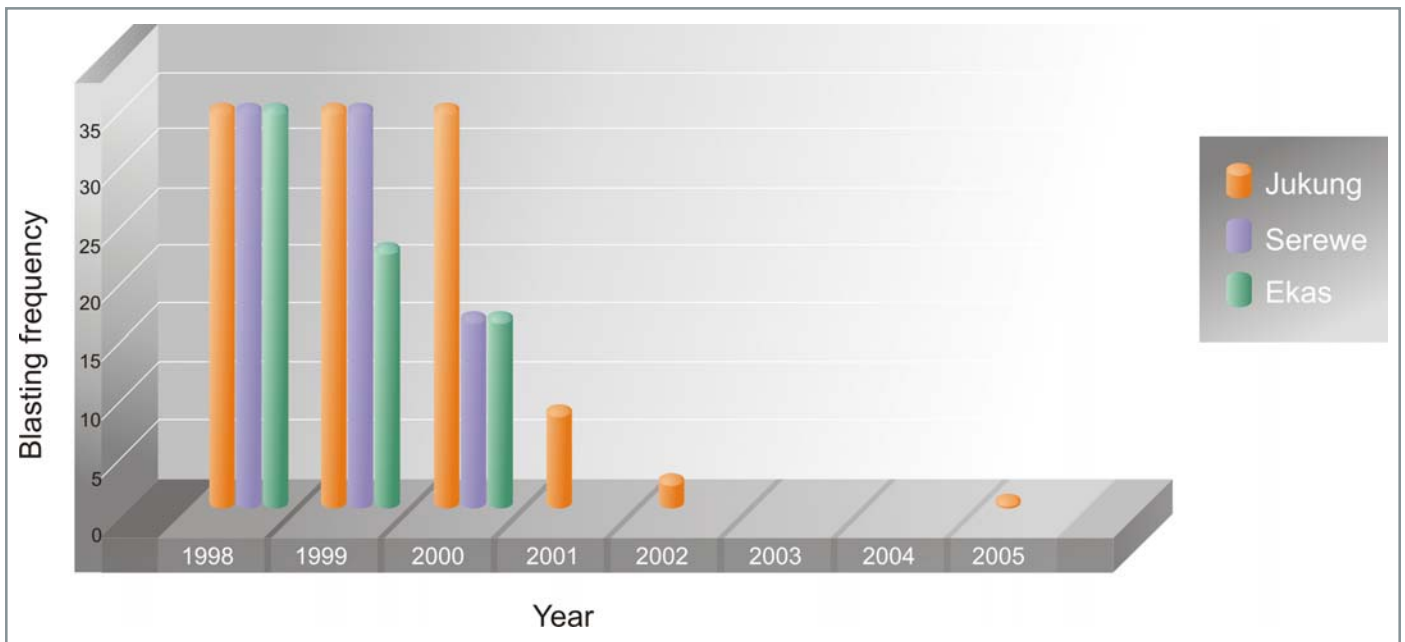


figure 1: Reduction of blast fishing frequency in three management areas (Jukung, Serewe, and Ekas Bays); implementation of participatory fisheries management had significant impact on reducing destructive fishing practices.

areas are open coastal waters facing the Alas Strait. Since the three southern management areas were sheltered bays, these three new areas were an experiment in coping with a much more difficult situation. In early 2004, each new area promoted its management plan as an awig-awig for coastal fisheries management. The implementation of these resulted in a decrease of blast fishing by about 70%. Fishing conflicts between artisanal fishers using compressor-aided spear was also reduced. These results show that participative fisheries management can also be implemented in open coastal waters.

Wider Coastal Zone Management Issues

An interesting feature of fisheries management in Lombok Timur is its integration with wider coastal zone management issues. The community management committees, the KPPLs, have been given management authority for coastal fisheries and also for other environmental and coastal issues, such as coral reefs.

As a result, the District Fisheries Services of Lombok Timur divided its coastal waters into six management areas (Figure 1), each managed by a committee (KPPL) with the authority to make and implement its own management plan through an awig-awig for all the villages within their management area. The awig-awigs set in place in partnership with local government are also applicable to visitors using resources within the area.

The local laws in each of the six management areas are very similar. Several variations can be found in the number of certain types of fishing gear allowed, and the use of compressor-aided spears for fishing (Table 1). Most violations are sanctioned by a fine. The nominal value of fines also differs slightly among the management areas.

As mentioned above, the Co-Fish Project also introduced conservation of habitats. At present, Lombok Timur has established five fish sanctuaries and two marine protected areas. The size of the sanctuaries, however, is small, as many fishers have rejected the idea of having bigger fish sanctuaries, and the short project timeframe is insufficient to demonstrate the benefits of protected areas for the fishing communities. To make these conservation and habitat protection efforts viable and sustainable, local institutions and communities were involved in the management of all habitat conservation areas. Currently, nearly 1200 ha of fish habitats are under the management of the community management committee (KPPL). Restocking of pearl oyster spats has been done on the reefs within fish sanctuaries, although the results so far have been unsatisfactory.



Figure 2: The six management areas in the District of Lombok Timur (DLT): all the coastal waters of the District now have a management plan implemented by a KPPL. (M.A. = Management Area)

Regulated or prohibited activities in the six management areas

EB=Ekas Bay, SB=Serewe Bay, JB=Jukung Bay, LH=Labuhan Haji and Sakra Timur, PI=Pringgabaya, SA=Sambelia.

Activities	Management area						Sanction
	EB	SB	JB	LH	PI	SA	
Operation of commercial fishers in Zone 1.	P	P	P	P	P	P	F
Fishing and trading of endangered species: dugong, dolphins, turtles, napoleon fish.	P	P	P	P	P	P	F
Blast- and poisonous fishing practices.	P	P	P	P	P	P	DC, F
Trading of blasted or poisoned fishes.	P	P	P	P	P	P	F
Use of compressor in spear fishing.	R	R	R	P	P	P	F
Use of conflicting fishing gears, such as: lift net, number of light trap, jaring oros.	R	R	R	R	R	R	F
Location of mariculture rafts and long line.	R	R	R	R	R	R	F
Mangrove logging.	P	P	P	P	P	P	F
Coral and sand mining.	P	P	P	P	P	P	F

Note: P=prohibited, R=regulated, F=fined, DC=district court, DC will be applied whenever evidences and witness requirements can be fulfilled.

As a result, all coastal waters of Lombok Timur are now managed using awig-awig through KPPL. There are six awig-awigs on coastal fisheries resources management, five on fish sanctuary management, and two on marine protected area management. It is expected that all 13 awig-awigs will be acknowledged in the District Regulation on participative coastal fisheries resources management, in the near future.

Institutional and Coordination Aspects

Each KPPL consists of representatives of stakeholder groups from all villages in the management area, proposed by village headmen.

Each village generally has six representatives, representing capture fishers, mariculture farmers, women involved in post-harvest of fish, the religious leader, the youth leader, and the village headman. The management area of Ekas Bay is a special case, since it spreads across two districts, so the KPPL consists of representatives from both Lombok Tengah and Lombok Timur. The KPPL has the authority to make a management plan, and a mandate to revise the plan whenever necessary. In order to revise an established awig-awig, approval from all heads of the villages within the management area must first be given.

In the context of fisheries management, KPPL is different from regular community surveillance groups established by District Fisheries Services in other districts, called Pokmaswas (community surveillance group). A KPPL can enforce the awig-awig and prosecute violators of the management plan by itself, which the Pokmaswas cannot, having a standard operational

KKPK – the district fisheries management advisory committee

The KKPK (*komite kelautan dan perikanan kabupaten*, or district fisheries management advisory committee) is an advisory committee that plays an important role in providing resolutions and recommendation on problems and issues related to fisheries management for the head of the district. The KKPK consists of representatives of stakeholder groups and government agencies at the district level.

The members of the KKPK in Lombok Timur are representatives of the six KPPL leaders, small-scale fishermen (<5 GT), fishermen using bigger boats (e"5 GT), seaweed, lobster and grouper mariculturists, the post-harvest women's group, the fisheries businessmen group, fisheries faculty of Universitas Gunung Rinjani, BPPI (*balai pengembangan penangkapan ikan*), District Development Planning Board (*Bappeda*), District Transportation Services (*Dishubpar*), District Fisheries Services (*Dislutkan*), and District Secretary (*Setda*).



photo by Imam Bachtiar



photo by Imam Bachtiar

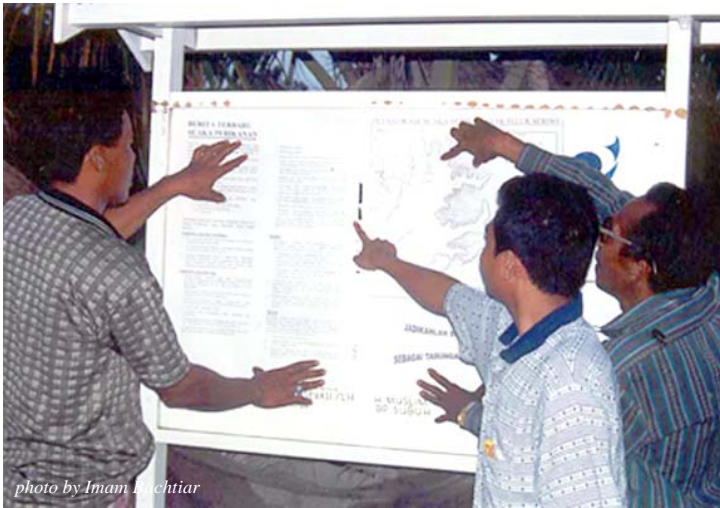
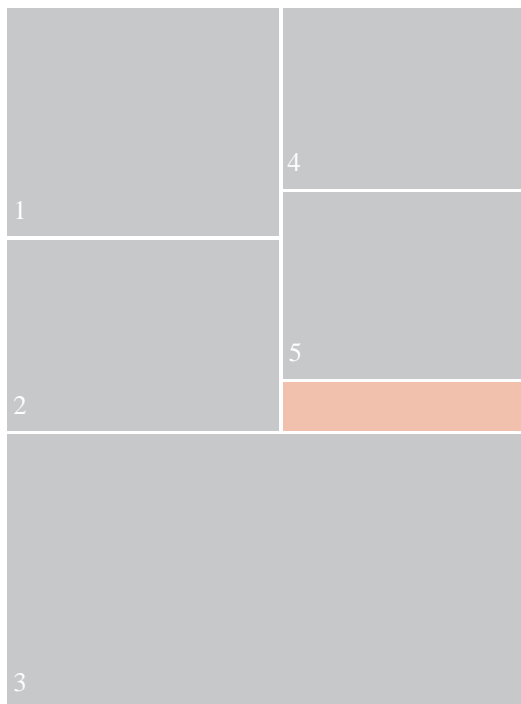


photo by Imam Bachtiar



photo by Imam Bachtiar



1. Representatives of six KPPLs in Lombok Timur discussed about current issues in KPPL institution, 2005.
2. Written public hearing during discussion of the management plan (*awig-awig*) of Serewe Bay, 2001. The management plan was posted in public boards to be reviewed by all community members.
3. KPPL of the Ekas Bay, 2002.
4. KPPL of Sambelia discussed about management plan of the marine protected area of Gili Sulat-Gili Lawang, about 1206 ha, 2003.
5. Head of the KPPL of Jukung Bay, Soemadi, received first medal of fisheries surveillance group from the Indonesian President, Megawati Sukarnoputri, in January 2004.

procedure (SOP) that can be applied to fine illegal fishers. In the case of destructive fishing practices, formal enforcement by police is prioritised. Whenever there is insufficient evidence and witnesses to prosecute violators in a district court, enforcement using *awig-awig* is necessary.

Because of its extra authority in enforcement, the KPPL in Lombok Timur always gets the first nomination in the provincial competition among surveillance groups for their effectiveness. At the national level, the KPPL of Jukung Bay was given an award as the best surveillance group (*Pokmaswas*) in 2003 and received rewards directly from the President of Indonesia in early 2004.

Another institution involved in co-management mechanisms is the KKKP (*komite kelautan dan perikanan kabupaten*, or the district fisheries management advisory committee). Whenever a KPPL is deemed no longer effective, the KKKP may recommend to the head of the District Fisheries Services to reshuffle the committee in a management area. In one case, the KPPL was unable to carry out its duty because of pressure from blast fishers. The KKKP recommended that the head of the District Fisheries Services take over, and the case was handed to a special district taskforce consisting of selected KPPL members from other management areas.

The six KPPLs and the KKKP have all been equipped with radios so that they can coordinate with each other about their daily activities. At least one radio is provided for each village in the management areas as well. A total of 45 radios have been distributed to support communication, while two repeaters (which are communication equipment that strengthen radio signals) are also available to widen the coverage area. Beside the communication equipment, one 60 HP powered speed-boat has been provided for each of the six management areas for surveillance. This material was financed through a small grant from the district government, added by donations from tourists and local companies (in cash or in kind such as petrol).

The KKKP and the six KPPL also have been granted with supporting infrastructure. The District Fisheries Services supported each KPPL with a surveillance post, which is also used as a meeting place for the committee. Meanwhile, the KKKP has a secretary office and a meeting room (*Kerapu Room*) located at Selong.

Unresolved issues

There are several issues that need further attention in the context of implementing the Code of Conduct for Responsible Fisheries. Among these, the sustainability of the KPPL and KKKP need to be prioritised, as these are the driving force behind responsible fisheries in the Lombok Timur.

Small boat for artisanal fisheries at Jukung Bay. The number visible on each boat is a registration number of artisanal boat. Boat registration is carried out by KPPL, 2003.

Photo by Imam Bachtiar



These two committees, which have been so successful at supporting the implementation of responsible fisheries, must be maintained and strengthened. For this purpose, district regulations (PERDA) are required to acknowledge the existence of the committees and their respective authorities in fisheries management. Notably, the district regulations on participative fisheries management will strengthen the position of the KPPL when coping with violators from other districts. A draft for district regulations has been discussed, and is expected to be approved by the district parliament some time this year. These regulations are also very important to ensure that both KPPL and KKPK have a regular budget to carry out their work, as the district government will have a legal obligation to fund the committees.

Beside this sustainability issue, coral mining is another longstanding issue that has never been completely resolved. At present, there is no example of successful approaches to handle coral mining. The COREMAP project in Lombok Barat attempted to address this issue in 1997-2000, but failed to stop coral mining. Since the mining involves many people below the poverty line, just law enforcement might not be sufficient.

Conclusion

Lombok Timur has shown impressive efforts and some impressive success in implementing the Code of Conduct for Responsible Fisheries. This has been achieved mainly through establishing a framework for participative coastal fisheries management. The use of customary law (awig-awig) to support fisheries management plans has proved most suitable for Lombok culture. The institutions of KPPL and KKPK that have been set up locally have been working very well, showing the importance of involving local communities to achieve sustainable fisheries management.

Acknowledgements

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ABOUT THE AUTHOR

Imam Bachtiar is a lecturer on Marine Biology, at Biology Education Department, University of Mataram. His involvement on the COREMAP (3 years) and Co-Fish Projects (7 years) had enriched his perspective on marine resources management and he has published a number of papers on coral reef ecology, and on fisheries co-management. He is a contributor to UNEP publications on Global International Waters Assessment (GIWA) and chairman of the Centre of Coastal and Marine Studies of the University of Mataram. The author can be joined at ibachtiar@telkom.net.

Event Calendar

Date /Venue	Events	Organizer
2005		
7-11 Nov Myanmar	On-Site Training on Heavy Metal Analysis	SEAFDEC/MFRD
9-11 Nov Malaysia	BIMP-EAGA Train-the-Trainer's Workshop on Fish Quality Preservation and Safety (HACCP)	SEAFDEC/MFRD
15-29 Nov Philippines	Training on Hatchery and Grow-out Culture of Abalone November 15-29, 2005)	SEAFDEC/AQD
21-23 Nov Indonesia	The Fourth Technical Consultation Meeting: Information Collection for Sustainable Pelagic Fisheries in the South China Sea	SEAFDEC/MFRDMD
28-30 Nov Malaysia	RTC on Information Gathering for Capture Inland Fisheries in ASEAN Countries	SEAFDEC/MFRDMD
5-9 Dec Malaysia	4 th Regional Workshop on Good Laboratory Practices and Methods Validation	SEAFDEC/MFRD
6-7 Dec Cambodia	End-of-Activity Seminar on Maximizing Utilization of Freshwater Fish Catch – Freshwater Species	SEAFDEC/MFRD
10 Dec Thailand	Consultative Meeting on the International Supports for Fisheries Project in Southeast Asia	SEAFDEC/TD
2006		
16-19 Jan Malaysia	Technical Group Meeting: Information Collection for Sustainable Pelagic Fisheries In the South China Sea	SEAFDEC/MFRDMD
17-20 Jan Cambodia	Preparatory and Planning Mission for the Project on Capacity Building for Community Fisheries Management	SEAFDEC/Sec-FAO
1-3 Feb Cambodia	1 st National (Inception) Workshop for the Project on Capacity Building for Community Fisheries Management	SEAFDEC/Sec-FAO
15-17 Feb Philippines	BIMP-EAGA Train-the-Trainer's Workshop on Fish Quality Preservation and Safety (HACCP)	SEAFDEC/MFRD
17-20 Jan Philippines	Participatory Workshop on Responsible Aquaculture	SEAFDEC/AQD
20-22 Feb Thailand	Regional Technical Consultation on International Fish Trade Related Issues	SEAFDEC/Secretariat
27 Feb-3 Mar Cambodia	Fisheries Management Training for the Project on Capacity Building for Community Fisheries Management	SEAFDEC/Sec-FAO
13-15 Mar Thailand	On-site Training/Workshop on Capacity Building for Coastal Resource Management	SEAFDEC/Sec-Sida
15-17 Mar Indonesia	BIMP-EAGA Train-the-Trainer's Workshop on Fish Quality Preservation and Safety (HACCP)	SEAFDEC/MFRD
20-23 Mar Indonesia	Workshop on Mariculture Development	SEAFDEC/AQD
27-31 Mar Cambodia	On-site Training/Workshop on Capacity Building for Establishment of Refugia and Coastal Resource Management	SEAFDEC/Sec-Sida
27 Mar-8 Apr Philippines	Training in Freshwater Prawn Hatchery and Pond Grow-out	SEAFDEC/AQD
10-14 Apr Malaysia	BIMP-EAGA Training Course on Fish Quality Preservation and Safety (HACCP)	SEAFDEC/MFRD
17 Apr Brunei Darussalam	8 th Meeting of the ASEAN-SEAFDEC Fisheries Consultative Group	SEAFDEC/Secretariat
18-21 Apr Brunei Darussalam	38 th Meeting of the Council of the SEAFDEC	SEAFDEC/Secretariat

Southeast Asian Fisheries Development Center (SEAFDEC)

What is SEAFDEC?

SEAFDEC is an autonomous intergovernmental body established as a regional treaty organization in 1967 to promote sustainable fisheries development in Southeast Asia.

Objectives

SEAFDEC aims specifically to develop fishery potentials in the region through training, research and information services in order to improve food supply through rational utilization of fisheries resources in the region.

Functions

To achieve its objectives the Center has the following functions:

1. To offer training courses, and to organize workshops and seminars, in fishing technology, marine engineering, extension methodology, post-harvest technology, and aquaculture;
2. To conduct research and development in fishing gear technology, fishing ground surveys, post-harvest technology and aquaculture, to examine problems related to the handling of fish at sea and quality control, and to undertake studies on the fisheries resources in the region; and
3. To arrange for the transfer of technology to the countries in the region and to make available the printed and non-printed media, which include the publication of statistical bulletins for the exchange and dissemination related to fisheries and aquaculture development.

Membership

SEAFDEC members are the ASEAN Member Countries (Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam) and Japan.



SEAFDEC Addresses

Secretariat

P.O. Box 1046
Kasetsart Post Office
Bangkok 10903
Thailand
Tel:(66-2)940-6326 to 9
Fax: (66-2)940-6336
E-mail:secretariat@seafdec.org
<http://www.seafdec.org>

Training Department (TD)

P.O.Box 97
Phrasamutchedi
Samut Prakan 10290
Thailand
Tel:(66-2)425-6100
Fax:(66-2)425-6110 to 11
E-mail:td@seafdec.org
<http://www.seafdec.org/td>

Marine Fisheries Research Department (MFRD)

2 Perahu Road
off Lim Chu Kang Road
Singapore 718915
Tel: (65)6790-7973
Fax: (65)6861-3196
E-mail:mfrdlibr@pacific.net.sg
<http://www.fishsafetyinfo.com/>

Aquaculture Department (AOD)

Main Office: Tigbauan, 5021 Iloilo, Philippines
Tel (63-33) 511-9171, 336-2965
Fax (63-33) 335-1008, 511-8709, 511-9070
Manila Office: 17 Times Street, West Triangle
1104 Quezon City, Philippines
Tel (63-2) 372-3980 to 82; Fax (63-2) 372-3983
E-mail: aqdchief@aqd.seafdec.org.ph
<http://www.seafdec.org.ph>

Marine Fishery Resources Development and Management Department (MFRDMD)

Taman Perikanan Chendering
21080 Kuala Terengganu
Malaysia
Tel: (609)616-3150
Fax:(609)617-5136
E-mail:seafdec@po.jaring.my
<http://www.seafdec.org/mfrdmd>
<http://agrolink.moa.my/dof/seafdec>



In the occasion of the Millennium Conference, a drawing contest was organized for the children among ASEAN-SEAFDEC Member Countries, on the theme of 'Fish and the Culture'. This is the best drawing from Japan.