

Key issues in coastal fisheries in South and Southeast Asia, outcomes of a regional initiative

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Abstract

Asia is an important region in terms of fish trade supplying nearly 60% of global fish production. The region's coastal fisheries play a critical role in ensuring food security and providing livelihoods, particularly for poorer sections of the community. This paper introduces a regional initiative in which eight Asian countries (Bangladesh, India, Indonesia, Malaysia, the Philippines, Sri Lanka, Thailand and Vietnam) undertook simultaneous, multi-disciplinary assessments of their coastal fisheries. The outputs of this initiative are presented in the next four papers of this volume of Fisheries Research. The assessments have highlighted two disturbing regional trends: coastal fisheries resources are severely depleted, biological and economic overfishing is occurring throughout the region. These are symptoms of the lack of effective management of fishing capacity in the region.

This overview paper highlights the urgent need to reduce fishing capacity in the region. Only through such capacity reduction strategies can fish stocks be rebuilt to more productive and sustainable levels so that potential economic and social benefits from fisheries can be realized. Strategies need to be country- and fishery-specific and should focus on the development of effective access and property-rights regimes. For instance, countries need to explicitly allocate rights between small-scale and industrial fisheries, where resources are shared. This will require an understanding of the overlap between the sectors in terms of resource use and also the relative economic and social benefits from each sector.

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1. Introduction

In terms of fish², Asia³ is currently the world's food bowl, producing over 81 million tonnes, nearly 60% of global fish production (Table 1) and containing six of the top 10 fish producing countries. Asian countries currently export over 7.6 million tonnes, generating more than US\$18 billion in export earnings and contributing up to 40% to the agricultural GDP (Table 1). More than 50% of the exported fish is

traded within Asia. However, significant amounts go to other regions: 38% of North American fish imports, 49% of Oceania imports and more than 10% of European and African imports are from Asia (FAO, 2002a). This fish production must be examined not only in biological terms but also from the social and economic context of the region. Most Asian countries are still regarded as developing and 14 are classified as Low-Income Food-Deficit Countries (defined by FAO, 1996). Asia is home to over 3.4 billion people, more than half the global population and of these an estimated 746 million are living on < US\$1 per day (Table 1). In the context of these developing countries and high levels of poverty, fish and fisheries have an important role in food security, nutrition and livelihoods.

Fish provides a vital source of protein in Asia, contributing over 30% of the animal protein in countries such as Bangladesh, Malaysia, Vietnam, Thailand and the Philippines and over 50% in Indonesia and Sri Lanka (Table 1). Demand for fish in Asia will increase as populations grow;

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² Throughout the paper the term 'fish' refers broadly to fish, sharks, shrimps, crabs, cephalopods and other invertebrates.

³ Throughout the paper references to Asia exclude Central Asia.

Table 1
Relevant fisheries and population statistics for the eight countries involved in the regional project, as well as Asia and the world for comparison

Country	Total fish production 2002 (million t) ^a	Marine capture fisheries production 2002 (million t) ^a	Value of fish exports 2000 (US\$ million) ^b	Fisheries and aquaculture Per cent contribution to agricultural GDP	Population 2002 (million) ^a	Population earning <US\$1 per day (× million) ^c	Economy ranking ^d	Total number of fishers (× 1000), 1990 ^e	Number of fishers in marine capture fisheries (× 1000) ^f	Per cent animal protein contributed by fish ^g
Bangladesh	1.89	0.42	372	7	144	52	L	1445	507	48.3
India	5.97	3.06	1405	4	1050	364	L	5959	1025	15.3
Indonesia	5.42	4.23	1585	10.2	217	16	L - M	4668	2400	53.1
Malaysia	1.44	1.28	349	11.31	24	<0.48	U - M	101	78	34.5
Philippines	2.48	1.90	400	19	79	12	L - M	991	722	42.8
Sri Lanka	0.31	0.27	135	21	19	1.25	L - M	125		54.3
Thailand	3.57	2.72	4367	15.18	62	<1.24	L - M	439	157	41.5
Vietnam	2.03	1.36	1480	40	80	14	L	3030	420	39.4
Total	23.10	15.22	10093		1675	461		16717		
Asia	80.87	39.07	18595		3449	746		22377		
World	132.99	85.82	54570		6225	1326		27066		

Sources.

^a FAOSTAT (2004).

^b FAO (2002b).

^c Calculated from the population size and the per cent earning <US\$1 per day (ADB, 2005).

^d World Bank Group (2005), L=Low income economies, L-M=Lower-middle income economies, U-M=Upper-middle income economies (<http://www.worldbank.org/data/countryclass/classgroups.htm>).

^e WRI, 2005.

^f Abu Talib et al. (2003a), Boonchuwongse and Dechboon (2003), Cruz-Trinidad (2003), Immanuel et al. (2003), Long (2003), Wijayaratne and Maldeniya (2003), Koeshendrajana et al. (2004 unpublished), Aquaculture technologies and fishing practice in Indonesia. A report prepared for: the ICLARM project on 'a study on strategies and options for increasing and sustaining fisheries production to benefit poor households in Asia. Available from the WorldFish Center, Penang, Malaysia).

^g Laureti (1999).

the population in Asia is expected to reach 4.6 billion by 2050 (WRI, 2005). Aquaculture production has grown rapidly in the region to meet the increasing demand and it is predicted that this growth will continue (Delgado et al., 2003). Capture fisheries landings, while not likely to increase substantially, must be maintained as they currently supply nearly 50% of total fish production. Projections of fish supply show clearly that demand will not be met and the price of fish will rise more rapidly under scenarios of collapse in capture fisheries (Delgado et al., 2003).

Capture fisheries also provide an important livelihood in Asia where fishing is often traditional in many cultural groups (e.g., The nomadic sea gypsies; Charles, 2001). FAO (2002a) estimated there are over 27 million fishers worldwide, 22 million of whom live in Asia (Table 1). If the associated industries (e.g., fish processing and boat building) are included, capture fisheries support the livelihoods of at least 88 million people⁴ in Asia. In contrast, currently it is estimated there are only 7.4 million fish farmers worldwide (FAO, 2002a).

An important dimension of capture fisheries in Asia is their role in poorer sections of the community, particularly in coastal and rural areas. The open access nature and low entrance cost of many fisheries means that they can provide a safety net against failures from income in other sectors, they can also provide a “livelihood of last resort” to the landless poor (Bene, 2003). Even if the level of poverty in fishing communities is similar to national averages, an estimated 22 million people in Asia who live on <US\$ 1 per day depend on fisheries and associated industries for their livelihoods (FAO, 2002a). The fisheries sector, if appropriately managed could be a source of increased economic benefit for poor communities, potentially providing pathways out of poverty.

Marine capture fisheries provide most of the capture fisheries landings in Asia, contributing over 90% (FAO, 2002b, Table 1). In most countries this sector also employs most of the fishers (Abu Talib et al., 2003b; Boonchuwongse and Dechboon, 2003; Cruz-Trinidad, 2003; Long, 2003; Wijayaratne and Maldeniya, 2003). The marine capture fisheries primarily exploit the continental shelves and coastal waters, potentially the most productive oceanic waters (Longhurst and Pauly, 1987; Poore and Wilson, 1993). However, throughout Asia, there is concern regarding the state of coastal fisheries with signs of overfishing and overcapitalization. While similar problems occur in many developed countries, the social and economic context of Asia provides a different focus and greater urgency for effective management.

In response to the concerns regarding coastal fisheries a regional project “Sustainable management of coastal fish stocks in Asia”⁵ (1998–2003) was implemented by the WorldFish Center. The project was conducted in partnership with national organizations from eight South and Southeast Asian countries: Bangladesh, India, Indonesia, Malaysia, the Philippines, Sri Lanka, Thailand and Vietnam (Fig. 1). The

project aimed to assess the biological, social and economic status of coastal fisheries to provide impetus and direction for improved management. The project concluded with the International workshop on the management of tropical coastal fisheries in Asia (March 2001, Penang, Malaysia), at which regional trends and issues were discussed and initiatives identified to support improved fisheries management (documented in Silvestre et al., 2003).

The papers in this special section of Fisheries Research provide regional overviews from the project and workshop. This was the first time in the region that standardized analyses were applied simultaneously across eight countries to examine the coastal fisheries, from biological (Garces et al., this issue, pp. 143–157; Stobutzki et al., this issue, pp. 130–142), socio-economic (Ahmed et al., 2004 unpublished⁶) and policy perspectives (Silvestre et al., 2003). The aim of this special section is to highlight the magnitude and urgency of the issues facing coastal fisheries in Asia, particularly the central issues of overfishing and the depleted state of the fish stocks. Prescribing specific solutions is beyond the scope of the project and these papers. However, we hope that by highlighting the issues to a wider audience it will provide impetus for the development and implementation of solutions. This introductory paper provides a brief background to the sector and highlights the key regional issues. The paper concludes with the recommendation that the next step must focus on addressing the critical issue of reducing fishing capacity in the region.

2. Coastal fisheries sector

The countries involved in this study (Bangladesh, India, Indonesia, Malaysia, the Philippines, Thailand, Sri Lanka and Vietnam) vary in the extent and characteristics of their coastal fisheries resources, considered here as extending from the shoreline to the 200 m depth contour, and also their history of fisheries production (Fig. 2). Of the participating countries Indonesia has the largest Exclusive Economic Zone (EEZ) while Bangladesh has the smallest (Table 2). The proportion of the EEZ covered by continental shelf varies from 68% in Malaysia to only 5% in Sri Lanka (Table 2) and this influences the contribution of demersal resources to coastal fisheries.

Together the eight countries produce 23 million tonnes of fish, over 60% from marine capture fisheries (Table 1). These countries include four of the top 12 fish producing nations (Indonesia, India, Thailand and the Philippines) (FAO, 2002a). Combined, the eight countries are responsible for nearly 40% of the marine capture fisheries production in Asia and 60% of the production outside of China (FAOSTAT, 2004). The marine sector dominates capture fisheries production in all countries, contributing 51–88%, except Bangladesh where it contributes 22%. Coastal fisheries

⁴ Assuming a 1:3 ratio.

⁵ Asian Development Bank Regional Technical Assistance 5766.

⁶ Ahmed, M., Boonchuwongse, P., Dechboon, W., Squires, D., 2004. Overfishing in the Gulf of Thailand: policy challenges and bioeconomic analysis. Working Paper, available from the WorldFish Center, Penang, Malaysia.

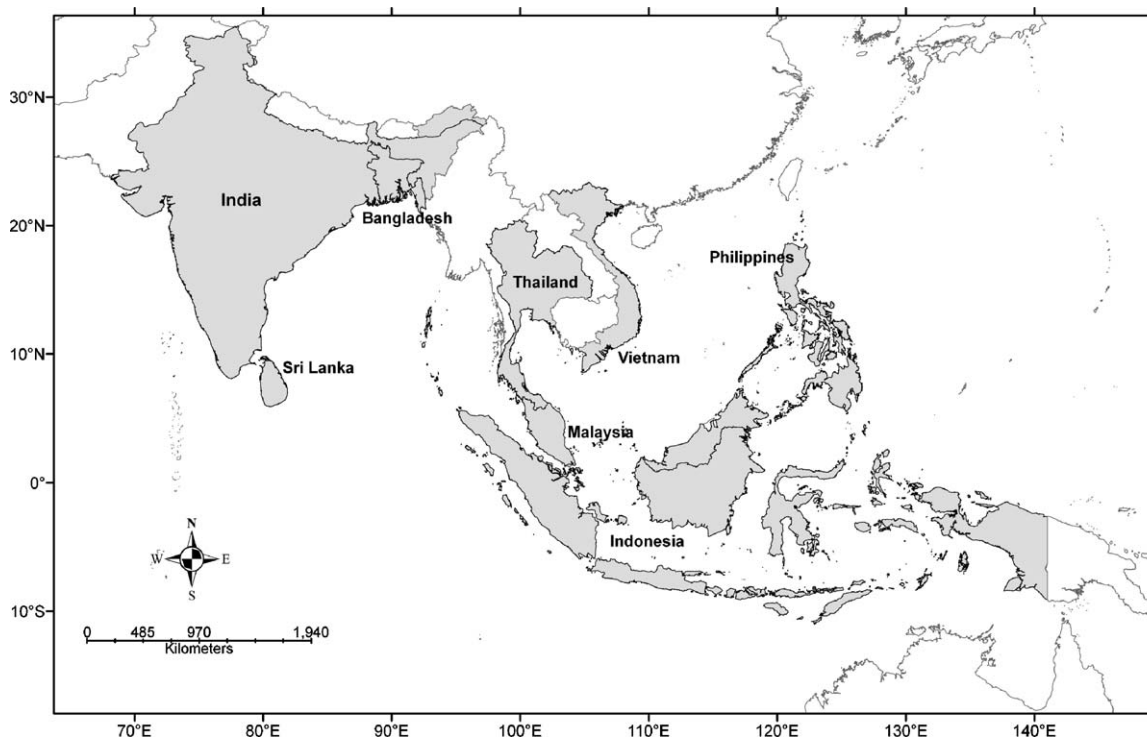


Fig. 1. The geographical scope of the “Sustainable Management of Coastal Fisheries in Asia” project, which covered Bangladesh, India, Indonesia, Malaysia, the Philippines, Sri Lanka, Thailand and Vietnam.

Table 2

The area of continental shelf and Exclusive Economic Zone (EEZ) in each country

Country (Source)	Continental shelf area, 0–200 m depth ($\times 1000 \text{ km}^2$)	EEZ Area ($\times 1000 \text{ km}^2$)	Continental shelf area as per cent of EEZ
Bangladesh (Khan et al., 2003)	66	164	40
India (Immanuel et al., 2003; WRI, 2005)	372	2103	18
Indonesia (Purwanto., 2003)	2777	5800	48
Malaysia (Abu Talib et al., 2003a)	374	548	68
Philippines (Barut et al., 2003)	178	2200	8
Sri Lanka (Samaranayake, 2003)	27	536	5
Thailand (Janetkitkosol et al., 2003; WRI, 2005)	185	420 ^a	44
Vietnam (Son and Thuoc, 2003)	328	1000	33

^a This includes areas that overlap with the EEZs of Cambodia and Vietnam.

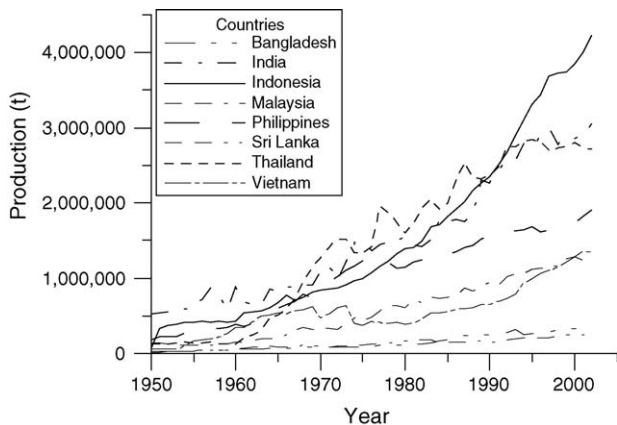


Fig. 2. The total production from marine capture fisheries in each country (FAOSTAT, 2004).

are the main contributor to marine landings for most of the countries, 60–85%, and these tend to be dominated by demersal species (Abu Talib and Alias, 1997; Eiamsaard and Amornchairojkul, 1997; Abu Talib et al., 2003a; Vivekanandan et al., 2003; Janetkitkosol et al., 2003). Sri Lanka and the Philippines are exceptions where pelagic species dominate the landings from coastal fisheries (Barut et al., 2003; Wijayarathne and Maldeniya, 2003).

The coastal fisheries of these countries can be divided into two broad sectors, small-scale fisheries (as defined by COFI, 2003) and large-scale or industrial fisheries (Table 3). The small-scale fisheries are characterized by small vessels (e.g., <5 gross registered tonnage (GRT) in Indonesia and Thailand, <3 GRT in the Philippines) and usually labour-intensive harvesting methods (Charles, 2001). Small-scale fisheries in these countries include both non-motorized and

Table 3

The distribution of fishers, vessels and production between small-scale and industrial sectors in each country

Country (Source)	Number of fishers (× 1000)		Number of vessels (× 1000)		Production (× 1000 t)		Small-scale vessels as per cent of total fleet	Small-scale production as per cent of total production
	Small-scale	Industrial	Small-scale	Industrial	Small-scale	Industrial		
Bangladesh (Masudur et al., 2003)			14	3.4	276	16	81	95
India (Vivekanandan et al., 2003)			128	49			72	
Indonesia (Priyono, 2003; Purwanto., 2003)	2088		362	40			90	
Malaysia (Abu Talib et al., 2003a)	24.2	27	15	12	335	834	56	29
Philippines (Barut et al., 2003; Cruz-Trinidad, 2003)	743	57	500	2.5	~500	~500	99	
Sri Lanka (Samaranayake, 2003)			13	13	49	100	51	33
Thailand (Boonchuwongse and Dechboon, 2003; Janetkitkosol et al., 2003)	235	288	43	11		249	79	
Vietnam (Son and Thuoc, 2003, Nguyen et al., 2004 unpublished) ^a	411	3.6	95	5.0	709	422	95	63

^a Nguyen, V.H., Luu, T.T., Nien, N.M., 2004. Profile of Key Aquaculture Technologies and Fishing Practices in Vietnam. A report prepared for: the ICLARM project on 'a study on strategies and options for increasing and sustaining fisheries production to benefit poor household in Asia. Available from the WorldFish Center, Penang, Malaysia.

motorized vessels and cover many gear, including gillnet, trammel hook and line, trap, small push-net and seine nets (Abu Talib et al., 2003a; Barut et al., 2003; Janetkitkosol et al., 2003; Rahman et al., 2003; Purwanto., 2003; Son and Thuoc, 2003; Vivekanandan et al., 2003). Due to the nature of their vessels most small-scale fishers are restricted to fishing in near-shore waters. In all participating countries, except Sri Lanka, the nearshore coastal zone is designated as a small-scale zone from which industrial vessels are excluded (Garces et al., this issue, pp. 143–157).

The industrial sector is characterized by larger motorized vessels that tend to have greater fishing and storage capacity. In countries such as Malaysia and Thailand this sector is dominated by trawlers (Abu Talib et al., 2003a; Janetkitkosol et al., 2003), while in countries such as India and the Philippines this sector is dominated by vessels that fish pelagic resources (Barut et al., 2003; Vivekanandan et al., 2003). This sector has been the focus of most development since the 1960/70s with the industrialization of fishing and the expansion of national fishing areas with the establishment of EEZs. Current national fisheries policies continue to emphasize the development of this sector, aiming to expand landings through promotion of offshore and deeper water fishing (Abu Talib et al., 2003b; Masudur et al., 2003; Purwanto., 2003; Son and Thuoc, 2003; Vivekanandan et al., 2003; Ebbers, 2005 unpublished⁷).

The relative social and economic contribution of the two sectors is often hard to assess due to the lack of robust data for small-scale fisheries in most countries (Ninnes, 2003

unpublished⁸; Staples et al., 2004). Small-scale fisheries dominate the region numerically, both in terms of the number of vessels and fishers (Table 3). In Bangladesh, Indonesia, the Philippines and Vietnam over 80% of the fishing fleet are small-scale vessels. In terms of landings, the small-scale sector contributes an estimated 95% in Bangladesh and over 30% in the Philippines, Sri Lanka and Vietnam (Table 3). The landings of small-scale fisheries and their contribution to food security is thought to be underestimated in most countries because of the difficulties associated with accurate monitoring (Ninnes, 2003 unpublished).

3. Key issues facing coastal fisheries

The central issue for coastal fisheries in Asia is the depleted state of the resources. In the countries with sufficient time series of data (Malaysia, the Philippines and Thailand), total biomass has declined to <10% of "baseline" estimates (earliest available values, usually prior to the expansion of fishing effort) in some areas, the average decline was down to 22% of the earlier estimates (Stobutzki et al., this issue, pp. 130–142). In the Gulf of Thailand, the earlier documented declines from 1965 to the 1980s (e.g., Ritrasa, 1976; Pauly, 1979; Beddington and May, 1982; Chanprasertporn and Lamsa-ard, 1987; Phasuk, 1987) have continued unabated into the 1990s (Kongprom et al., 2003).

⁷ To whom the fish belongs: a review of rights-based fisheries and decentralization. ASEAN-SEAFDEC Regional Technical Consultation on rights-based and co-management systems for small-scale fisheries, Jakarta, Indonesia, 18–20 July 2005. Available from SEAFDEC.

⁸ Ninnes, C., 2003. Improving the collection, analysis and dissemination of information in small-scale fisheries. Paper presented to the FAO Working party on small-scale fisheries, Bangkok, Thailand, 18–21 November 2003. Available from the FAO Regional Office for Asia and the Pacific, Bangkok, Thailand.

These drastic declines show no signs of leveling out. The assessment of the state of the resources was facilitated by the compilation of historic scientific trawl survey data (Garces et al., this issue, pp. 119–129).

The major contributor to these declines is overfishing, although this is compounded by environmental degradation (Stobutzki et al., this issue, pp. 130–142). All eight countries showed signs of overfishing in coastal fisheries, such as declining catch per unit effort. In Vietnam, from 1987 to 1999, the catch per unit effort only increased 1.8-fold, while the horsepower of the fishing fleet increased at least 3-fold (Son and Thuoc, 2003) indicating a decrease in catch per unit effort when changes in fishing power are accounted for. Exploitation ratios (fishing mortality: total mortality) calculated for 185 stocks across the region show that over 65% had exploitation ratios >0.5 (Stobutzki et al., this issue, pp. 130–142). This is above the suggested sustainable range for exploited fish species (0.3–0.5; Gulland, 1988; Pauly, 1980). In Thailand the exploitation ratios have increased over time, showing a worsening of an already bad situation (Stobutzki et al., this issue, pp. 130–142).

Bioeconomic analyses of coastal demersal fisheries in six of the countries: Bangladesh (Khan and Haque, 2003), India (Immanuel et al., 2003), Indonesia (Priyono, 2003), Malaysia (Abu Talib et al., 2003b), Thailand (Boonchuwongse and Dechboon, 2003; Ahmed et al. 2004 unpublished⁵) and Vietnam (Long, 2003) provide further evidence of the extent of overfishing. All fisheries had harvest rates greater than those required for maximum sustainable yield (MSY) or maximum economic yield (MEY). In some, the resource stock size has been reduced to levels lower than those needed to support MSY or MEY. This clearly demonstrates the regional prevalence of biological and economic overfishing, which will result in continued degradation of the resources and reduced economic returns from the fisheries.

The drastic declines in coastal resources are linked intimately to another major regional issue - poverty among fishing communities. Poverty is regarded as pervasive in small-scale fisheries and small-scale fishing is often cited as an income of last resort for the poorest of the poor (reviewed by Bene, 2003). In the industrial sector the crew members are also often poor, in some cases with lower incomes than the owners of small-scale vessels (Abu Talib et al., 2003b). Most countries recognize that poverty is an issue in fishing communities and have policy objectives focused on improving the economic conditions of the fishers, particularly in the small-scale sector (Abu Talib et al., 2003a; Barut et al., 2003; Janetkitkosol et al., 2003; Masudur et al., 2003; Purwanto., 2003; Samaranayake, 2003; Son and Thuoc, 2003; Vivekanandan et al., 2003). However, when the resources are depleted and overfishing is prevalent the poverty is likely to worsen. This situation often results in Malthusian overfishing (Pauly, 1988). As the resource declines, incomes to fishers decline and the communities become poorer. In response, they tend to fish harder and often with more destructive gears, reducing the resources even fur-

ther (Pauly, 1988). Therefore, poverty itself contributes to overfishing.

The depleted state of the resources and overfishing are symptoms of the lack of effective management of fishing capacity in the region. In the Java Sea, by 1994, the fishing effort exceeded f_{MSY} by the equivalent of over 420 standard 25 GRT trawlers (Purwanto., 2003). In the Gulf of Thailand, by 1995, the effort was twice f_{MSY} (Kongprom et al., 2003). The fishing capacity in the region is likely to be still increasing although robust measures of fishing capacity are not available for most countries. In terms of the number of licensed vessels, in a few countries the number has leveled out, or decreased as in the case of Malaysia (Abu Talib et al., 2003a); however, in most, such as the Philippines, Indonesia and Vietnam, the number of licensed vessels is still increasing (Barut et al., 2003; Purwanto., 2003; Son and Thuoc, 2003). Even where fleets are not growing the fishing capacity of individual vessels is increasing with increased mechanization and improved technology, particularly in the small-scale sector (Masudur et al., 2003).

4. Discussion

The primary recommendation to come out of this regional initiative is that interventions to improve fisheries management in the region need to focus urgently on reducing fishing capacity. Fish stocks can be rebuilt to more productive and sustainable levels only if fishing pressure is reduced: maintaining current levels can lead only to further depletion of the resources. The socioeconomic benefits from fisheries will also continue to be dissipated if overfishing continues.

Strategies for capacity reduction will be country- and possibly fishery-specific and are beyond the scope of the discussion here. However, they will require effective access and property-rights regimes that take into account the balance among sectors. The current overcapacity is due to the *de facto* open access regimes currently in the region. Most countries have attempted to implement limited entry systems and gear and vessel restrictions, primarily through licensing systems. However, these are usually focused only on the industrial sector, with no real limit to the number of licenses and poor enforcement. Malaysia is the only country that has attempted to implement a moratorium on licenses for coastal fisheries (Abu Talib et al., 2003a). However, this has not been sufficient, as the decline in stocks has not been halted (Stobutzki et al., this issue, pp. 130–142). Licensing systems alone are rarely sufficient to effectively manage fishing capacity, particularly if the enforcement is poor and compliance low (Cunningham and Greboval, 2001; Metzner and Ward, 2002). In Asian fisheries, monitoring and enforcement is difficult due to the large number of vessels and landing sites. The high levels of illegal fishing (fishing without licenses, with illegal gears, or in zones where they are not permitted) within the region are indicative of the poor enforcement. All countries report illegal fishing (Silvestre et al., 2003) but few have

measures of the actual extent. In Malaysia, the number of operating vessels is surveyed annually, this includes licensed and unlicensed vessels, providing a measure of illegal fishing. In some areas the number of operating vessels is double the number licensed (Abu Talib, pers. commun.). There is also a general lack of compliance with regulations, which is most obvious in terms of the use of illegal mesh sizes and gear. Many countries have legal minimum mesh sizes but the use of smaller mesh sizes is common (Masudur et al., 2003; Barut et al., 2003). Countries have also attempted to ban gear such as pushnets, but they are still used widely.

The delineation of fishing zones has been another approach to managing access within the region. The EEZ of most countries is divided into zones, based on depth or distance from shore, where particular gear and/or vessels can be used (Garces et al., *this issue*, pp. 143–157). For example, as mentioned previously, most countries have a nearshore zone for small-scale fisheries, where industrial vessels are banned. These fishing zones were implemented to reduce conflicts among sectors and also limit access to the resources (Garces et al., *this issue*, pp. 143–157). They have not been effective, however, with respect to managing capacity and the level of fishing effort on particular resources. Analyses of the assemblage structure of coastal fisheries resources show that most assemblages occur across fishing zone boundaries (Garces et al., *this issue*, pp. 143–157). So while the zones geographically separate different sectors they may still be competing for the same resource. Managing access to resources and the levels of fishing pressure require a better understanding of the spatial structure of fisheries resources within countries and the region (Ablan, *this issue*, pp. 158–168; Garces et al., *this issue*, pp. 143–157).

The balance between the small-scale and industrial sectors needs to be examined explicitly and addressed within the allocation of property rights and reduction of fishing capacity. Both sectors have contributed to the overfished state of coastal resources. However, there has been a tendency to focus management on the industrial sector and leave the small-scale sector unregulated. There is growing recognition in the region, and globally, that lack of management of small-scale fisheries has contributed to the pauperization of these fishers (Cunningham and Greboval, 2001). In response to this there are global (e.g., COFI, 2003) and regional initiatives to assist in the development of appropriate management strategies for small-scale fisheries. In Asia, these focus on the decentralization of fisheries management, co-management approaches and the implementation of group-user rights. One current example is the regional initiative of ASEAN-SEAFDEC (Association of Southeast Asian Nations – Southeast Asian Fisheries Development Center) to develop guidelines for “Group-user rights in co-management of small-scale fisheries” and implement these in member countries (Ebberts, 2005 unpublished⁶).

These regional initiatives need to specifically include strategies to reduce fishing capacity and assist countries in examining the balance between the two sectors. Countries

need a clear understanding of the overlap in terms of resource use between the two sectors and also the relative economic and social benefits from each sector. This information is lacking in most countries or has not been brought together in a way that will assist management. In cases where the resources are shared between small-scale and industrial sectors, the level of effort appropriate in each sector needs to be decided before rights can be allocated within sectors. Allocation of rights within one sector that ignore the level of effort in the other sector will not effectively manage fishing capacity or prevent overfishing. In this situation, overfishing is likely to continue and the resources and economic returns will not improve. This will result in fishers becoming more skeptical about management and less engaged as they do not see the benefits.

Once the appropriate level of fishing effort for the sectors has been determined, the instruments for rights allocation within sectors are likely to differ. In the industrial sector it may require a strengthening of the current licensing systems, or output controls, such as individually transferable quotas (ITQs). These will require improved monitoring, enforcement and compliance, and countries need to assess whether this is feasible. In the small-scale sector the moves towards group-user rights (Ebberts, 2005 unpublished⁶) are probably the most appropriate.

Any implementation of property rights and capacity reduction must also recognise that some people will be excluded. Small-scale fisheries play an important role in developing countries as a safety net for the poor, particularly when there are failures in other sectors, such as agriculture, and they also provide an important seasonal livelihood for some communities (Bene, 2003). Some small-scale fishers are also nomadic, following migratory species or changing target species and area depending on the season (Charles, 2001). Mechanisms for retaining this flexibility, or strategies to compensate for its loss, need to be incorporated into the capacity reduction strategies.

5. Conclusions

Coastal fisheries in Asia play a significant role in the region's fish trade and contribute to food security and livelihoods, particularly for poorer sections of the community. However, coastal fisheries face significant challenges due to the lack of effective management of fishing capacity, which has resulted in severely depleted resources and biological and economic overfishing. This is resulting in economic and food losses for these developing countries. Therefore, there is an urgent need to develop strategies to effectively reduce fishing capacity to ensure future fish production and improve the livelihoods of coastal communities.

Fisheries management initiatives should focus on the development of appropriate capacity reduction measures such as access and property regimes. These strategies need to explicitly examine the overlap between small-scale and industrial fisheries and the relative benefits of each. Evidence

demonstrating the depleted state of fisheries resources in the region is compelling; what is needed now is management action to address the issue.

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