



**THE FOURTH REGIONAL WORKSHOP ON SHARED STOCKS:
RESEARCH AND MANAGEMENT
IN THE SOUTH CHINA SEA**

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**MANAGEMENT OF SHARED STOCKS IN SOUTH CHINA SEA:
ARE WE READY?**

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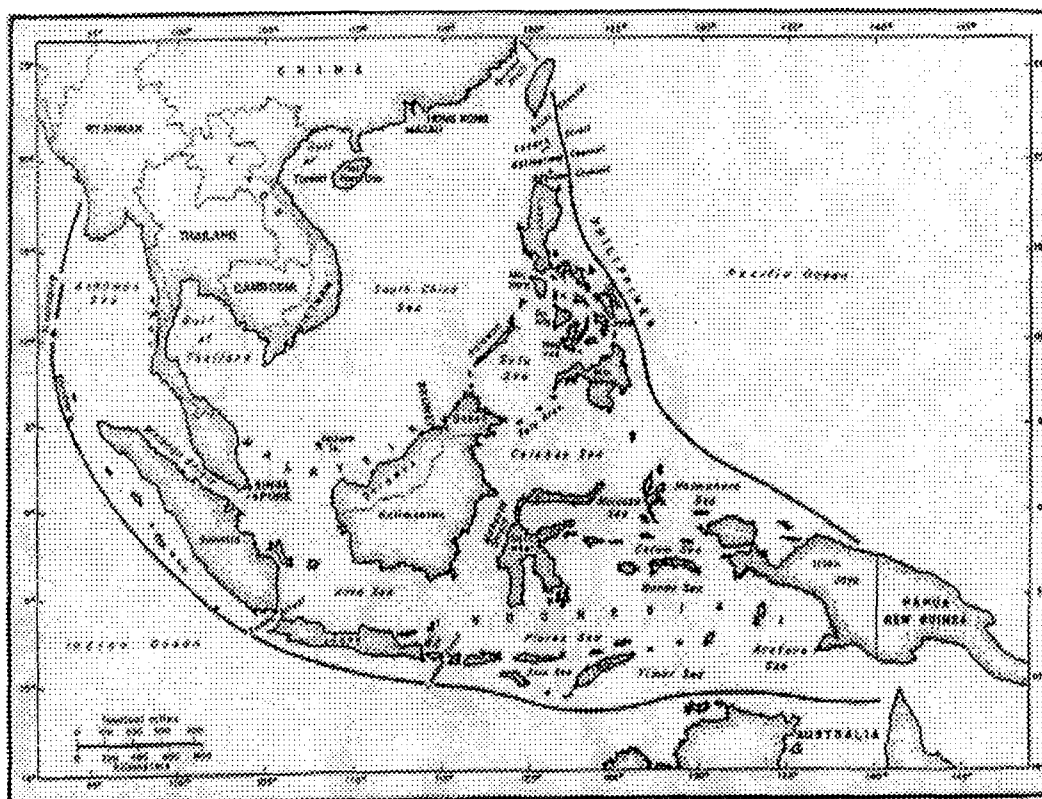
MANAGEMENT OF SHARED STOCKS IN SOUTH CHINA SEA: ARE WE READY?

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1. INTRODUCTION

South China Sea is bordered by several countries in Southeast and East Asia, including Brunei Darussalam, Cambodia, China, Indonesia, Malaysia, Philippines, Singapore, Thailand, Viet Nam and Taiwan Province of China (see Figure 1). About a half of the South China Sea are shallow continental shelf, most of which located in the south and south-west part and it becomes deeper as we go towards north and north-east area which ends up in the Philippines archipelago. The freshwater influence originates from rivers in the Asian continent and among the big rivers include Chu-Lung Chiang, Pearl and Lien Chiang in China, Red and Mekong in Viet Nam and Chao Praya in Thailand.

Figure 1. The South China Sea region (adopted from Menasveta, 1997)



The South China Sea harbours typical tropical living resources comprising of multitude of species and many of them have short life span. Around hundred species

belonging to more than 40 families are common in the catch of one hour of trawling, except in the overexploited area such number drops drastically. The dynamics of the South China Sea is very much governed by the monsoon regime. Strong wind during North-east monsoon (November to January and sometime extend to February and March) causes relatively uniform surface water layers in the Gulf of Thailand and east coast of Malaysian peninsula due to mixing. During this period the thermocline is indistinct, contrary to the situation in the pre and post North-east monsoon. Typical tropical environment, temperature variation in the water is relatively small, being 28.40 to 29.51 C (average 28.97 C) in the surface water during pre-NE monsoon and 27.78 to 30.76 C (average 29.91 C) during the post-NE monsoon (SEAFDEC, 1999).

Large part of the catches in the South China Sea comes from fishing in the coastal waters by the surrounding countries. Some distant-water fishing nations that have been fishing in the South China Sea for years, such as Japan and Korea, have reduced fishing activities in the region. Taiwan Province of China and Thailand, are the two coastal states bordering the South China Sea that some of their fleet fished outside their EEZ and expanded to the EEZ of neighbouring countries through special arrangement.

2. FISHERIES AND ITS DEVELOPMENT

The fisheries in the South China Sea performed rapid development in the 1970s when global economy started to influence the region. Higher price of fish commodities abroad compared to those in the local market resulted in the boom of fisheries export from coastal states. High demand of shrimp in international market had led to the development of shrimp trawling in various coastal states in Southeast Asia. Rapid development of shrimp trawling in the region has led coastal states preoccupied with development of management measures to response to the urgent needs. The fact that shrimp resources inhabit shallow water, trawl fishing targeting shrimp has resulted in conflicts with small-scale fishermen using other gears such as gillnets, trammel nets and other stationary gears. Various measures were introduced, to reduce such a conflict through enactment of zoning regulation, or regulation on zoning combined with time (day and night) of fishing. Rapid development of shrimp trawling has resulted in the overexploitation of coastal resources. The decline of catch in many coastal states appeared as early as late 1970s or 1980s. Unsuccessful in stopping conflict between small-scale fishermen and trawl fishermen, the Government of Indonesia introduced a drastic measure by banning trawl fishing for area in the western part of the country in 1980.

Due to the decline of shrimp catch from capture fisheries, shrimp culture started to develop in Southeast Asia in mid 1980s through adoption of culture technique previously developed in Japan and later in Taiwan. As a result, shrimp export from the region has revived and the production of shrimp culture has slowly bypassed the production of capture fisheries. Development of shrimp culture has also impacted indirectly on trawl fishing since the demand of trash fish for fishmeal production as main component of feeds has also increased. The rising demand of trash fish led to price increase which gives an incentive for trawl fishing and as a result fishing pressure also intensified.

Another important development of fisheries in the region is the development of tuna fisheries. Similar to shrimp fisheries, the development of tuna fisheries has also been driven by global market. Despite limitation of tuna resources in their own exclusive economic zone (EEZ), Thailand, through various incentive policy, has managed to become the centre for

tuna processing in the region. The processed tuna are exported to global market, many of them to USA. This has been followed by the Philippines, which relies largely on tuna catch from the Pacific Ocean than the South China Sea. Tuna catches in the South China Sea are dominated by kawa-kawa (*Euthymus* spp.) and bonito (*Auxis* spp.). They belong to shared stocks resources as they migrate across EEZ of various states in the region. The presence of skipjack (*Katsuwonus pelamis*) and yellowfin tuna (*Thunnus albacares*) in this region seems to be common to the most eastern part of the South China Sea close to the Philippines as such species are not reported in the statistics of Cambodia, Viet Nam, Thailand and Malaysia. Seerfish, *Scomberomorus* spp., is another important tuna group common in the region while sailfish (*Istiophorus* spp.) and marlin (*Makaira* spp.), are only common in the north-eastern part of the region.

Other important potential shared stock resources in the South China Sea are those belonging to the small pelagic group such as mackerels (*Rastrelliger* spp.), scads (*Decapterus* spp.), sardines (*Sardinella* spp.), anchovies (*Stolephorus* spp.). The development of these small pelagic fisheries is not so rapid compared to shrimp and tuna fisheries as those are mostly for domestic consumption. The exception is the anchovy fishery which has recently showed fast development in Thailand, a similar case as was driven by the high price of anchovy in the neighbouring countries especially Malaysia, Hong Kong, Singapore. Despite the existence of these shared stocks in the region and the awareness of officials in the coastal states on the need for regional management, there has been no such a regional management initiative in place.

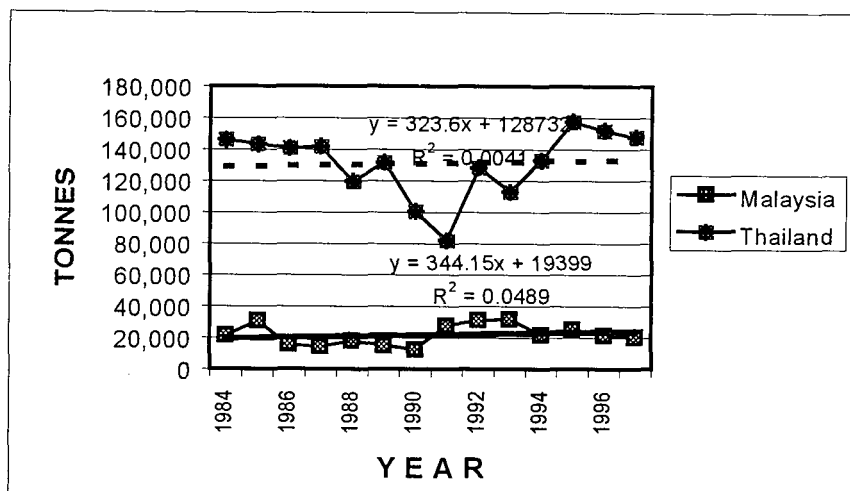
3. TREND OF CATCHES OF SOME SHARED STOCKS

Although information on potential shared stocks and their distribution have been gathered by SEAFDEC through a series of workshop and a review study by APFIC (Asia-Pacific Fisheries Commission, see Devaraj and Martosubroto, 1997), it is still difficult to be able to see trend of catches by stock. This is because the catch statistics by country do not differentiate stock by stock, and catches of species groups for some countries are lumped together. Only catch of some potential shared stocks is available in the FAO statistics (for some countries) which lends some analysis as presented below. The statistics of Malaysia and Thailand have been used to see the trend of catch of those potential shared stock. Catches from other countries were not included either because they were not broken down into detailed species group (in the case of Cambodia and Viet Nam) or they were mixed with catch from area outside the South China Sea (Indonesia and the Philippines).

3.1 Short mackerels (*Rastrelliger* spp.)

Trend of catch of this group in Thailand and Malaysia in the period of 1984 to 1997 shows similar trend. Although catch of Thailand had been higher than that of Malaysia (see Figure 2), both shows similar level of trend. The catch of Thailand had fluctuated between 80,000 to 160,000 tonnes during the period, while the Malaysian catch fluctuated between 15,000 and 25,000 tonnes. The overall catch difference between these two countries could be attributed to the different level of fishing pressures in those countries.

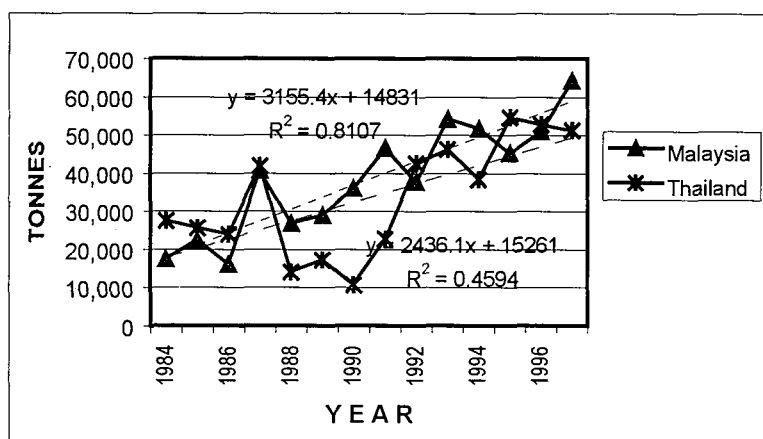
Figure 2. Trend of short mackerels, *Rastrelliger* spp. in the South China Sea off Thailand and Malaysia



3.2 Round scads (*Decapterus* spp.)

In the case of round scads the catch of Malaysia had been a bit higher than that of Thailand, although the fluctuation of catch seems to be not much different (see Figure 3). It appears that the rate of increase of the Malaysian catch is higher than that of the Thai catch during the period 1984 to 1997, although the rate in the last five years (1992-1997) looks similar.

Figure 3. Trend of catch of round scads, *Decapterus* spp. in the South China Sea off Thailand and Malaysia

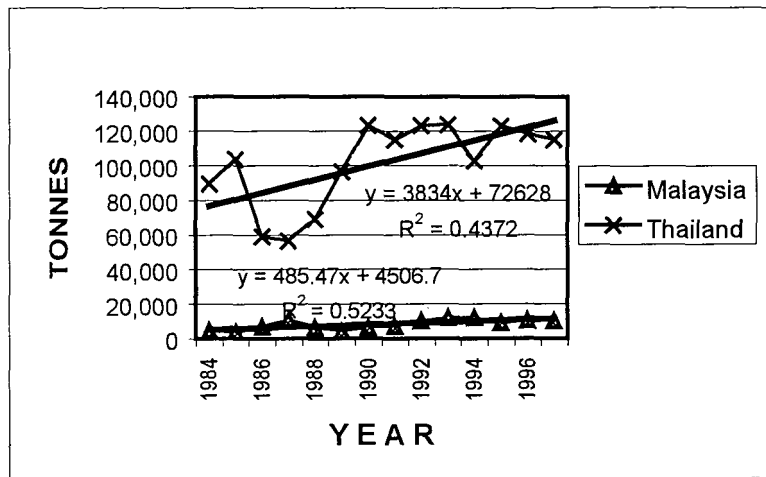


3.3 Anchovy (*Stolephorus* spp.)

In the case of anchovy, not only the amount of catch in Thailand had been much higher than in Malaysia but also the catch showed higher fluctuation (see Figure 4). The catch of Thailand has been relatively constant around 120,000 tonnes from 1990 to 1997 with a special drop in 1994 to around 100,000 tonnes. In Malaysia the catch had fluctuated between

5,000 and 10,000 tonnes during 1984 – 1997. High level of fishing pressure in Thailand may explain this difference.

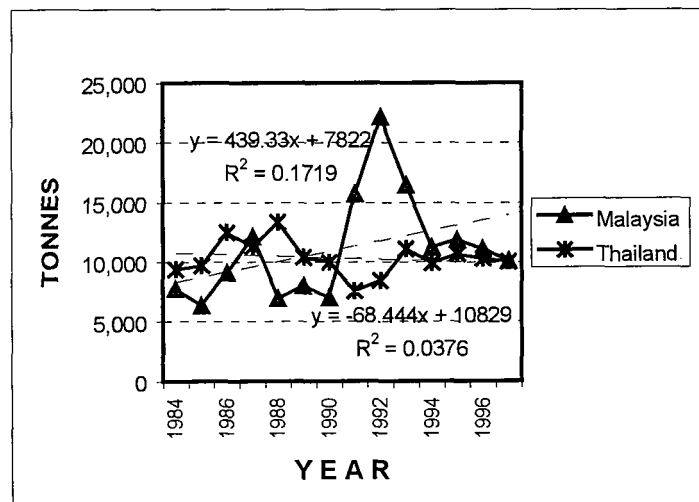
Figure 4. Trend of catch of anchovy, *Stolephorus* spp., in the South China Sea off Thailand and Malaysia



3.4 Seerfish (*Scomberomorus* spp.)

For the seerfish, the catch of Malaysia and Thailand around 10,000 tonnes each in the last 5 years (see Figure 5), although there was a sharp jump in 1992 for Malaysia which reached 20,000 tonnes. The Malaysian catch showed an overall increasing trend, while the Thai catch somewhat decreasing trend.

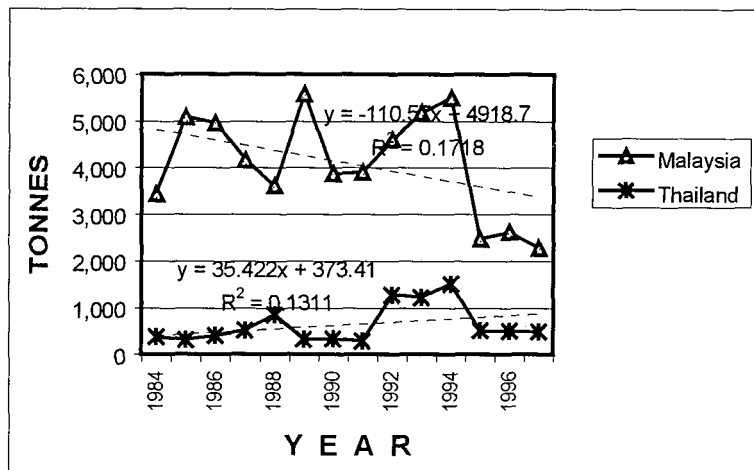
Figure 5. Trend of catch of seerfish, *Scomberomorus* spp., in the South China Sea off Thailand and Malaysia



3.5 Pomfret (*Stromateus* spp.)

Pomfret is one of the high priced fish in Southeast Asia. It is interesting to see that trend of catches of Malaysia and Thailand is on the opposite direction. The catch of Malaysia shows a declining trend in the last four years (see Figure 6), the catch was around 5,000 tonnes in 1985 and dropped as just over 2,000 tonnes in 1997. On the other hand, the catch of Thailand had increased from less than 500 tonnes to more than 1,000 tonnes in 1994 but then declined again to around 500 tonnes. The lower catch in Thailand compared to Malaysia is interesting phenomena as in most catches the figure is in reverse. It could be that the high catch of Malaysia has been contributed by the high catch of Sabah and Serawak.

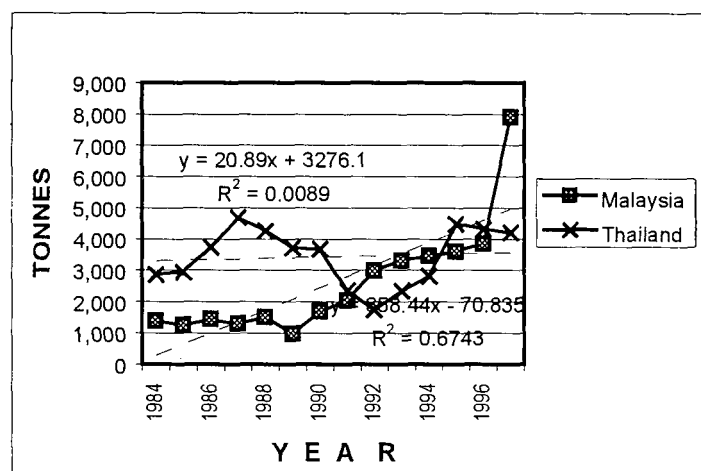
Figure 6. Trend of catch of pomfret, *Stromateus* spp., in the South China Sea off Thailand and Malaysia



3.6 Hairtail (*Trichiurus* spp.)

It is interesting to see that the catches of hairtail in Malaysia showed a steady increase from 1984 to 1997 and in particular in the last 7 years (see Figure 7) with the top catch of 8,000 tonnes in 1997. While for Thailand the catches had shown a clear fluctuation in the range of 2,000 to 4,500 tonnes. It is not clear whether the rapid increase of catch in Malaysia beginning in 1990 was attributed to the development of offshore fishing promoted in this country.

Figure 7. Trend of catch of hairtails, *Trichiurus* spp., in the South China Sea off Thailand and Malaysia



4. BRIEF REVIEW OF FISHERIES MANAGEMENT IN THE REGION

4.1 National context

Fisheries in many coastal states in the South China Sea that started in 1970s underwent rapid development. Cambodia and Viet Nam are those who came later due to social conflict and wars that occurred in those countries before 1970s. The rapid development of fishery in many coastal states has led to overexploitation of resources in the coastal areas, especially for those high valued resources such shrimp. Another impact is emerging conflict in the coastal area between small-scale fishermen using traditional gears and trawl fishermen. Various management measures have been enacted by many coastal states to cope with problems arisen in the fisheries (see Table 1). Some countries were able to reduce this conflict but by enlarge the conflict stopped only temporarily as it very often emerged again in different time and in certain case it could lead to the complete ban of the gear as it happened in Indonesia for the trawl fishery.

Table 1. Type of management measures enacted in the South China Sea

Type of management measure	BR	CA	CN	INS	MA	PHI	TH	VIE
• Mesh size limit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• Spatial & temporal closure	No	No	Yes	No	No	No	Yes	No
• Zoning (area allocation)	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
• Complete gear ban	No	No	Yes	Yes	No	Yes	Yes	No
• Use of BED (by-catch excluder device)	No	No	No	Yes	No	Yes	No	No
• Limited entry	Yes	No	No	Yes*)	Yes	Yes	No	No

Note : BR = Brunei Darusslam; CA = Cambodia; CN = PR China; INS = Indonesia; MA = Malaysia; PHI = Philippines; TH = Thailand; VIE = Viet Nam; *) only for Arafura Sea

Management measures adopted, in many cases, are not specific for a certain area or a certain management unit but rather for the whole EEZ of a country. The complex nature of tropical resources characterized by unclear discrete stocks seems to have hindered application of the concept of management by stocks. This seems to have resulted in the absence of management unit and thus also management plan for certain fisheries or resources.

It seems that open access principle is still in the mind of many fisheries officials of countries in the region as reflected by the absence of limited entry in many fisheries. Added to this is the concept of integrated approach that seems to have been popular in the region, unfortunately only in theory and lack in practice. A good example is powerless of the Department of Fisheries in making decision for matters closely link to fisheries, e.g. construction of fishing boats and processing plants. Very often DOF does not have MCS units and therefore it relies on the work of other agencies to support the management of fisheries.

Overexploitation of fishery resources is not limited to South China Sea but it is common globally. This has led to the initiative by world community in curbing overexploitation problems in fisheries and has resulted in the formulation of the Code of Conduct for Responsible Fisheries (CCRF) which was finally adopted in 1995. CCRF provides general principle and guidelines of responsible fisheries. Technical Guidelines in various thematic aspects are also available as companion to CCRF. FAO was requested by member countries to monitor the implementation of CCRF.

Review of the fisheries management framework in coastal states bordering the South China Sea by APFIC disclosed that despite the availability of management institutions and legal framework supporting the management in most of the countries, overexploitation and habitat degradation are still rampant in this region (Menasveta, 1997). Therefore, opportunities to strengthen existing fisheries management agencies in the region to assure sustainable and responsible fisheries are still open. FAO through funding support from Norway has assisted some countries in the region in improving provision of scientific advice to fisheries management and in strengthening MCS, the two important elements of fisheries management. The principle of developing management plan for a fisheries has been addressed and discussed thoroughly during the workshops in Denpasar (Indonesia), Penang (Malaysia) and Cha-am (Thailand) (FISHCODE, 1999). The concept of developing a management plan for a fishery is important, however any management plan would not be fruitful if the concept of limited entry is not advocated. Implementation of management is a painful undertaking as it involves trade-off of interests among stakeholders concerned. It is a prerequisite that representatives of all stakeholders concerned should participate in the development of management plan. No management plan is perfect as it evolves through time during which regular review is normally conducted.

4.2 Regional context

There are regional organizations in the area that deals with fisheries. FAO/APFIC is the oldest organization in the region dealing with fisheries as it was established in 1948 as IPFC (Indo-Pacific Fisheries Council). The role of APFIC is to assist member countries in the provision of advice in fisheries development and management. SEAFDEC is another organization that assists member countries in the region and SEAFDEC has been active in organizing training, research and development for capture fisheries as well as aquaculture. The presence of SEAFDEC in the region has allowed various regional surveys in the South China Sea in the effort to develop base line information on oceanography and other environmental parameters, an important component towards understanding the dynamics of shared resources in the region.

Another important organization that specifically deals with fisheries research and development is the International Center for Living Aquatic Resources Management (ICLARM) who became a member of CGIAR in 1995. ASEAN (Association of Southeast Asian Nations) is a political organization in the Southeast Asian region which in the past had its subsidiary unit dealing with fisheries (ASEAN Coordinating Group of Fisheries), however its abolishment in 1989 has led to the *ad hoc* approach by ASEAN as it be formed when special issues arises. However, the private sector in fisheries has established ASEAN Fisheries Federation where cooperation among businessmen in fisheries sector meet, although their agenda are far from discussing management issues. None of the existing organizations in the region has a mandate for the management of fisheries. Most countries

bordering the South China Sea are members of two or three regional organizations (see Table 2 and Fig. 8).

Table 2. Regional organizations and their individual members bordering the South China Sea

COUNTRIES	APFIC	ASEAN	SEAFDEC
Brunei Darussalam	No	Yes	Yes
Cambodia	Yes	Yes	No
China, P.R.	Yes	No	No
Indonesia	Yes	Yes	No
Malaysia	Yes	Yes	Yes
Philippines	Yes	Yes	Yes
Singapore	No	Yes	Yes
Thailand	Yes	Yes	Yes
Viet Nam	Yes	Yes	Yes
Japan*)	Yes	No	Yes

Note : Japan is the only country not bordered by the South China Sea

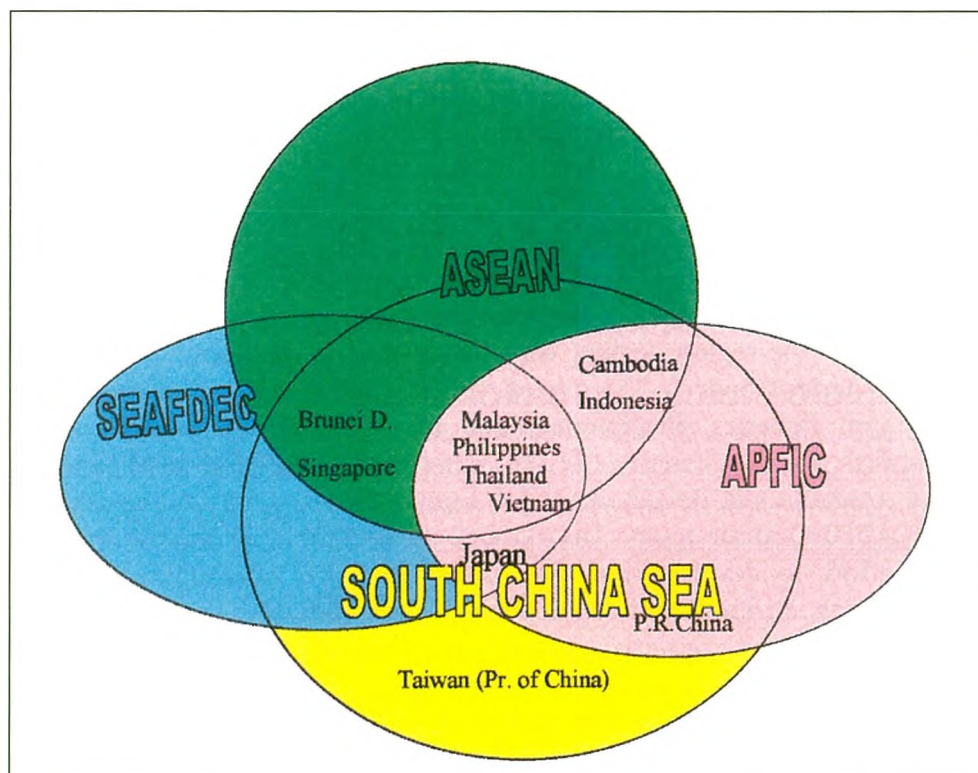


Figure 8. Regional organizations and their members in the South China Sea.

5. MANAGEMENT OF SHARED STOCKS

The development of fisheries management in countries in the region should now be enhanced by the availability of CCRF including its various technical guidelines. Fisheries management deals with allocation of resources and therefore participation of stakeholders in the process of developing management plan is a forefront requirement. It is the responsibility of fisheries management agency to promote this CCRF among stakeholders, in particular for those parts dealing with fisheries management. Therefore, management agency in individual countries should be well in place, should have a strong support of MCS unit, research establishment and more over it should also be supported by stakeholders. Only through an established and strong national management unit an initiative for management of shared stocks would have a good foundation. The incomplete boundary of EEZ in the South China Sea should not be an impediment in enhancing co-operation but on the contrary it should be an incentive for coastal states in addressing the need for management of stocks shared by them. ASEAN Fisheries Working Group has identified various places in the border area of two or more countries as joint development area, but it is not clear whether CCRF is already part of it. It is opportune for this ASEAN working group to take into account the principle of responsible fisheries in developing joint co-operation scheme, thus, shared stock management should be a part of it.

With the increase of globalisation, some developed countries have used trade as a tool to promote sustainable and responsible fisheries (Deere, 1999). Eco-labelling is one of the emerging practices in the global trade. USA has used TED/BED issue as a means to reject shrimp import from any country which do not use TED/BED in the shrimp fisheries. Dolphin safe is another label that required for tuna imported to USA. Through time this kind of international pressure will keep emerging. It becomes clear therefore that strengthening national management institution by coastal states bordering the South China Sea should form an important agenda for the Fisheries Department in the individual countries. Regional and international organizations will then play an important role in enhancing management of shared stocks, hand in hand with the management of national stocks by individual coastal states to enable them ready with the management of shared resources.

REFERENCES

Deere, C. (1999) : Eco-labelling and Sustainable Fisheries. IUCN and FAO, 32p.

Devaraj, M., and P. Martosubroto (eds., 1997) : Small Pelagic Resources and their Fisheries in the Asia-Pacific region. Proceedings of the APFIC Working Party on Marine Fisheries, First Session, 13-16 May 1997, Bangkok, Thailand. RAP Publication 1997/31, 445p.

FAO (1999) : FISHSTAT PLUS software. FAO website, <http://www.fao.org/fi>

FISHCODE (1999a) : Report of the Workshop on the fishery and management of Bali sardinella (*Sardinella lemuru*) in Bali Strait. FAO/Norway Government Cooperative Programme. GCP/INT/648?NOR. Field Report, 30p.

FISHCODE (1999b) : Report of a workshop on the fishery and management of short mackerel (*Rastrelliger spp.*) on the west coast of peninsular Malaysia. FAO/Norway Government Cooperative Programme. GCP/INT/648/NOR. Field Report, 25p.

Menasveta, D. (1997) : Fisheries Management Frameworks of the Countries bordering the South China Sea. FAO Regional Office for Asia and the Pacific, Bangkok. RAP Publication 1997/33, 151 p.

SEAFDEC (1999a) : Highlights of the SEAFDEC Interdepartment Collaborative Research Program on Fishery Resources in the South China Sea, Area I : Gulf of Thailand and East Coast of Peninsular Malaysia. SEAFDEC Special Paper No. SEC/SP/39. Southeast Asian Fisheries Development Center, Bangkok : 43 p.

SEAFDEC (1999b) : Highlights of the SEAFDEC Interdepartment Collaborative Research Program on Fishery Resources in the South China Sea, Area II : Waters of Sabah, Sarawak (Malaysia) and Brunei Darussalam. SEAFDEC Special Paper No. SEC/SP/40, Southeast Asian Fisheries Development Center, Bangkok : 54p.