



**THE THIRD REGIONAL WORKSHOP ON SHARED STOCKS
IN THE SOUTH CHINA SEA AREA**

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**TOWARD MANAGEMENT OF
SHARED STOCKS IN THE SOUTH
CHINA SEA REGION**

By:

PURWITO MARTOSUBROTO

Marine Resources Service
Fisheries Resources Division
Fisheries Department
Food and Agriculture Organization
of the United Nation*

*The views expressed in this paper are solely those of the author and do not necessarily reflect those of the food and Agriculture Organization of the United Nation

ABSTRACT

Fisheries in the South China Sea region have shown rapid development in the last two decades. Landings of the eight countries of Southeast Asia bordering the South China Sea have grown from 4.1 million tonnes in 1975 to 7.2 million tonnes in 1995, or an increase of 75% in the last two decades. Increased fishing pressure in coastal areas had brought about stagnant catches of shrimp in some individual countries, while allocations of tuna fishing effort by Indonesia and neighbouring countries indicated that high fishing pressure for tuna occurred in some countries. This trend of development and the momentum arises from the current progress in the negotiation and establishment of an organization that deals with tuna resources in the Indian Ocean and the western and central Pacific, should eventually lead to the initiative of management of shared stock in the region. General requirements and steps in the management of shared stocks are described as an attempt to promote understanding among potential participating countries in this venture.

1. INTRODUCTION

The term “shared stocks” has been commonly used to refer to those transboundary stocks exploited by two or more countries. However, in large countries, e.g. China and Indonesia, two different types of fisheries may also exploit a shared stock in national jurisdiction, e.g. trammel net fishermen may exploit a shared stock in national jurisdiction, e.g. trammel net fishermen may exploit the shrimp stocks exploited by the trawl fishermen. This paper shall deal only with the former, i.e., the stocks that are being shared by two or more countries, with a brief account of the potential activities for the management of such stocks.

Despite the frequent use of the term “fish stock”, precise definition such as those to denote “species” or “population” is not available. A “unit stock” is a technical term to denote an empirical grouping of fish that is sufficiently large that, when analysing the data concerning it, or taking decisions about its exploitation and management, events on “adjacent stock” can be ignored, or at least treated in a different way to events within the stock (Gulland, 1980). It should be borne in mind that what is considered a “stock” is not an absolute, but can be adapted, depending on the purpose, for convenience of analysis or policy making.

The concept of shared stocks relates to the reality that fishing deals with migratory resources and the disregard of such resources for man-made boundaries. Demersal species which are less mobile than the pelagic species, during their lives also perform movements, namely during larval stage and spawning phase. If such movement only takes place within the jurisdiction of a coastal state then such resources form a shared stock within a jurisdictional country. A good example is coastal shrimp fishery where stocks are exploited during the larval stage and the juvenile/adult stage. The management of the fishery should consider the two fisheries exploiting a single shared stock.

In line with the movement of resources and in relation to the exclusive economic zone, Caddy (1982) has made a systematic description on shared stocks of which four are considered important as in the following:

- 1 Stocks that lie almost entirely within a single national jurisdiction;
- 2 Non-migratory resources lying across the boundary between adjacent zones, and which are continuously available in each zone;
- 3 Migratory species moving across boundary areas which are only available in each zone on a seasonal basis; and
- 4 Highseas stocks that are only occasionally or partially available inside national zones.

In the context of the South China Sea region, some of the resources fall within the first three groups above and a more limited number belong to the fourth group, e.g. some of the tuna species.

2. HOW MUCH DO WE KNOW ABOUT SHARED STOCK?

The FAO/SEAFDEC Workshop on Shared Stocks in Southeast Asia (Bangkok, 18-22 February 1995) identified potential shared stocks in the South China Sea to which by this time additional information has become available and could be added to the list of shared stock identified in 1985. Reports of two past SEAFDEC Workshops also updated the status of potential shared stocks in the region.

In a tropical environment like the South China Sea where multispecies resources are found, the shared stock concept also applies for species groups rather than a single species. This is particularly relevant for the demersal species that in many cases perform transboundary movement across neighbouring coastal states, e.g. shrimp in the Malacca Straits (between Malaysia and Thailand) and the Gulf of Thailand (between Malaysia and Thailand) and (between Thailand and Cambodia and Cambodia and Vietnam). Such categorisation also applies to a certain extent to some pelagic species where detailed information is still meagre.

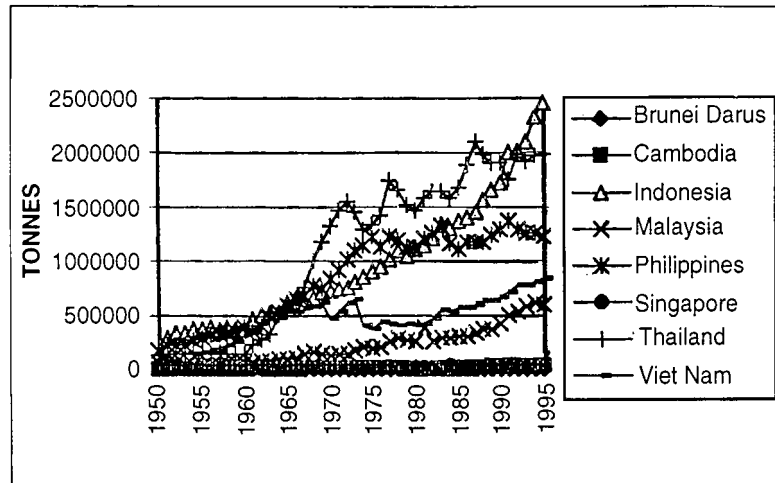
Despite less variation of oceanographic conditions in the tropics than in temperate waters, much of the aquatic life especially during their larval stages are sensitive to environmental conditions. Impact of monsoonal changes on larval production and recruitment of many fish species is still not well understood, and remains a challenge for scientists in the region. The relatively short lives of many tropical fish and continuous spawning demonstrated by some pelagic species may complicate boundaries of stocks. Some of these form a research agenda for future research work in the region.

3. TRENDS OF CATCHES IN THE REGION

The development of fisheries in the region has resulted in total marine landing of the eight countries bordering the South China Sea (Brunei Darussalam, Cambodia, Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam) amounting to 7.2 million tonnes in 1995 (excluding seaweeds), of which 99% contributed by the six countries as the other two, Brunei and Singapore, are small coastal States. The annual aggregate rate of increase in the last three decades was about 5%, an indication of a relatively fast growth (figure 1). Of the total amount of marine landing, 6% were shrimp, 12.8% demersal, 37.4% pelagic, 13% tuna and 27.9% miscellaneous fish. Current catches of cephalopods and other invertebrates were still less than 5% of the total catch. Please note that in the absence of breakdown of catches in the national fishery statistics, the reported catch is treated as miscellaneous

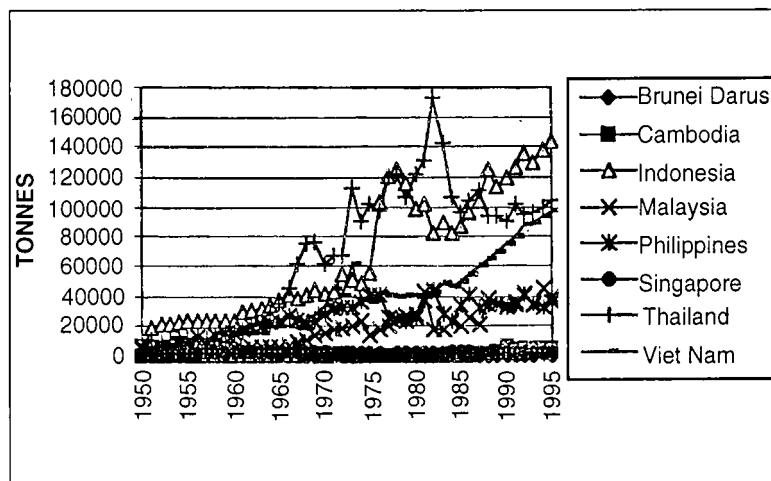
fish in the FAO Statistics, such as in the case of Vietnam and Cambodia. This contributed to the high percentage of miscellaneous fishes as shown in the analysis above.

Figure 1. Trends of landings of major states in the South China Sea region



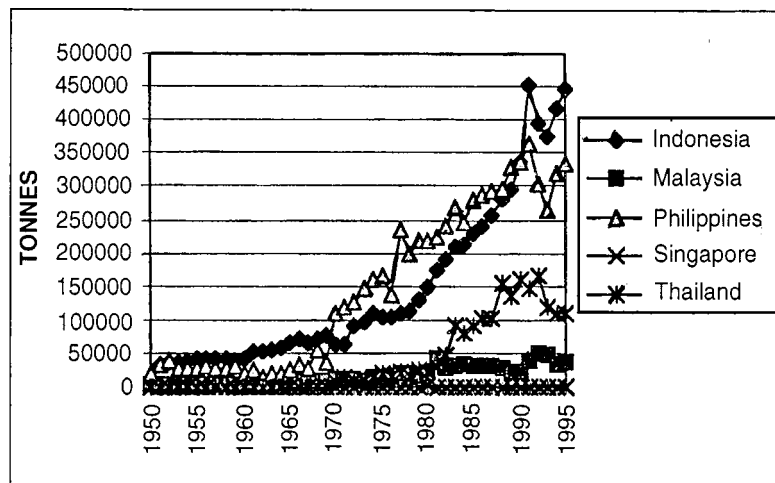
Individual trends of shrimp landings in Malaysia, Philippines and Thailand showed flat curves since the mid-1980's, indicating that the shrimp stocks in their waters have probably been overexploited since that time (Figure 2). It is unlikely that further increase can be expected in shrimp capture fisheries in the future. Shrimp culture production in those countries, however, has compensated for the stagnant production of the capture fisheries. To prevent further decline of shrimp production from the wild stocks, the management of shrimp fisheries is needed not only nationally but also to a certain extent regionally as some of the stocks are transboundary between countries, such as those in the border between Thailand and Cambodia in the northern Gulf of Thailand and between Thailand and Malaysia in the northern part of the Malacca Strait (FAO, 1985).

Figure 2. Trends of shrimp landings of major states in the South China Sea region



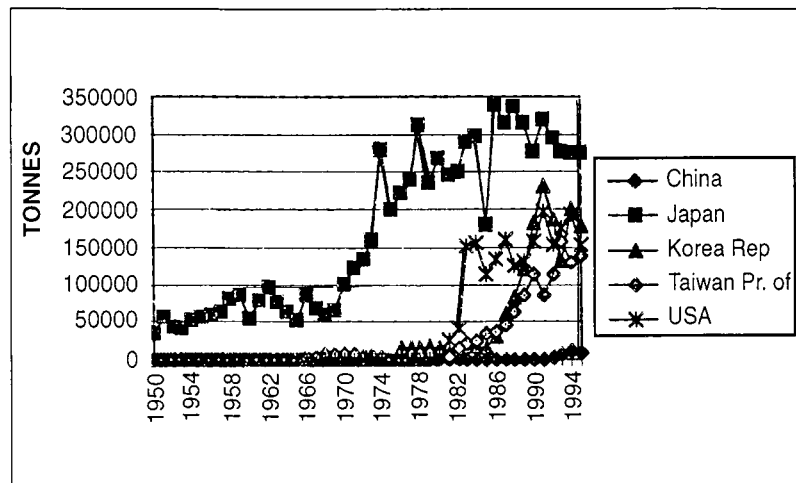
Development of tuna fishing in the region is worth nothing. Indonesia and the Philippines are the two countries with a high landing of tuna, their catch statistics indicated 448,000 tonnes and 334,000 tonnes respectively in 1995 with some fluctuation in early 1990s (Figure 3). Some of the Philippino purse seiners obtained fishing access in the adjacent Indonesian EEZ through the licensing scheme of the Indonesian Government, while some other licensed foreign purse seiners have been fishing in the Indonesian part of the South China Sea as well (Gillet, 1996). This development obviously demands more information on updated resources availability on the Indonesian side and it should encourage collaborative efforts between the two countries in obtaining catch and effort data on tuna fishing as a first step in developing the data base needed in the management of tuna fisheries.

Figure 3. Trends of tuna landings of major states in the South China Sea region



Tuna catch of the distant-water fishing nations in the high seas of the Western Central Pacific (obviously outside the South China Sea) has increased in the last decade and the catch amounted to 754,000 tonnes in 1995 (Figure 4). Despite the decline of the Japanese catch in the nineties, their catch was still higher on the average than those of other distant-water fishing states (around 250,000 to 300,000 tonnes). China joined the others in late 1980's with the small longline fleets which landed around 5,000 - 10,000 tonnes in 1994-1995. Total tuna catch the countries bordering the South China Sea was still higher (931,000 tonnes) than that of the distant water fishing states as the catch included the coastal tunas.

Figure 4: Trends of tuna landings of distant-water fishing states in the Western Central Pacific (fishing area-71)



4. WHY MANAGEMENT OF SHARED STOCKS?

The contribution of the region to the global fisheries production is on significant importance as described in the preceding section. Despite the increasing sign of overexploitation of resources in the coastal waters, it is still common to find increase of production as being one of the objectives of fisheries development plan in countries in the region. In addition, the absence of a fisheries management plan in many countries also reflects the low priority that has been given to fisheries management in the region. With this background, there is not doubt that fisheries management institutions in many countries are still in a developing stage.

Overlapping claim of EEZs among countries in the region has become an important topic in the current news media. The cause of overlapping claim was, however, more related to the suspected potential of oil reserves in some of the islands than to fisheries. An encouraging development in the region in dealing with this problem is the new practice to make use of the conflicting area to become a production sharing area where the conflicting countries could obtain mutual interim benefit (Matics, 1997).

It appears that in the fisheries sector, the initiative towards management of shared resources has been pioneered by the recent development in the establishment of the Indian Ocean Tuna Commission (IOTC), to which the management of tuna fisheries will be the main part of its mandate. Members of IOTC are not limited only to the coastal states surrounding the Indian Ocean but also includes the distant-water fishing states. In the Pacific side, a similar type of development has also been taking place where coastal nations and the distant-water fishing states hve actively participated in several diplomatic meetings which hopefully will lead to the establishment of an organization to which management of tuna fisheries in the Western and Central Pacific will rest on. Small island developing states in this region have been very active in the negotiation under its regional organization FFA (Forum Fisheries Agency), while from countries bordering the South China Sea, Indonesia and the Philippines have participated. The participation of China in this meeting is a mere reflection of China

being a member of the distant-water states fishing in the Pacific Ocean. The next diplomatic meeting has been scheduled for June 1998 (Doulmann, pers.comm.).

Concern of the world community on the current exploitation of fishery resources has grown and this is reflected by the outcome of global initiatives, e.g. the 1992 Rio Declaration and the Agenda 21 of UNCED, 1993 Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, the 1995 UN Agreement for the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, and the 1995 FAO Code of Conduct For Responsible Fisheries. At the request of its member states, FAO is presently engaged in developing a series of guidelines of the Code of Conduct for Responsible Fisheries. FAO is also charged with monitoring the implementation of the Code. Some developed countries have agreed to fund the global activities in promoting the Code of Conduct and its implementation through FAO. Globalization of trade has also opened doors for countries to impose trade barriers to block markets for certain fishery products which are caught from irresponsible fisheries. It is likely that such types of global pressures will increase in the future and will, no doubt, become a burden for countries where irresponsible fisheries still flourish.

The Code of Conduct for Responsible Fisheries with its respective guidelines serves as important direction for the countries towards building sustainable fisheries. The current momentum in the establishment of regional organization dealing with shared tuna resources should serve as an incentive for the member countries in strengthening the management institutions in each individual country. Hopefully this process will lead to initiatives in the direction of promoting the management of any stocks shared among countries in the region. How fast the process will progress is very much dependent on the perception and response of the countries concerned, the regional bodies such as SEAFDEC and APFIC could only act as a catalyst. Once the countries sharing the resources are ready to negotiate, the countries concerned could make use of the regional organization in providing technical information relating to the concerned resources. The information below provides a brief note on general requirements and the steps normally taken, but some variation may also exist depending on the status of resources, level of exploitation, socio-economics of the fisheries and the management objectives of the individual countries.

5. REQUIREMENTS FOR THE MANAGEMENT OF SHARED STOCK

In general, the requirements and the process of management of fisheries in the individual EEZs apply to the management of shared stocks. The difference is in the number of parties involved being more than one, which undoubtedly requires cooperative agreement. If the countries exploiting the stocks have a different level of economic development, the management arrangement would be different from those applied to the situation where the parties are of equal level. Nevertheless the process of management of shared stock should, in principle, be similar. Mahon (1987) presented four major sequential activities in the management of shared stocks as follow: (a) definition of stocks; (b) stock assessment; (c) allocation and co-operative regulation, and (d) surveillance and enforcement. These activities are dealt with in the following sections.

The definition of stocks

All parties in the management of shared stocks should agree on the definition of stocks which will be used as the basic unit for management. An important aspect of stock that should be taken into account, where its delimitation should be agreed by the parties concerned, is the boundary of stock. The boundary may be revised based on a better understanding of the dynamics of the stock concerned. In a simple situation, stock may be confined to a certain habitat although such a situation may not be so obvious in the tropics, except for certain habitats such as coral reefs, mangroves, etc.

Approaches in distinguishing stocks may be taken through inferences or direct observation. Three types of inferences and direct observation were put forward by Mahon (1987). The first inference is through genetic discrimination. Morphometric (measurements of body parts, e.g., length or width of the body, fins, etc.) and meristic analysis (the counts of spines, scales, fin rays, gill rakers, etc.) are commonly employed. More recently, biochemical techniques are becoming frequently used (electrophoresis).

The second approach is through inference from population dynamics parameters. Similar pattern of variation of certain population parameter of different stocks such as variation of abundance of the different groups may indicate that the groups are of the same stock. Another inference is through analysis of growth and migratory patterns. If the individuals of a species migrate through a number of fisheries, the timing of their migration, coupled with information on growth, may indicate which fisheries share a common stock. This method, however, is likely to end in ambiguous interpretation.

The third approach is the direct observation which has been commonly executed through tagging and recapture of individuals. While another is to follow patches of eggs and larvae as they disperse. The direct methods are subject to different interpretation and therefore application of various methods are desirable to obtain convincing results.

Stock Assessment

Assessment of shared stock bears the same characteristic as assessment of stock under single national jurisdiction. As aquatic resources live in a fluid environment their assessment faces many uncertainties, therefore, varied stock assessment approaches need to be employed. In the case of shared stock, the degree of complexity of the stock assessment methods also depends on the management approach agreed by the participating countries.

In principle there are two main approaches to managing shared stocks (Mahon, 1987). First, allocation of catch or effort and second, co-ordinated conservation oriented regulation. The allocation of catch is derived from the estimate of total allowable catch (TAC), while allocation of effort from total allowable effort (TAE). Two methods are commonly employed to derive the basis for allocation, one through yield per recruit analysis and the other through surplus production estimation. Detailed descriptions of the methods is not presented here as they are generally available including that of Ricker (1975) and Gulland (1969).

In practice, allocation of effort is easier to monitor and control than allocation of catch. Nonetheless, both still require regular monitoring activities. Present practice by some countries in the region in providing licenses to foreign boats is basically based on allocation of effort, although such allocation may not have been supported by a scientifically based calculation of TAE. As fishing gear used by

participating countries is generally not the same, calibration of effort is always required. Assessment of the stock may run into difficulty when the number of nominal effort keeps constant but effective effort is increasing due to technological innovation, then the impact of fishing will be difficult to see. In such cases, regular resource surveys are needed to enable one to get an independent estimate of the stock.

Co-ordinated regulation

Along with the allocation of catch or effort that participating countries may have agreed on the management of shared stocks, they may also agree to introduce compatible regulations to maintain the sustainability of the catch. Closed area or closed season may be employed to protect the spawning stocks and mesh size limitation for reducing catch of the undersized fish.

Negotiation among countries for fishing on shared stocks requires knowledge of the stocks on both sides, thus exchange of information and collaborative research need to be developed accordingly. In the context of South China Sea, as no regional mechanism for management of shared stocks is available, SEAFDEC could play an important role in facilitating such co-operative research to support the management of shared stocks in this region.

Surveillance and enforcement

Fisheries management is not an easy task and it will not bear fruit unless the rules and regulation associated with it are followed by the participants. Surveillance and enforcement are costly, yet important. Such an effort should be under the joint responsibility of the parties concerned to which joint enforcement could be finally established by the participating countries.

6. CONCLUSION

Development of fisheries in the last four decades has brought a spectacular increase in marine fishery production in the region. However, occurrences of overexploitation of resources, especially the coastal ones, has also increased. Fisheries development in the region has also resulted in the expansion of fishing by some countries in their neighbouring EEZs. Allocation of fishing access by individual countries to the neighbouring countries and other distant-water fishing states have subsequently emerged. The Philippines and Thailand are the two countries that seek fishing access to neighbouring countries apart from the other distant-water fishing fleets such as the Republic of Korea and Taiwan, Province of China. Such development will open doors for further management arrangements in the future once the parties recognise that the shared resources are under heavy fishing pressure.

The SEAFDEC/MFRDMD has a strategic position in the region to play a role in the collation of information on shared stocks, establishment of regional database and networks for scientists working on shared stocks in the region. Such an effort is essential towards building management oriented information for the shared stocks. FAO, through the APFIC Committee and its Working Party on Marine Fisheries, will join hand in hand with SEAFDEC in helping the Member States to facilitate such activities.

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