Annex 8

THE THIRD REGIONAL WORKSHOP ON SHARED STOCKS
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COUNTRY STATUS REPORT

MALAYSIA

(3) PENINSULAR MALAYSIA

PELAGIC FISHERIES RESOURCES IN THE PENINSULAR MALAYSIA

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1. INTRODUCTION

The fisheries sector in Malaysia plays a significant role with regards to the provision of employment, especially in rural areas, and in the support it provides to economic growth and perhaps most importantly, however, is its role in the provision of fish as food. In 1995, the marine fisheries contributed 1,108,436 tonnes or 89.02% of the total fish production, valued at RM2.711 billion. The rate of demand for fish as the main source of protein is expected to increase from an annual consumption of 630,000 metric tons to over 1,579,800 metric tons by the year 2010 (DOF, 1995). Hashim (1993) reported that in 1991, a total of 175,216 tonnes of fishery commodities were exported, which valued at RM739.7 million. The exports of fishery commodities showed an increase for the last three years from RM577 million in 1989 to RM739.7 million.

Total landing in the Peninsular Malaysia in 1995 had increased by 4.2% from the previous year to 819,464 tonnes. The overall total marine landing for the West Coast of Peninsular Malaysia increased by 14.89% (from 460,302 tonnes to 528,818 tonnes). However, the East Coast of Peninsular Malaysia showed a decrease in its total marine landing by 10.51% (from 324,772 tonnes to 290,646 tonnes).

The deep sea fisheries include vessels of 70 GRT and above operating trawlnet, fish purse seine nets (except anchovy purse seine nets), hooks and lines, have been issued for the vessels of more than 70 GRT in the Peninsular Malaysia out driftnets and operate a distance of above 30 nautical miles from the coast. Presently, 427 licenses of which 135 of them are purse seines. In 1995, the deep sea fisheries contributed a total of 91,997 tonnes of fish landing in the Peninsular Malaysia, which was about 8.3% of the total marine fish landing of Malaysia.

2. TOTAL ANNUAL PRODUCTION AND CATCH RATES

The annual production of *Rastrelliger* spp shows a significant increased from 1994 to 1995 (Fig. 1). The total landings of the *Rastrelliger* spp by all gears had increased by 61.8% from 69,877 tonnes in 1984 to 113,078 tonnes in 1995. The west coast recorded bigger increase of the total landings of the *Rastrelliger* spp by 68.3. In contrast, the total landings of the *Rastrelliger* spp in the east coast shows a decrease by 26% from 16,220 tonnes in 1984 to 12,075 tonnes in 1995. The total landings of the *Decapterus* spp in Peninsular Malaysia in 1995 had increased by 65% compared to year 1984 (Fig. 2). However, the annual production shows the decrease by 17% compared to year 1994.

With the expansion of the maritime jurisdiction, tuna fishery is seen as among the important fishery resources to be exploited. The total landings of the tuna by all gears in the Peninsular Malaysia show a slightly decreased from 1984 to 1995 (Fig. 3) with exceptance of the total landings in 1987 where it showed a slight increase. The total landings in 1984 was 17,723 tonnes and dropped to 10,624 tonnes in 1995. The annual landings of the tuna in the east coast are 2 time higher than the west coast.

Apart from tuna landings by local boats in the west coast, there are the Taiwanese tuna longliners continuing to discharge and export their catches of deep sea tuna at Penang Harbour. Their catches from Indian Ocean fishing areas comprised mostly of yellowfin tuna *(Thunnus albacares)* followed by small quantities of bigeye *(Thunnus obesus)* and other species of sharks, swordfish and small tuna (Chee, in press). Total montly landings ranged from 136 - 2,040 tonnes over the period of 1990 - 1994 (Chee, In Press). From January to July 1995, the average catch per boat per trip ranged from

5.8 tonnes to 8.8 tonnes. The fishing season was similar to that observed for previous years. i.e. peak fishing activity was observed from September/October till March/April the following year.

The maximum sustainable yield for the *Rastrelliger* spp. and *Decapterus* spp. in the west coast calculated through surplus production model estimated to be 45,629 tonnes and 8,419 tonnes respectively and their fMSY in term of horse power are 88,631 and 1,108,126. This brings out the idea that the *Rastrelliger* spp stock in the west coast waters is slightly under-exploited while the catch of the *Decapterus* spp shows the other way round. The estimated potential yield of small tuna solely in the east coast waters with regard to MSY is between 14,000 to 16,000 tonnes.

3. LANDINGS PATTERN AND FISHING SEASON

Generally, the total monthly landings of tuna in the west coast in 1995 appeared to be constant ranging between 100 - 600 tonnes (Fig. 4). The annual production in 1995 had increased by 26.8% for the west coast, however the east coast recorded a decrease of 17.2% (Fig. 5). In the east coast, the fishing activities on the small tunas actively occurred immediately after the end of the north east monsoon March till October.

For the *Rastrelliger* spp, the fishing season in the east coast seems to start from May till October just immediately before the north-east monsoon where the landings range from 1,100 - 2,300 tonnes. While in the west coast the total monthly landings fluctuated between 4,500 tonnes to 13,400 tonnes and decreasing toward the end of the year.

The fishing season of the *Decapterus* spp. in the east coast occurs almost at the same period as of the *Rastrelliger* spp. However, in the west coast there is no clear fishing seasons were observed and total monthly landings ranged from 600 to 1,100 tonnes.

4. FISHING GEARS AND FISHING AREAS

Figure 6 and 7 show the different in catch rates by two major fishing gears; purse seines (Fig. 6) and drift nets (Fig. 7) in the west and east coast of Peninsular Malaysia.

In 1991, there was a sudden drop of the catch rates from these two gears to the range of 13.07 - 4.78 tonnes and 0.42 - 0.73 tonnes for purse seines and drift nets respectively. This phenomenon occurred probably due to a drastic increase of effort level (total no of boats) in 1991.

Purse seine, drift net and trawler are the major fishing gears that catch *Rastrelliger* spp in the west coast waters. Annual total landings in 1995 of the Rastrelliger spp by trawlers, purse seines and drift net had increased in catches by 66.6%, 85.8% and 40.8% respectively. For the tuna and round scads, purse seines contributed more that 90.7% and 58.4% respectively of the total annual production in the west coast. There are two operation methods of the purse seine where they use FAD and spotlight to lure the fish, but the later method is more common and widely used by the fishermen. The trawlers of more than 70 GRT frequently operating using high opening trawl nets and *Rastrelliger brachysoma* form a dominant species caught by this gear.

In the east coast, purse seines from the major fishing gear to catch tuna, *Rastrelliger* spp and *Decapterus* spp. The landings of *Rastrelliger* spp by this gear had dropped from 9,831 tonnes in 1994 to 6,725 tonnes in 1995. Also, the landing of *Decapterus* spp and tuna record the decrease by 23.5%

and 2.6% respectively. Other fishing gears that contribute to the tuna landings in the east coast are longlines and drift nets with the former form the second important gear after purse seines.

Study on the fishing area in the northern part of west coast of Peninsular Malaysia, shows that the majority of the drift netters preferred to operate their vessels in coastal waters. The popular fishing grounds for drift netters in Penang, were located of Pulau Kendi and the coastal areas extending from Teluk Kumbar to Teluk Bahang. Also, areas around Pulau Song-Song, Pulau Bidan and Pulau Langkawi were marked to be the most common fishing grounds for Kedah drift netters (Figure 8). The fishing areas for fish purse seiners were quite dispersed, extended from 10 nm from the coast toward Pulau Perak (Figure 9). Most of them operated away from each other. However, their fishing grounds were easily located by the presence of fish lures.

5. MAJOR PELAGIC SPECIES

In 1995, pelagic fish species primarily *Rastrelliger* spp., *Decapterus* spp., Trevallies group, Sardines, Anchovies and Hardtail scad were mainly caught by purse seines, drift nets, and hooks and lines (Figure 10). The highest landing of *Rastrelliger* spp was recorded in 1995 on the west coast of Peninsular Malaysia at 101,003 tonnes. Tuna catches were dominated by the small neritic species such as Kawakawa (*Euthynnus affinis*), Longtail (*Thunnus tonggol*), Frigate (*Auxis thazard*) and Skipjack (*Katsuwonus pelamis*). The other species caught were the oceanic species; Yellowfin (*Thunnus albacores*) and Bigeye (*Thunnus obesus*)

The catch composition of the tuna group in the west coast is dominated by *Thunnus tonggol* while *Euthynnus affinis* make up only small percentage. In the mackerel group, *Rastrelliger brachysoma* form the most abundance species. There are three species in Genus *Rastrelliger* occur in the west coast; *R. brachysoma, R. kanagurta* and *R. fughni.* Small pelagic caught by the purse seine nets in the west coast waters, mainly from species *Euthynnus affinis, Thunnus tonggol, Decapterus* spp, *Rastrelliger kanagurta. Rastrelliger brachysoma*, and *Rastrelliger faughni.* For the *Rastrelliger* spp., *Rastrelliger kanagurta* normally caught by using FAD while the *R. brachysoma* form the main *Rastrelliger* spp caught by high opening trawlers. Other common pelagic species are *Atule mate, Sardinella fimbriata, Selaroides leptolepis* and *Scomberomours* spp that are also caught by purse seine nets.

The main neretic tuna species in the east coast water comprise of *Euthynnus affinis, Thunnus tonggol* and *Auxis thazard,* where the first two species form the main spp caught by purse seine nets, lift nets and hook and lines. Generally, *Rastrelliger kanagurta* is the dominant species and may be the only *Rastrelliger* spp caught in the east coast waters. For the *Decapterus* spp, it consists of *Decapterus ruselli, D. maruadsi and D. macrosoma* (ANON, 1978). However, in the west coast waters the *Decapterus maruadsi* appeared to be the main and most common spp caught by purse seine nets whereas in the east coast, *Decapterus ruselli* is the major species.

6. FISHERIES BIOLOGY

Biological information of all the small pelagic and tuna species still do not cover various aspects comprehensively. The total length and weight of the *R. kanagurta* ranging from 94 - 277 mm and 71.1 - 257.2 g respectively. The combine length-weight relationship of both juvenile, male and female

is W = 3.04 x 10 - 6 L3.245 (Mansor and Abdullah, 1995). For the *Decapterus ruselli*, the size of length and weight ranging from 97 - 168 mm and 9.1 - 167.7g respectively. While the combined length-weight relationship is W = 7.53 x 10 - 6 L3.052.

The growth and mortality parameter recorded by Mansor and Abdullah (1995) for species *R. kanagurta* and *D. ruselli* from the east coast sample are shown in table 1. In the west coast, the average size of *Rastrelliger kanagurta* and *Rastrelliger brachysoma* are ranged from 168 - 228.3 mm and 160 - 197 mm respectively.

Table 1: Growth and mortality parameters of *R. kanagurta* and *D. ruselli* (*average values from west coast samples)

	L^{∞}	K	M	F
R. kanagurta	252 - 322 29.2*	0.42 - 1.33 0.65*	101 - 214	1.56 - 1.56
Decapterus ruselli	235 - 322	0.56 - 1.10	1.01 - 2.07	0.13 - 3.23
Euthynus affinis	65*	0.5*		

Irregular availability of sample for certain species were the limiting factor on biological sampling. This restricted the ability to provide comprehensive information of the biological aspect particularly on species maturity. Table 1 also shows gonadosomatic indices for small pelagic and tuna species. For *Rastrelliger kanagurta*, highest values of GSI were recorded in March, April and August while for *Rastrelliger brachysoma*, the values seem to be high in all the year round except in August giving suggestion that *R. kanagurta* spawned twice a year while *R. brachysoma* spawned throughout the year.

Study on food habit of small tuna species in the east coast, shows the primary food items of the species consist of squid, anchovies, Indian mackerels and filefishes (Zainuddin and Noordin, unpublished). Landing pattern of the tuna species seems to exhibit similar trend of these prey particularly the squid and Indian mackerels that prove the close prey-predator relationship between tuna and these respective preys.

Study on *Rastrelliger brachysoma*, at one of the major landing centre in the west coast showed that in 1994 the monthly mean length of *R. brachysoma* ranged from 15.5 cm to 19.4 cm total length, and from January to May 1995 the monthly mean size of fish fluctuated between 18.0 cm and 19.6 cm.

Larger fish were sampled in the last quarter of the year, while the smallest average size of fish were sampled in February and June. In December 1994, the GSI of 7.7% calculated for male fish and 6.2% for female fish were highest value recorded. This coincided with the time when the largest size fish were recorded suggesting that *R. brachysoma* could spawn just after the last quarter of the year and the young fish could then recruit into the fishery in the first half of the following year.

However other possible smaller spawning peaks could accur as suggested by the fluctuating GSI. Thus it is concluded that mature fish could be found throughout the year but the spawning intensity may vary monthly to result in one major and other minor spawning peaks.

7. OCEANOGRAPHIC INFORMATION

Very few data regarding oceanography information on the coastal and offshore fishing areas are availabled. However, since 1992, study on fisheries oceanography have been carry out in the west coast particularly in the coastal areas off the northwest Peninsular Malaysia. Monthly data collection for certain parameters are still being carried out and it will be part of future fisheries research activities. On the deep-sea fishing areas, the oceanographic data collection were carried out along with the regular monthly monitoring to locate the main offshore fishing areas by using Resource Management Vessel.

Certain water quality parameters like dissolved oxygen, sea surface temperature, salinity, pH and conductivity were collected to study the relationship between certain water quality parameters with the distribution and seasonal movement of fish. In 1995, the average values for sea surface temperature, dissolved oxygen, conductivity and salinity in the northern part of west coast of Peninsular Malaysia were 30^{0}C, 6.1 mg/l, 49.5 umhos/cm and 32 ppt, respectively. The relationship between the parameters with the distribution and seasonal movement of the fish will be studied when more data are collected.

Generally, the sea surface temperature in Malaysia waters is relatively constant throughout the year, ranging between 26.1^{0}C to 32.2^{0}C (Fisheries Research Institute, 1987). During the north-east monsoon period, the temperature range between 26.1 to 28.8^{0}C but during the off monsoon period, the range is 28^{0}C to 30^{0}C. The average surface water temperature during the south-west monsoon period in the east coast of Peninsular Malaysia is 30.5^{0}C and it range between 28.8^{0}C to 32^{0}C (Hamid, 1989).

The surface salinity in the west coast of Peninsular Malaysia during the north-east monsoon period ranged between 27 to 33.3 ppt, and at the depth between 13 to 21 m, the salinity ranged between 25.4 to 33.4 ppt (Samsuddin, 1995).

In term of bottom topography, the depth of water off the west coast of Peninsular Malaysia seldom exceeds 120 m within the Malaysian EEZ, where the deepest part is at the northern tip of the Straits of Malacca or the eastern part of Bay of Bengal, where the two water bodies meet. It has a distinctly large area of mud-flats, running north-west from the central part of the coast. The east coast of Peninsular Malaysia has a relatively flat sea bottom. Again the depth of the water is seldom deeper than 100 m (Abu Talib and Alias, 1997)

8. RECOMMENDATIONS FOR REGIONAL COLLABORATIVE EFFORTS

Regional collaboration effort of the topic of sustainable exploitation of shared stocks should be viewed on:

(i) Formulation a research framework approach that can be adopted by each participating countries for shared stocks assessment purposes.

(ii) Discuss ways and means how these data can be utilized in the assessment on the status of the stocks and in providing measures for the management purposes.

(iii) Discuss ways and means how these data can be shared by all participating countries in the form of database using available information technology facilities.

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