Annex 6

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

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COUNTRY STATUS REPORT
MALAYSIA

(3) SARAWAK

By:

ALBERT CHUAN GAMBANG

Fisheries Research Institute Sarawak
Bintawa, Kuching, Sarawak

STATUS OF PELAGIC FISHERIES RESOURCES OF SARAWAK, MALAYSIA

Albert Chuan Gambang
Fisheries Research Institute Sarawak
Bintawa, Kuching Sarawak

1. INTRODUCTION

The state of Sarawak ,which is part of East Malaysia, borders the southern part of the South China Sea. The state's continental shelf extends between 30 to 200 nautical miles northwards. The water depth within the continental shelf reaches 200 metres at the edge and then drops to 1,000 metres. The trench towards the northeast can reach 2,500 metres depth. All demersal fish presently landed is caught within the continental shelf. However, pelagic fish is more widespread and could be fished even beyond the continental shelf. Because of the central position (Figure 1) of waters off Sarawak within the South China Sea, the area is believed to be the main routes for straddling and migratory fish stocks.

The 1997 statistics showed that 11,008 people are involved in fishing and related activities. There are 10,438 fishermen and 570 fish dealers. The present fishing is still concentrated in the coastal area which occupies only 1/.3 of the EEZ area for Sarawak.

2. FISHERIES

2.1 Fishing Fleets

In 1997, a total of 4,370 fishing vessels of every category operated mostly in the coastal waters. The fishing vessels could be grouped into 4 main categories: purse seiners, gillnetters, bottom trawlers and traditional fishing vessels. The largest number of vessels belongs to the gill net category (36.4 percent), followed by traditional vessels (31.3 percent) and bottom trawlers (16.4 percent) (Table 1). The smallest number is purse seiners, which occupied only 0.5 percent of all fishing vessels. Fishing vessels that are used to fish small pelagics are gillnetters and purse seiners.

In terms of catch, bottom trawlers dominated (57.8 percent) followed by gillnetters (22.5 percent) and traditional vessels (14.8 percent). Purse seiners only landed 1.5 percent of the catch.

About 88 percent or 3,847 of the fishing vessels are below 20 GRT (Table 2). These are mostly coastal and traditional fishing vessels. Only 2.8 percent or 124 fishing vessels are more than 70 GRT. These are deep-sea fishing vessels. The rest of the fishing vessels (399 in numbers) are fishing between the coastal and offshore area.

For purse seiners, only 2 vessels are above 70 GRT and therefore able to fish offshore. All the gillnetters are below 70 GRT and carry out their fishing within the vicinity of coastal area.

2.2 Fish Landings

2.2.1 Overall

Since 1985 the overall landings had increased by 64 percent from 62,892 tonnes to 103,212 tonnes in 1997 (Table 3). Almost all landings are from the coastal area, that is, between 20-30 nautical miles from the coast. The main resources are demersal,

pelagic, prawn and jellyfish. Demersal fish occupied the bulk of the landing at 35-52 percent for the last three years (Table 4). Prawn occupied between 8-11 percent and jellyfish occupied between 10-38 percent of the landings.

2.2.2 Small Pelagics and Tuna

For the last five years (1994-1998) landing from small pelagics has not increased and is hovering around 20,000 tonnes (Table 3 and Figure 3). Small pelagics occupied only 15-20 percent of the overall landings. Almost 100 percent of the landings are from the coastal area

Tuna landings have not been impressive at around 2,000 tonnes annually, which is 2 percent of the overall landing. Tuna is also caught mainly in the coastal area. The offshore tuna is mostly caught by purse seiners based at Labuan.

3. PELAGIC FISH SPECIES COMPOSITION

3.1 Coastal Pelagic Fish

The catch composition of coastal pelagic fish is dominated by 6 main groups, which occupied 8 to 13 percent of the catch (Table 5). These groups are mackerel (*Rastrelliger sp.*), scads (*Selar mate, Selar sp.*), sardines (*Sardinella sp., Dussumieria sp.*), spanish mackerel (*Scomberomorus sp.*), hairtail (*Trichiurus sp.*), and hardtail scad (*Megalaspsis cordyla*). The other important groups are sharks, pomfret (*Pampus sp., Parastromateus sp.*), shad (*Tenualosa sp.*) and longfin herring (*Opisthopterus sp.*). All these groups are caught close to the shore. At least 17 main pelagic fish groups are caught in the coastal area.

3.2 Offshore Pelagic Fish

The offshore pelagics are dominated by 8 groups such as round scads (*Decapterus russeli, Decapterus macrosoma*), one-fillet scad (*Selar mate*), bigeye scad (*Selar crumenophthalmus*), Indian mackerel (*Rastrelliger kanagurta*), black pomfret (*Formia niger*), yellow banded scad (*Selaroides leptolepis*), hardtails (*Megalaspis cordyla*) and sardines (*Dussumiera sp.*) (Table 6). The most common offshore pelagic fish is round scad ,which occupied 57 percent of the catch. This is followed by the scad/selar group which occupied 26 percent of the catch. The proportion for Indian mackerel is 8 percent.

3.3 Tuna

The coastal tuna is dominated by the following species: kawakawa (*Euthynus affinis*), longtail tuna (*Thunnus tonggol*), frigate tuna (*auxis thazard*) and skipjack (*Katsuwonus pelamis*).

The main species of oceanic tuna are skipjack (*Katsuwonus pelamis*) , 72 percent, yellowfin (*Thunnus albacares*) , 28 percent and frigate tuna (*Auxis thazard*). Frigate tuna is small in size and generally escape through the large mesh size of tuna purse seine. Tuna caught has a mean size of 37-83 cm or between 0.9 – 10 kg.

4. BIOMASS AND EXPLOITATION OF PELAGIC FISH

Several acoustic surveys (KL Paus, 1994; SEAFDEC, 1996,1997; and KL Cermin, 1998) of the Exclusive Economic Zone (EEZ) off Sarawak and Sabah have assessed the biomass at between 900,000 – 1,700,000 tonnes. The estimated biomass for Sarawak waters is between 700,000 – 1,088,000 tonnes. This gives a potential annual yield of 435,200 tonnes.

All this resource is found in the offshore area. The present landing at 20,000 tonnes of pelagic fish (which is from the coastal area) shows that there is still room for further exploitation of the offshore resource. Purse seiners using FADs is a suitable fishing method to exploit the resource.

The biomass of tuna has been estimated at 90,000 tonnes for both coastal and offshore. There is also a need to expand the exploitation of tuna, considering that the present landing is only 2,000 tonnes annually.

5. FISHERIES MANAGEMENT

Management of fisheries resources in Malaysia has been through two main management measures: (1) controlling effort through the issuing of fishing licences and (2) restriction on fishing area for different size boats. In Sarawak, the restriction on fishing area is based on the zonation system according to the size of boats (see Table below).

Fishing Zones in Sarawak

Zone Category	Distance From Coast (nautical miles)	Vessel Size Allowed For Each Zone (GRT)
A	0-3	<15
B	>5	<40
C	>10	40-70
C_2	>20	>70

The coastal area as defined by fishing zone is 30 nautical miles from the coast. Beyond 30 nautical miles local vessels of more than 70 GRT and vessels from outside the state are allowed to fish subjected to conditions in the Fisheries Act.

For coastal fisheries resources, the management problems are the encroachment of bigger fishing vessels into the coastal area because of the presence of prawn resource and the more valuable species. The increase in the number of small fishing boats and efficient fishing methods in the estuarine area have almost depleted the shad (*Tenualosa sp.*) stock. The increase efforts have also reduced the stock of the more valuable species such as spanish mackerels (*Scomberomorous sp.*), long finned herring (*Opisthopterus sp.*), threadfin (*Polynemus sp.*) and long tail croaker (*Panna microdon*).

The offshore resource has less management problems due to the fact that very few local fishing vessels (if any) are fishing in the offshore zone. Our main problems are encroachment by fishing vessels from outside the state and other countries. Foreign fishing vessels caught by the Enforcement Division have used several very efficient fishing methods such as gill net targeting for sharks, large trawl nets with large size twine able to bull doze corals and some cases of bombing and poisoning. These methods are very destructive and the main challenge would be to control these fishing methods and encourage the environmentally friendly fishing methods.

6. FISHERIES RESEARCH

Some of the main research studies carried out are listed in Table 7. Most of the studies are concentrated on stock assessment, and less on biology.

Future studies should concentrate on the biology as biological knowledge of fish species are still lacking, The priority biological studies are the following: migration; spawning and reproduction; stomach contents (feeding); fish behaviour to FADs and fishing; and seasonal distribution. However, pelagic resource surveys should continue to be carried out to assess the changing status of the resource.

7. REFERENCES

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Table1: Number of fishing vessels and landing,1997

Vessel	Number	Percentage	Landing(tonnes)	Percentage
Purseseiner	20	0.5	1292	1.5
Gillnet	1589	36.4	19692	22.5
Trawler	715	16.4	50729	57.8
Traditional	1369	31.3	12995	14.8
Others	677	15.5	3004	3.4
Total	4370	100.0	87712	100.0

Table2: Breakdown of fishing vessels by grosstonnage(GRT),1997

GRT	Vessel	Purseseine	Gillnet	Trawler
<20	3847	1	1529	323
20-70	399	17	60	273
>70	124	2		119
Total	4370	20	1589	715

Table 3 : Marine Fish Landings (MT) in Sarawak (1985-1998)

Year	Total	Pelagic	Tuna	Cephalopod	Demersal	Jellyfish	Prawn	Others
1985	62,892	12,050	879	273	28,279	9,994	11,246	171
1986	67,983	13,350	587	570	33,521	10,641	9,112	202
1987	69,442	10,100	711	516	33,467	12,980	11,466	202
1988	82,591	13,050	821	780	40,200	17,700	9,797	243
1989	84,257	13,500	1508	1581	41,286	11,190	14,943	249
1990	85,352	14,400	2450	2289	40,826	13,614	11,527	246
1991	86,607	16,700	1992	1895	45,645	8,962	11,137	276
1992	88,247	18,547	2103	2590	37,890	12,323	14,254	540
1993	81,924	18,679	1511	1824	38,811	10,061	10,397	641
1994	96,188	20,637	1518	1783	49,349	5,949	16,073	879
1995	99,257	23,836	1,835	1,333	57,629	3,814	10,196	614
1996	100,743	18,921	2,342	1,058	50,217	15,947	11,924	334
1997	128,194	19,152	1,353	1,919	44,982	49,186	11,048	554
1998	103,212	20,988	2,014	2,536	53,934	10,431	12,511	798

Table 4 : Percentage composition of landing by resource category

Year	Pelagic	Tuna	Cephalopod	Demersal	Jellyfish	Prawn	Others
1996	18.8	2.3	1.1	49.8	15.8	11.8	0.3
1997	14.94	1.06	1.50	35.09	38.37	8.62	0.43
1998	20.3	2.0	2.5	52.3	10.1	12.1	0.8

Table 5 : Production (tonnes) and percentage composition of pelagic species from coastal area ,1998

Fish group/species	Production	Percentage
Mackerel, *Rastrelliger sp*	3327	13.6
Scad, *Selar mate, Selar sp.*	2360	9.6
Sardines,*Sardinella sp.,Dussumieria sp.*	2342	9.5
Spanish Mackerel, Scomberomorus sp.	2284	9.3
Hairtail, *Trichiurus sp.*	2179	8.9
Hardtail Scad, *Megalaspsis* cordyla	2026	8.3
Tuna	2014	8.2
Sharks	1772	7.2
Others	1442	5.9
Pomfret,*Pampus sp.Paratromateus sp.*	1316	5.4
Shad,Tenualosa sp.	1033	4.2
Longfin Herring, *Opisthopterus sp.*	899	3.7
Wolf Herring, *Chirocentrus sp.*	433	1.8
Indian Threadfin, *Polynemus sp.*	353	1.4
Queenfish , *Chorinemus sp.*	295	1.2
Round Scad, *Decapterus sp.*	224	0.9
Travelly, *Caranx sp., Carangoides sp.*	161	0.7
Barracuda	71	0.3
Mullet, Mugillidae	22	0.1
Total	24553	100

Table 6 :Catch composition of Purse Seiners,1998
(Adapted from Richard Rumpet,1999)

Fish group/ Species	Percentage
Round Scad,*Decapterus russeli, D.macrosoma*	57.4
One-fillet Scad, *Selar mate*	15.3
Bigeye Scad, *Selar crumenophthalmus*	9.2
Indian Mackerel, *Rastrelliger kanagurta*	8.1
Black Pomfret, *Formio niger*	3.5
Yellow banded Scad, *Selaroides leptolepis*	1.2
Hardtail, Megalaspis cordyla	0.1
Sardines, Dussumiera sp.	0.1
Others	5.1

Table 7: Some of the main research activities carried out on pelagic resources

Research Area	Year	Vessel/Agency	Targeted Output
1. Acoustic surveys	1986	RV Rastrelliger Malaysia	Quantitative assessment of small pelagic
2. Acoustic surveys	1994	KL Paus Malaysia	Qualitative assessment of small pelagics
3. Acoustic surveys (SIMRAD)	1996/1997	RV SEAFDEC - Collaborative Malaysia/SEAFDEC/ Thailand	Quantitative assessment of small pelagic
4. Acoustic surveys (SIMRAD)	1998	KL Cermin, Malaysia	Quantitative assessment of small pelagic
5. FAD study	1988-1989 1997-1998	IPPCS Sarawak	Effectiveness of FADs in purse seine fishing and biology of commercial small pelagics
6. Tuna resources study	1992-1994	IPPCS Sarawak	Stock assessment, migration and biology
7. Tuna longline fishing	1993	IPPCS Sarawak	Assessment of large tuna species
8. Coastal pelagic resources	1993	IPPCS Sarawak	Assessment biology of coastal pelagics: pomfrets, and spanish mackerel
9. Shad (*Tenualosa toli*) resources	1985-1987	IPPCS Sarawak	Assessment, biology, spawning, stomach contents

FIGURE 1 - REGIONAL LOCATION OF SARAWAK, MALAYSIA

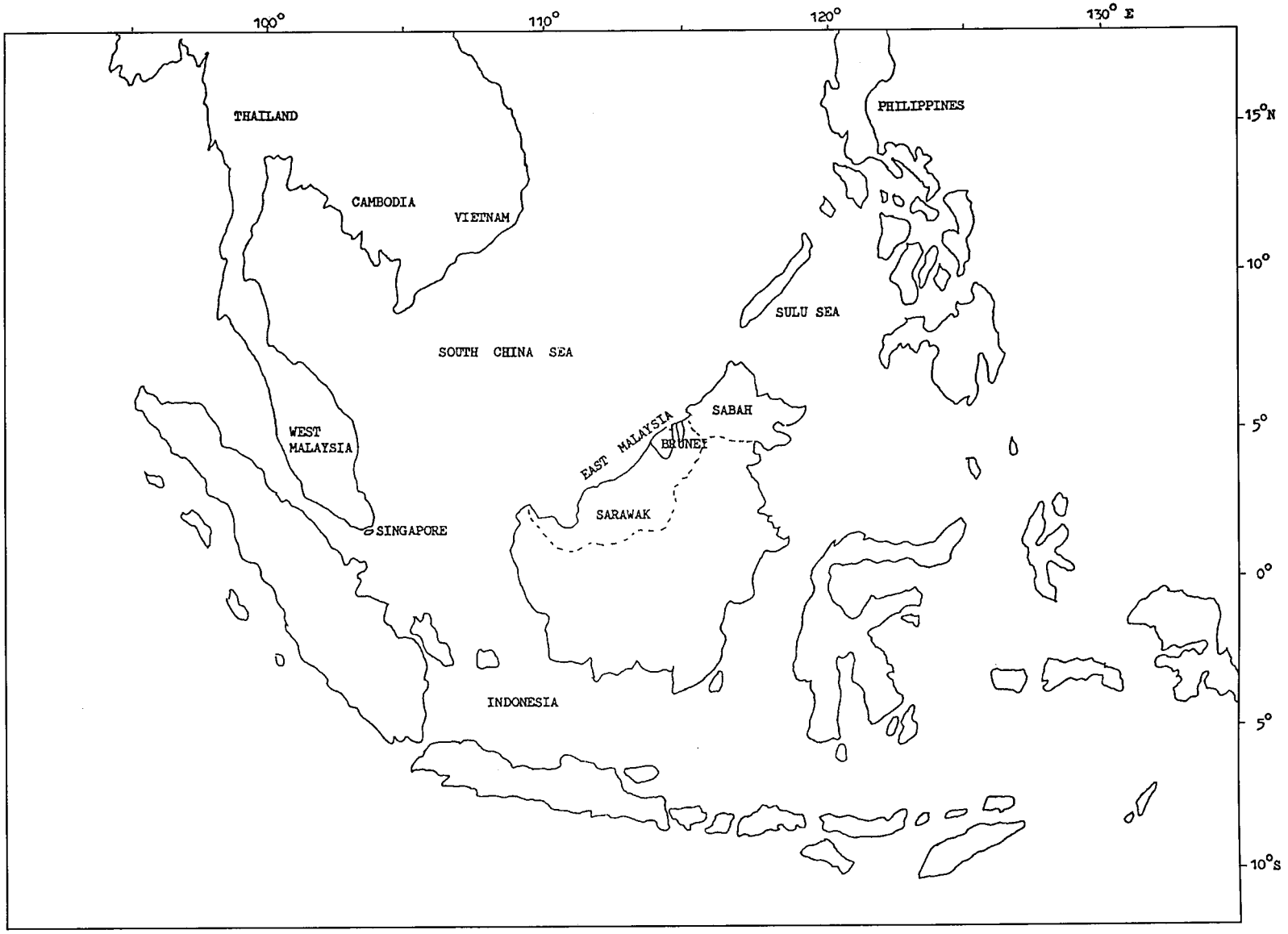

Figure 2: Fish landing by fishing gears

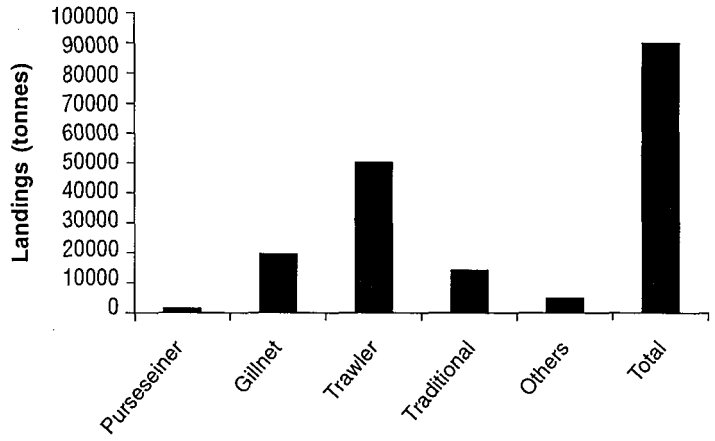

Figure 3: Trends of fish landing in Sarawak