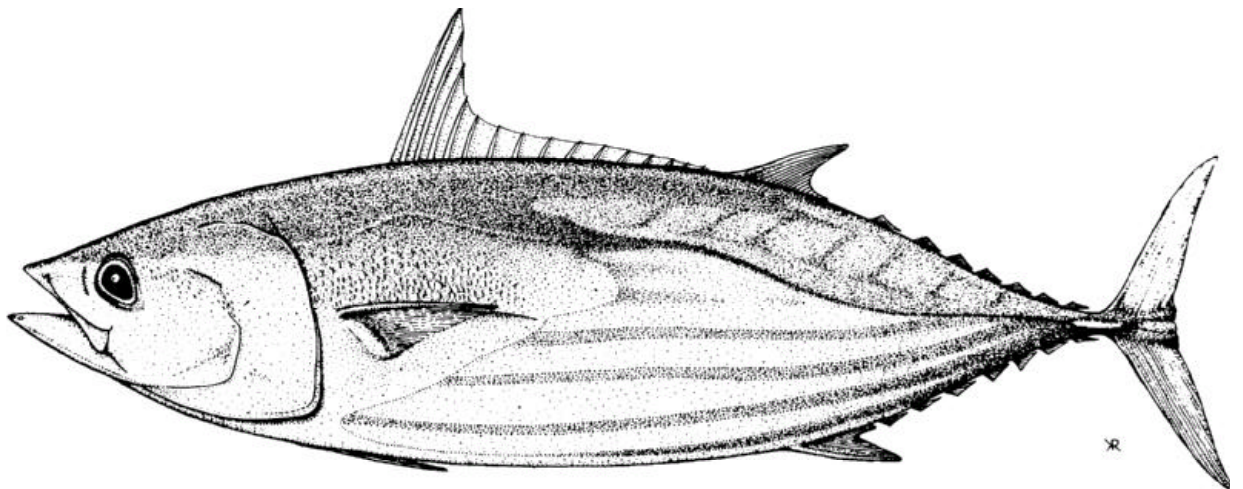




## **Tuna and tuna-like fisheries in Indonesia**



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## **TUNA AND TUNA-LIKE FISHERIES IN INDONESIA**

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### **I. BACKGROUND**

Tuna and tuna-like fishes are a highly migratory species, distributes through out the Indonesian waters, such as in the Indian Ocean, Sulawesi Sea and the Pacific Ocean.

As a second commodity after a shrimp product, the tuna and tuna-like fishes products are tend to increase every year. Since the contribution of these species to the world's demand on fisheries product is significant, therefore, in many places, the utilization on these species are becoming more and more intensive. As a sequence, in some. areas, the resources are decreasing. In order to sustain these resources, it is, therefore, a proper management must be implemented immediately.

### **II. INDONESIAN WATERS**

Indonesian coastal waters are much influenced by tidal conditions, both from the Indian Ocean and the Pacific Ocean. The tidal affecting from the Indian Ocean is stronger than the tidal affecting from the Pacific Ocean.

Instead of the tidal, the topography of the Indonesian waters is also different. In the western part of Indonesia where relatively shallower than the eastern part of Indonesia, the depth are mostly less than 2000 meters, where in the eastern part, the depth are mostly more than 2000 meters, even at some locations can reach to 5000 – 6000 meters.

### **III. THE FISHERIES PRODUCTION**

Within the last four years period, i.e. from 1997 up to 2000, the production of the Indonesian marine capture fisheries increased with an average 1,78% per year. It was recorded that the advantage of the fish stocks in 1997 was reached 72.16% from TAC, when in 2000 was increased to 76.04% from TAC. (The TAC is 5.01 million tons settled by the National Commission on the Fish Stocks Assessment, 1998)

The amount of the marine capture fisheries product in 2000 was 3.81 million tons. From these amounts, the purse seiner fisheries contributed 609.24 thousands tons, the hook

and line contributed 752.82 thousand tons (the tuna long liner 74.76 thousand tons, the drift long liner 43.78 thousand tons, the set long liner 78.81 thousand tons, the skipjack pole and line 150.72 thousand tons, the other pole and line 277.05 thousand tons and troll line 127.70 thousand tons) whereas the other fishing gears were contributed 2.45 thousand tons.

Regarding the effectiveness of the fishing gear in term of contributing their production within the last 1997-2000 period, the skipjack pole and line was the most gear; increased 11.99% per year, then followed by the troll line, i.e. increased 11.19% per year, the tuna long liner with annually increased by 9.54%. Table 1 shows the production of marine capture fisheries by fishing gear.

Table 1. Production of Marine Capture Fisheries by Fishing Gear, 1997 – 2000 (MT)

Fishing Gear	1997	1998	1999	2000	Increasing Average (%)
Purse Seine	637,458	661,354	585,680	609,243	-1.22
Hook and Line	661,678	778,468	709,152	752,815	4.97
-Tuna Long Line	57,200	57,405	66,595	74,763	9.54
- Drift Long Line other than LL	43,052	37,560	48,737	43,774	2.27
- Set Long Line	74,544	76,552	75,860	78,807	1.89
- Skipjack Pole and Line	111,618	152,497	140,974	150,722	11.99
- Other Pole and Line	271,739	299,922	257,960	277,045	1.26
- Troll Line	103,525	154,532	119,026	127,704	11.19
Others	2,313,825	2,283,924	2,387,612	2,445,133	1.89
Total	3,612,961	3,723,746	3,682,444	3,807,191	1.78

With regards to the landing places, the production at the coastal areas where interact with the Pacific Ocean, i.e., the coastal area of the eastern part of Kalimantan, the northern part of Sulawesi and the Moluccas - Papua increased by 5.60% per year. In 2000, the production of marine capture fisheries which was landed at the coastal areas interact with the Pacific Ocean were 1.01 million tons (or only contribute 26.63% from the total production on the Indonesian marine capture fisheries). The production of marine capture fisheries can be seen in the Table 2.

Table 2. Production of Marine Capture Fisheries by Coastal Area, 1997 – 2000 (MT)

Coastal Area	1997	1998	1999	2000	Increasing Average (%)
East Kalimantan-North	861,696	935,178	983,464	1,014,023	5.60
Sulawesi – Maluku-Papua					
Others	2,751,265	2,788,568	2,698,980	2,793,168	0.54
<b>Total</b>	<b>3,612,961</b>	<b>3,723,746</b>	<b>3,682,444</b>	<b>3,807,191</b>	<b>1.78</b>

With regard to FAO area, the production of marine capture fisheries in the Western Central Pacific (71) increased 1.95% per year in the 1997 - 2000 period. In 1997, the marine capture fisheries production of this area was 83.22% from the total marine capture fisheries production. In 2000, the percentage of marine capture fisheries production of this area was 83.62% from the total marine capture fisheries production. The production of marine capture fisheries by FAO area is presented in the Table 3.

Table 3. Production of Marine Capture Fisheries by FAO Area, 1997 – 2000 (MT)

Area	1997	1998	1999	2000	Increasing Average (%)
Western Central Pacific (71)	3,006,572	3,077,916	3,050,067	3,183,716	1.95
Eastern Indian Ocean (57)	606,354	645,830	632,377	623,475	1.01
<b>Total</b>	<b>3,612,961</b>	<b>3,723,746</b>	<b>3,682,444</b>	<b>3,807,191</b>	<b>1.78</b>

From Table 4 below, it shown that the production of purse seiner and groups of hook and line gear that landed at the coastal areas interact with the Pacific Ocean were 422.68 million tons (or contributed about 41.68% from the total production at the Pacific Ocean).

Within the period of 1997 - 2000, the two major gear which produced more fishes and growth faster were purse seine and the skipjack pole and line, i.e. 15.21% and 15.20% per year. While at the same period, the tuna long liners were only contributed 2.77% from the production of marine capture fisheries was landed at the coastal area interact with the Pacific

Ocean. However, in the total number from 1997 up to 2000, these gears increased significantly, i.e. 14.24% per year.

Table 4. Production of marine capture fisheries was landed at the East Kalimantan - North Sulawesi - Maluku - Papua coastal areas by fishing gear, 1997 – 2000 (MT)

Fishing Gear	1997	1998	1999	2000	Increasing Average (%)
Purse Seine	88,151	100,664	111,484	134,532	15.21
Hook and Line	246,606	294,994	277,617	288,149	5.84
- Tuna Long Line	19,894	18,658	27,216	28,047	14.24
- Drift Long Line other than LL	10,291	12,717	13,336	13,341	9.49
- Set Long Line	8,607	7,238	7,212	6,765	-7.49
- Skipjack Pole and Line	87,127	134,561	107,057	119,472	15.20
-Other Pole and Line	81,761	69,332	76,417	74,404	-2.54
-Troll Line	38,926	52,488	46,379	46,120	7.55
Others	526,939	539,520	594,363	591,342	4.01
<b>Total</b>	<b>861,696</b>	<b>935,178</b>	<b>983,464</b>	<b>1,014,023</b>	<b>5.60</b>

#### IV. THE ADVANTAGE OF TUNA/SKIPJACK TUNA/EASTERN LITTLE TUNA

The advantage of tuna/skipjack tuna/eastern little tuna including billfish was recorded reached 71.42% from TAC in 1997 and about 89.98% from TAC in 2000. The production of these fishes growth 8.49% per year in the 1997 - 2000 period. The production of these fishes within 1997 - 2000 was growth at 8.49% per year, i.e. 515.93 thousand tons in 1997 and 650.04 thousand tons in 2000.

The production of tuna/skipjack tuna/eastern little tuna where was landed in the coastal area of the eastern part of Kalimantan, the northern part of Sulawesi and Mollucas - Papua in 1997 was amounting to 202.31 thousand tons or about 39.21% from the total production of these species in Indonesia. In 2000, the production from these areas increased and reached to 44.22% from the total production. Within 1997 - 2000, the total production of these species in these areas increased to approximately 13.35% per year. Especially for tuna, the production in the same period increased 15.15% per year. The production of these species is presented in Table 5.

Table 5. Production of tunaskipjack tuna/eastern little tuna was landed at the East Kalimantan, North Sulawesi, and Maluku - Papua coastal area, 1997 – 2000 (MT)

Species	1997	1998	1999	2000	Increasing Average (%)
Tuna	116,214	168,122	136,474	163,241	15.15
Skipjack Tuna	187,206	227,068	244,847	236,275	8.54
Eastern Little Tuna	212,511	236,673	236,111	250,522	5.75
<b>Total</b>	<b>202,310</b>	<b>271,730</b>	<b>283,451</b>	<b>287,465</b>	<b>13.35</b>

The production of these species in the Western Central Pacific (area 71) in 1997 was 422,92 thousand tons and increased become 564,76 thousand tons in 2000, or average increasing 10.58% per year. The increasing production of tunas more rapidly than skipjack tunas and eastern little tunas in period of 1997 - 2000 (Table 6).

Table 6. Production of tuna/skipjack tuna/eastern little tuna in the Western Central Pacific Area (area 71), 1997-2000 (MT)

Species	1997	1998	1999	2000	Increasing Average (%)
Tuna	100,898	140,267	121,647	145,728	15.18
Skipjack Tuna	151,700	194,749	210,606	215,656	12.97
Eastern Little Tuna	170,320	191,216	194,937	203,379	6.18
<b>Total</b>	<b>422,918</b>	<b>526,232</b>	<b>527,190</b>	<b>564,763</b>	<b>10.58</b>

## V. THE ADVANTAGE OF BILLFISH

The Indonesian statistic data on marine capture fisheries were not yet present the data on the billfish caught in the Indonesian waters. The data on the billfish were included on the data of the tunas as an aggregate. Based on the survey on *Trend in tuna landings by the long line fishery operating on Bena Bali*, which was carried out through the collaboration between the CSIRO, Division of Marine Research, Australia and the Research Institute for Marine Fisheries, Indonesia, the percentage of billfish to tuna production that landed at the Bena Port in 1996 was 5.7%.

With the same assumption, it is, therefore, the production of billfish was caught in the Indonesian waters in 1997 amounted around 6.62 thousand tons (or about 0.18% from

the total fish production) and about 9.31 thousand tons in 2000 (or about 0.24% from the total fish production).

The production of billfish was landed in the eastern part of Kalimantan, the northern part of Sulawesi and Moluccas - Papua in 1997 was 3.29 thousand tons (0,38% from the total fish product landed at those coastal areas), while in the 2000, the production was increased to 4.54 thousand tons (0,45% from the total fish product landed at those coastal areas). Table 7 present the estimation on production of billfish, 1997 - 2000.

Table 7. Estimation on production of billfish, 1997 – 2000 (MT)

Coastal Area	1997	1998	1999	2000	Increasing Average (%)
East Kalimantan - North	3,286	4,120	4,504	4,540	11.83
Sulawesi - Maluku-Papua					
Others	3,338	5,463	3,275	4,765	23.04
<b>Total</b>	<b>6,624</b>	<b>9,583</b>	<b>7,779</b>	<b>9,305</b>	<b>15.15</b>

The production of that species in the Western Central Pacific (area 71) in 1997 was 5.75 thousand tons and increased become 8.31 thousand tons in 2000, or average increasing 15.18% per year. The production data of billfish can be seen in the Table 8.

Table 8. Estimation on production of billfish in the Western Central Pacific Area (area 71), 1997 – 2000(MT)

Area	1997	1998	1999	2000	Increasing Average (%)
Western Central Pacific (71)	5,751	7,995	6,934	8,306	15.18
Eastern Indian Ocean (57)	873	1,588	845	998	17.74
<b>Total</b>	<b>6,624</b>	<b>9,583</b>	<b>7,779</b>	<b>9,304</b>	<b>15.15</b>

## VI. THE NUMBER OF FISHING BOATS

The total number of fishing boats operated in the Indonesian waters in 2000 was recorded 449,558 units, or 47,454 units more than the total number of fishing boats operated in 1997.

The total number of fishing boats that received a license from the Central Government ( $\geq 30$  GT) and operates in Indonesian waters, was recorded 7,394 units (up to September 2001). From those licenses, the long liner amounted 2,061 units, the purse seiner are 1,516 units and the pole and liner are 278 units. The fishing boats were operated in the Sulawesi Sea and Pacific Ocean are 741 units. Detail information is presented in the Table 9.

Table 9. Number of fishing boats operated in Indonesian waters by fishing gear were licensed by Directorate General of Capture Fisheries up to September, 2001

Sea Area	Purse Seine	Long Line	Pole and Line	Others	Total
Sulawesi Sea and Pacific Ocean	166	398	138	39	741
Others	1,350	1,663	140	3,004	6,653
<b>Total</b>	<b>1,516</b>	<b>2,061</b>	<b>278</b>	<b>3,043</b>	<b>7,394</b>

The number of boats with size 50 -100 GT, 100 - 200 GT and 30 - 50 GT in the Sulawesi Sea and the Pacific Ocean, more than the number of boats with size 200 - 300 GT and >300 GT. The fishing boats with size more than 200 GT only licensed for the purse seiner and the long liner (Table 10).

Table 10. Number of fishing boats operated in the Sulawesi Sea and Pacific Ocean by size of boat were licensed by Directorate General of Capture Fisheries up to September, 2001

Size of Boat	Purse Seine	Long Line	Pole and Line	Others	Total
30 - 50 GT	30	80	35	12	157
50 - 100 GT	60	180	99	13	352
100 - 200 GT	42	112	4	14	172
200 - 300 GT	7	8	-	-	15
> 300 GT	27	18	-	-	45
<b>Total</b>	<b>166</b>	<b>398</b>	<b>138</b>	<b>39</b>	<b>741</b>

## VII. EXPORT OF FISHERIES COMMODITIES

Within the last four years period, i.e. from 1997 to 2000, the export of fisheries commodities was decreased, both in volume and value. The majority of the Indonesian marine fisheries commodities exports are shrimp and tuna/skipjack tuna/eastern little tuna. It was recorded that during the period of 1997 - 2000, the export volume and value of shrimps increased by 12.06% per year in volume and 0.22% per year in value. At the same time, the export of tuna/skipjack tuna/eastern little tuna also increased by 5.11% per year in volume and 6.61% per year in value. Table 11 present the export of fisheries product in 1997 - 2000.

Table 11. Export of fisheries product, 1997 - 2000

Export	1997	1998	1999	2000	Increasing Average (%)
Volume (MT)	574,419	650,291	644,604	519,416	-2.36
- Shrimp	93,043	142,689	109,650	116,188	12.06
- Tuna/skipjack tuna/eastern little tuna	82,868	104,330	90,581	92,958	5.11
- Others	398,508	403,272	444,373	310,270	-6.26
Value (US\$ 1000)	1,686,168	1,698,666	1,605,421	1,675,074	-0.14
-Shrimp	1,011,135	1,011,467	888,982	1,002,123	0.22
- Tuna/skipjack tuna/eastern little tuna	189,433	215,134	189,386	223,916	6.61
- Others	485,600	472,065	527,053	449,035	-1.98

With regards to the fishing ports where located in the eastern part of Indonesia, i.e. Gorontalo, North Sulawesi, North Moluccas, Moluccas and Papua, they were contributed almost 23.32% of the export volume of tuna/skipjack tuna/eastern little tuna in 2000. From those fishing ports, the North Sulawesi province contributed the highest volume export in tunas canned. In Gorontalo port, most of the fishes were frozen, except in 1999 onwards, the fishes export are fresh fish. The other ports, i.e., Moluccas and Papua are also export the tuna/skipjack tuna/eastern little tuna in a frozen type (Table 12).

Table 12. Export of tuna/skipjack tunateastern little tuna from ports of Gorontalo, North Sulawesi., North Maluku, Maluku and Papua, 1997 - 2000

Province	1997	1998	1999	2000	Increasing Average (%)
Volume (MT)	32,333	28,123	24,026	21,681	-12.45
- Gorontalo	21	100	260	183	168.86
- North Sulawesi	10,869	14,782	10,694	15,203	16.84
- North Maluku	4,382	2,553	2,980	559	-35.42
- Maluku	7,582	4,414	1,673	-	-67.96
- Papua	9,479	6,274	8,419	5,736	-10.50
Value (US\$ 1000)	34,797	41,092	25,591	23,282	-.9.55
- Gorontalo	25	115	273	288	167.63
- North Sulawesi	17,931	27,650	17,082	18,906	8.89
- North Maluku	4,340	3,070	1,528	280	-53.72
- Maluku	7,478	3,419	1,109	-	-73.95
- Papua	5,023	6,838	5,599	3,808	-4.66

## VIII. FISHERIES PROCESSING INDUSTRIES

It is recorded that there are 6 units of fisheries processing industries in Gorontalo, 25 units in North Sulawesi, 2 units in North Moluccas and 19 units in Papua. In Gorontalo and North Moluccas fishing processing industries, they only process a fresh fish and frozen, while in North Sulawesi, they process a fresh fish, frozen, canned, smoke, and fillet. In Papua, the fishing processing industry only process frozen, canned and smoke fish. The type of processing in each area can be seen from Table 13 below.

Table 13. Number of processing industries in Gorontalo; North Sulawesi, North Maluku and Papua

Type of Processing	Gorontalo	North Sulawesi	North Maluku	Papua	Total
Fresh	-	2	-	-	2
Frozen	6	10	2	15	33
Canned	-	3	-	1	4
Smoked	-	2	-	2	4
Fresh and Frozen	-	2	-	-	2
Frozen and Canned	-	1	-	1	2
Frozen and Smoked	-	4	-	-	4
Frozen and Fillet	-	1	-	-	1
<b>Total</b>	<b>6</b>	<b>25</b>	<b>2</b>	<b>19</b>	<b>52</b>

## IX. CLOSURE

Based on the data and information from the statistical report, the utilization on the fisheries resources in Indonesia in 2000 had reached 76.04% from TAC. Theoretical, there is an opportunity to expand 23.96% from TAC or 1.20 million tons.

With regards to the production of tuna/skipjack tuna/eastern little tuna including billfish, it has reached 89.98% from TAC in 2000. Therefore, the opportunity of expand these species are 10.02% from TAC or about 72.38 thousand tons.