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**INDONESIAN FISHERIES FOR YELLOWFIN TUNA IN THE WESTERN
PACIFIC - EASTERN INDONESIA**

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Working paper for the 5th Meeting of the Western Pacific Yellowfin Tuna Research Group,
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1. INTRODUCTION

Fisheries plays an important role in the Indonesian economic growth, it is not only as a source of food, but also as a strong foreign exchange earning, as well as it creates job opportunities. Fish is the most important protein source in the Indonesian diet contributing 63 percent of total animal protein intake. Forming only a modest percent of GDP (2.0% of 20% agriculture GDP), fisheries makes a disproportionately large contribution to employment providing in 1991 direct jobs for 4.0 million workers (among others 1,632,630 were fishermen). In addition, the fisheries sector provides employment for an estimated additional 100,000 workers in fish processing, transportation, marketing and support industries (e.g boat building and fishing gear manufacturing). These direct and indirect employment is equivalent to 5 percent of Indonesia's total labor force.

As a result of the increasing investment in fishing, aquaculture and processing industries, exports of fisheries products have recorded impressive growth in recent years. From 1987 to 1991 export value of fisheries products was increasing at an annual rate of 28.1 percent from \$ 475 million to a record of \$ 1,256 million. Tuna and skipjack are ranked second after shrimp in term of both value and volume of the overall fisheries commodity export.

Traditionally, the centre of the Indonesia tuna industry is the eastern of Indonesian waters. The region accounts for about 80% of the Indonesia tuna catch, and about 80 - 95% of the tuna exported from Indonesia comes from this area. This dominant position has changed since 1986, at least as far as fresh tuna for sashimi export fishery is concerned, with the Indian Ocean, particularly south of Java and West of Sumatera, accounting for most of the catch.

2. TUNA AND SKIPJACK FISHERY IN THE EASTERN INDONESIA

Eastern Indonesia includes nine provinces that are not as well developed economically as compared with the provinces in western Indonesia. The provinces are West Nusa Tenggara, East Nusa Tenggara, East Timor, South Sulawesi, Central Sulawesi, Southeast Sulawesi, North Sulawesi, Mollucas and Irian Jaya. Eastern Indonesia is a vast region of over 3 million sq km and makes up about 52% of the 5.8 million sq km of Indonesian seas (Including Indonesia's Exclusive Economic Zone - IEEZ).

The eastern Indonesia region can be broken down into four major fishing areas of fishing bases. These include the waters of Flores sea, Sulawesi, Mollucas and Irian Jaya.

The Four types of fishing gear used to exploit tuna and skipjack resources in the eastern Indonesia include longline, purse seine, pole and line, and handline. Some other fishing gears categorized as "unclassified that also catch tuna incidentally include troll line, danish seine, and gill net.

Skipjack (*Katsuwonus pelamis*) is the principal tuna caught in the eastern Indonesia area, account for 80 - 90% of total tuna landing of Indonesia. The four other species of tuna caught in the eastern Indonesia include yellowfin (*Thunnus albacares*), bigeye (*T. obesus*), albacore (*T. alalunga*), and southern bluefin tuna (*T. maccoyii*). Among these species, yellowfin is the most important and its catch ranges from 50 to 95%, 5 to 15%, and 25 to 70%, for the longline, pole-and-line and purse seine fisheries, respectively.

3. LANDING AND NUMBER OF VESSELS

Skipjack tuna is the principal species caught by pole and line fishery; the species account for 85 to 95% of pole and line landings and 80 to 90% of the total tuna landings. Skipjack tuna landings increased from 73,660 mt in 1992 to 77,346 mt in 1993

and to 81,219 mt in 1994. Yellowfin tuna landings caught by pole and line have slightly increased from 5,319 mt in 1992 to 5,585 mt in 1993 and to 5,830 mt in 1994. The number of pole and liners in eastern Indonesia based (Bitung, Gorontalo, Kendari, Ternate, Labuha, Ambon, Sorong, Biak and Fak-fak) was 823 vessels in 1993 and 820 vessels in 1994.

Preliminary estimate of the Indonesian long line catch of yellowfin in eastern Indonesia (WPYF - 3 code area) for 1994 is 4600 mt compared to 6241 in 1993 (Table 1). The number of longliners has increased from 141 in 1992 to 309 in 1993 and decreased to 293 in 1994 (Table 2.). Since the end of 1992, many longliners (mostly small longliners of 50 GRT (gross registered tons) or less have been moved from Bena Bali - based operate in Indian Ocean to Bitung North Sulawesi - based operate in Banda Sea and Sulawesi Sea (WPYF - 3 code area). Some of these longliners target was yellowfin and bigeye for the sashimi market of Japan.

Purse seine catches were also dominated by skipjack and then followed by yellowfin. The yellowfin catches were 2,200 mt in 1992, increased to 4,599 mt in 1993 and to 4,900 mt in 1994. The increased was caused by reentering of three large purse seiners Biak - based to the fishery at the beginning of 1993 which was slow down their activities in 1992. The number of large purse seine in Biak was still remaine 3 purse seiners, while the number of ringnet (purse seiners) operate in Sulawesi Sea were 156 vessels in 1993 and 162 vessels in 1994.

Tuna (yellowfin and bigeye) landings by artisanal fisheries (hand-line and "unclassified" fishing gear such as gill net, danish seine and troll line) have increased from 4,794 mt in 1992 to 5,034 mt in 1993 and to 6,150 mt in 1994 caught by hand line and increased from 36,770 mt in 1992 to 38,608 mt in 1993 and decreased to 37,650 mt in 1994 (yellowfin caught by unclassified fishing gear). Number of hand liners have increased from 286 vessels in 1992 to 307 vessels in 1993 and to 388 vessels in 1994.

4. YELLOWFIN TUNA AVERAGE WEIGHT

Average sizes (weight) of yellowfin tuna caught by longline fishery have fluctuated between 40,5 kg/fish and 35 kg/fish (from 40 kg/fish in 1991 decreased to 35 kg/fish in 1992, and increased again to 40 kg/fish in 1993 and to 40.5 kg/fish in 1994(see Table 3). Size of yellowfin caught by handlining in 1991 was 20.0 kg/fish. Average size of yellowfin catch by handlining in 1991 was 20.0 kg/fish, increased to 25.5 kg/fish 1992, decreased to 23 kg/fish in 1993 and increased again to 25.5 kg/fish in 1994.

Sizes of yellowfin tuna caught by purse seine and pole and line for 1991 to 1994 were quite similar and relatively small sizes of fish, ranging from 1,5 to 2.5 kg/fish. The average sizes of purse seine catches decreased from 2.5 kg/fish in 1991 to 2.0 kg/fish in 1992 to 1.5 kg/fish in 1993 and slightly increased to 1.7 kg/fish in 1994. While the average sizes of yellowfin catch by pole and line decrease from 2.5 kg/fish in 1991 to 2.0 kg/fish in 1992 and 1993 and increase again to 2.2 kg/fish in 1994.

Table 1. Catch of Yellowfin Tuna by Type of Fishing Gear in the WPYF-3 Code Area 1974-1994.

Year	Unclas sified	Pole and line	Purse seine	Long line	Hand line	Total
1974	10,165	-	-	-	-	10,165
1975	11,062	-	-	-	-	11,062
1976	7,530	507	-	-	-	8,037
1977	10,268	591	-	-	-	10,859
1978	8,225	1,160	-	1,216	-	10,601
1979	11,482	1,907	-	1,274	-	14,663
1980	11,626	2,269	2,177	1,478	-	17,550
1981	15,793	2,015	2,275	1,806	-	21,889
1982	17,393	1,887	1,428	3,605	-	24,313
1983	15,239	1,900	2,013	1,048	-	20,200
1984	18,140	2,282	2,108	1,670	2,250	26,450
1985	20,130	2,344	2,107	2,466	2,540	29,587
1986	25,226	2,278	1,650	2,347	2,737	34,238
1987	24,732	2,323	1,683	905	2,793	32,436
1988	26,377	2,439	1,767	576	2,899	34,058
1989	31,345	3,553	2,520	5,124	2,726	45,268
1990	32,285	4,433	2,665	5,508	3,196	48,087
1991	34,459	5,472	2,500	6,059	3,835	52,325
1992	36,770	5,319	2,200	6,242	4,794	55,325
1993	38,600	5,319	4,599	6,241	5,934	57,660
1994	37,650	5,430	4,900	4,600	6,150	55,730

Table 2. Number of vessels participation in yellowfin tuna fishery by type of fishing gear, 1985 - 1994.

Year	Pole and line	Purse seine	longline	Handline	Gillnet
1985	1,115	3	27	-	-
1986	1,287	3	63	-	-
1987	1,170	3	79	-	-
1988	1,577	3	70	-	-
1989	921	3	139	-	-
1990	900	3	152	-	-
1991	872	3	145	-	-
1992	849	3	141	286	-
1993	823	156	309	307	113
1994	820	162	293	388	152

Table 3. Yellowfin tuna average weight(kg/fish) 1991-1994

Year	Pole and line	Purse seine	Longline	Handline
1991	2.5	2.5	40.0	20.0
1992	2.0	2.0	35.0	25.0
1993	2.0	1.5	40.0	23.0
1994	2.2	1.7	40.5	25.5