Korean Tuna Fishery and Research Activity

by

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1. Tuna fishery

1.1 *Trends in Fishing Vessel and Total Catch*

From 1980 onwards, Korea has kept two types of fishing gears mainly targeting tunas in the Pacific Ocean. The longline fishery has been active for large bigeye and yellowfin tunas in a wide area between 40° N and 40° S including the SPC area. The purse seine fishery has been operating for small skipjack and yellowfin tunas in part of the SPC area according to the condition of fishing fee with some coastal nations.

Historical fishery data on the Korean fishing vessels for tunas and tuna-like species and on their annual total catches are given in Table 1. A total of 192 fishing vessels, which composed of 160 tuna longliners and 32 purse seiners, were active in the Pacific Ocean during 1994. The 1994 longliners were 12 more than in the number of the 1993 vessels but in recent years, number of the fishing vessels did not show much fluctuation compared with the past years'. The purse seiners in 1994 were 2 less than in the previous year's, having a continuous decreasing trend since 1990.

The 1994 catch from these fishing vessels totaled about 228,400 MT. Of the total catch, 85.4 percent was taken by the purse seiners and 14.6 percent by the longliners. The longline catch in 1994 amounted to about 33,400 MT, an increase of 29.7% over the 1993 figure. The purse seine catch was recorded to about 195,000 MT, up 54.0% from the previous year's catch.

According to percentage composition in annual total catch between the Korean tuna longline and purse seine fisheries shown in Table 1, majority of the Pacific tuna catch in the SPC area has been from the purse seine fishery since 1989, accounting for more than 80 percent of the total catch every year.

1.2 *Tuna Catch Statistics for all Fishing Gears*

Total catch of three main target species (bigeye, yellowfin and skipjack) of the Korean longliners and purse seiners in the SPC area was reported to about 224,400 MT in 1994, representing 98.2 percent of the total catch (Table 2). The species composition was broken down as follows:

- 145,541 MT skipjack (63.7 percent of the total catch)
- 59,257 MT yellowfin (25.9 percent)
- 19,603 MT bigeye (8.6 percent)

Skipjack catch comprised the highest proportion of the total catch, followed by yellowfin and bigeye, as has been the case during the previous eight years. Skipjack catch in 1994 doubled nearly the 1993 catch. But yellowfin catch decreased about 2.5 percent over the previous year's, keeping a trend indicating decrease from 1991 onwards. Bigeye catch was up 55.6 percent to 19,603 MT from the 1993 figure together with an increasing tendency as a whole.

1.3 *Tuna Catch and CPUE Statistics for each Fishing Gear*

Longline Fishery: The Korean longline statistics on fishing effort in number of hooks used, catch and catch-per-unit of effort (fish per 100 hooks, CPUE) by fish species in the SPC area were given in Table 3-1.

Longline fishing effort exerted to catch the Pacific tunas during 1994 in the SPC area was estimated to be about 76,380 hooks, an increase of 35.9 percent compared with that in 1993. The CPUE value for all fish species in this year decreased to 1.44 fish per 100 hooks from 1.60 fish in 1993. From the long term trends shown in the Table 3-1, it was appeared that the amount of fishing effort showed upward trend during the 1990s and the CPUE downward trend in the same period.

Albacore tuna catch of the longline fishery has maintained a significant decreasing pattern from a peak of 15,700 MT in 1986 to 95 MT in 1994, and the CPUE value also showed a decreasing trend. Bigeye tuna catch in 1994 increased to 19,600 MT from 12,580 MT in 1993 but the CPUE values of this

fish species during 1990~1994 did not fluctuate much, ranging between 0.70 and 0.88. Yellowfin tuna catch was about 9,800 MT in 1994, an increase of 20.6 percent compared with the 1993 figure but the CPUE estimate halfed the 1993 value (Table 3-1).

Purse seine Fishery: Table 3-2 shows the Korean purse seine statistics including fishing effort in day and haul, catch and catch-per-unit effort (per day, CPUE) for each fish species in the SPC area. Fishing efforts both in day and haul in 1994 increased slightly over the previous year's values, respectively. The 1994 CPUE value was 42.8 MT per day, up 49.1 percent compared with that of 1993. The 1994 estimate was comparable to the figures from 1988 to 1991 which were as high values as 41.0~45.8 MT per day. Yellowfin tuna catch in 1994 amounted to about 49,500 MT, a decrease of 6.1 percent from the 1993 value and the CPUE value declined from 11.1 MT in 1993 to 9.1 MT in 1994. Skipjack has been main target species of this fishery, accounting for approximately 73 percent of annual total catch since inception of this fishery in 1980. The 1994 catch of this fish species was recorded to about 145,500 MT of which was 84.6 percent of the 1991 catch at a peak of 172,000 MT through the whole time series. The CPUE of this species in 1994 was estimated to 33.5 MT per day, reaching the levels during 1988~1990 (Table 3-2).

2. Markets of Catches

It was very difficult to estimate the total values of the Pacific tunas caught by the Korean tuna fisheries in the SPC area due to no information available on domestic consumption and export prices. However, it was possible to derive average prices of some commercially important fish species from the Statistical Yearbook of Agriculture, Forestry and Fisheries published by the Ministry of Agriculture, Forestry and Fisheries, Rep. of Korea. This yearbook includes not only yearly total catch by species but also total values for each species through the whole Oceans. Table 4-1 gives the average prices per metric ton for the four main target species of the Korean tuna fisheries during

1990~1993. The total values of the target species for both longline and purse seine fisheries of Korea in the SPC area were estimated by multiplying the total catch by the average price for each species (Table 4-2).

The average prices of albacore and yellowfin tunas showed much variation between years. That of bigeye kept the highest value every year with an increasing tendency but skipjack were at low price level compared with other species', showing no large fluctuation through the years of 1990~1993 (Table 4-1).

Estimated total values of albacore, bigeye, yellowfin and skipjack in 1993 were US$ 0.14 million, 83.8 million, 93.1 million and US$ 61.0 million, respectively (Table 4-2). The total value of albacore continued to decrease owing to decrease of catch. The bigeye's value in 1993 decreased about 13.5 percent from the 1992 figure, but it was up 73.3 percent over the 1991 value when the total catch was closely at the 1993 level. The total value of yellowfin in 1993 increased over both the 1991 and 1992 values even though annual catches in two years were higher than the 1993 catch. The skipjack's value showed a decreasing trend every year.

3. Research Activity

The National Fisheries Research and Development Agency (NFRDA) pays special efforts every year to collect fishery data and information directly from the Korean tuna fishing vessels. NFRDA is running a kind of logbook system with a view to gathering fishery data on haul-by-haul catch and fishing effort statistics including other information such as location of fishing, water temperature at fishing area etc. The data collected from the Korean tuna longline fishery have been compiling to prepare information on basic statistics, 5 degree longitude by 5 degree latitude and on monthly distribution patterns of some commercially important species.

The basic data from 1975 to 1992 obtained from the Korean tuna longliners are published and provided already not only to SPC but also other related

organizations in the western Pacific Ocean. The 1993 data collected from the Korean tuna longliners through the whole Oceans and the data from the Korean purse seiners in the western Pacific region during 1980~1993 are being compiled as in the previous manner by NFRDA.

In 1993, NFRDA initiated a sampling programme at domestic places where the Pacific tunas are unloaded to obtain biological data, especially on tunas from the purse seine fishery. From the programme, data on monthly size compositions and reproductive biology of yellowfin and skipjack tunas have been collected. Besides, NFRDA has a scientific observation project to carry out research activities on board the Korean commercial fishing vessels. In June this year, one scientist has completed his mission on board a Korean purse seiner in the western Pacific Ocean. The results obtained from the observation will be available at the fifth meeting of the Western Pacific Yellowfin Tuna Research Group to be held next week here.

4. Others

Historical catch statistics for longliners of Korea in the SPC area were re-estimated by NFRDA based on the data, determined from logbook information aggregated by 5° x 5° by month published in NFRDA. Detailed descriptions are explained in Table 3-1.

Accordingly, catch statistics for the Korean tuna longline fishery in Table 11 of Tuna Fishery Yearbook in 1993, South Pacific Commission could be replaced by Table 3-1 in this report. On the other hand, Table 3-2 in this report contains more detailed information on the Korean purse seine fishery than in Table 36 of the same Yearbook issued by SPC.

Table 1. Korean fisheries statistics for the Pacific tunas in the SPC area

Year	Vessel active			Catch (MT)		
	LL	PS	Total	LL	PS	Total
1975	253		253	33,262		33,262
1976	257		257	56,196		56,196
1977	217		217	50,863		50,863
1978	223		223	43,236		43,236
1979	216		216	52,045		52,045
1980	211	2	213	50,405	544	50,949
1981	209	3	212	35,582	2,044	37,626
1982	121	10	131	30,654	12,209	42,863
1983	102	11	113	23,086	16,216	39,302
1984	96	12	108	22,104	14,183	36,287
1985	94	11	105	40,012	11,279	51,291
1986	134	13	147	41,122	27,732	68,854
1987	138	20	158	38,590	58,752	97,342
1988	124	23	147	34,954	79,397	114,351
1989	152	30	182	25,134	115,754	140,888
1990	182	39	221	35,662	173,343	209,005
1991	220	36	256	25,056	227,518	252,574
1992	166	36	202	30,243	182,287	212,530
1993	148	34	182	25,735	126,648	152,383
1994	160	32	192	33,378	195,004	228,382

LL : Longline, PS : Purse seine

LL vessels are from the entire Pacific Ocean including SPC area.

PS vessels are from the SPC area.

Longline catches are re-estimated by the National Fisheries Research and Development Agency (NFRDA) on the basis of data (statistical-sea block, 5° longitude x 5° latitude) compiled from Korean tuna vessels' logsheets.

Table 2. Catch (MT) statistics for the Pacific tunas of Korea in the SPC area

Year	Albacore	Bigeye	Yellowfin	Skipjack	Others	Total
1975	6,261	13,543	9,529		3,929	33,262
1976	9,008	20,176	15,118		11,894	56,196
1977	11,454	15,978	16,179		7,252	50,863
1978	11,302	7,878	13,812		10,244	43,236
1979	11,046	12,488	18,421		10,130	52,045
1980	9,640	13,106	22,863	476	4,864	50,949
1981	13,153	7,838	10,827	1,462	4,346	37,626
1982	11,499	6,988	10,996	10,167	3,213	42,863
1983	6,997	5,923	9,244	15,417	1,721	39,302
1984	5,212	7,086	7,208	13,767	3,014	36,287
1985	12,935	10,022	11,671	9,655	7,008	51,291
1986	15,677	10,156	11,959	25,305	5,757	68,854
1987	6,921	15,529	27,442	40,918	6,532	97,342
1988	6,171	11,928	26,200	64,032	6,020	114,351
1989	3,905	10,008	42,373	80,903	3,699	140,888
1990	3,062	16,016	46,983	138,460	4,484	209,005
1991	1,224	12,107	63,663	171,951	3,629	252,574
1992	195	14,875	78,194	115,290	3,976	212,530
1993	79	12,580	60,777	73,989	4,958	152,383
1994	95	19,603	59,257	145,541	3,886	228,382

Table 3-1. Catch and CPUE statistics for longliners of Korea in the SPC area

Year	Hooks	Albacore		Bigeye		Yellowfin		Others	Total	
		Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	Catch	CPUE
1975	57,102	6,261	0.19	13,543	0.70	9,529	0.39	3,929	33,262	1.44
1976	86,867	9,008	0.71	20,176	0.57	15,118	0.62	11,894	56,196	2.09
1977	92,492	11,454	0.70	15,978	0.62	16,179	0.85	7,252	50,863	2.31
1978	56,661	11,302	1.45	7,878	0.65	13,812	1.07	10,244	43,236	3.37
1979	90,883	11,046	0.72	12,448	0.51	18,421	0.98	10,130	52,045	2.33
1980	93,835	9,640	0.61	13,106	0.38	22,795	0.87	4,864	50,405	1.96
1981	96,735	13,153	0.89	7,838	0.26	10,245	0.37	4,346	35,582	1.64
1982	71,750	11,499	1.00	6,988	0.35	8,954	0.55	3,213	30,654	2.03
1983	45,162	6,997	1.17	5,923	0.46	8,445	0.78	1,721	23,086	2.52
1984	52,994	5,212	0.68	7,086	0.47	6,792	0.59	3,014	22,104	1.87
1985	90,521	12,935	0.79	10,022	0.52	10,047	0.60	7,008	40,012	2.02
1986	67,313	15,677	0.91	10,156	0.54	9,532	0.68	5,757	41,122	2.24
1987	68,239	6,921	0.35	15,119	0.70	10,059	0.70	6,491	38,590	1.79
1988	76,461	6,171	0.40	11,928	0.48	10,835	0.58	6,020	34,954	1.56
1989	66,546	3,905	0.15	9,774	0.42	7,841	0.49	3,614	25,134	1.14
1990	73,216	3,062	0.09	15,898	0.69	12,218	0.62	4,484	35,662	1.48
1991	53,452	1,224	0.15	12,103	0.88	8,247	0.55	3,482	25,056	1.60
1992	62,125	195	0.24	14,860	0.79	11,212	0.81	3,976	30,243	1.95
1993	56,190	79	0.11	12,580	0.77	8,118	0.61	4,958	25,735	1.60
1994	76,380	95	0.11	19,603	0.86	9,794	0.37	3,886	33,378	1.44

Units : hooks in thousands, catch in MT and CPUE in numbers of fish per 100 hooks

1. Catches for 1975-1980 were detemined as follows : the numbes of fish caught in the SPC area, determined from logbook data aggregated by 5° ×5° by month published in NFRDA (1980, 1981, 1985), were multiplied by average weights and divided by coverage rates.
2. Catches for 1981-1994 were determined as follows : weights of fish caught in the SPC area, determined from logbook data aggregated by 5° ×5°, were divided by coverage rates. The average weights (kg) and coverage rates by species are presented in Table 3-2.

Table 3-1(continued). Average weight and coverage rate by species for longliners of Korea in the SPC area

	Average weight (kg)				Coverage rate			
Year	Albacore	Bigeye	Yellowfin	Others	Albacore	Bigeye	Yellowfin	Others
1975	20.1	53.9	38.2	28.9	0.0291	0.1338	0.0761	0.0714
1976	18.6	45.7	37.0	35.3	0.2248	0.1989	0.2349	0.0940
1977	14.3	33.0	27.8	28.4	0.3422	0.5018	0.5702	0.2186
1978	15.1	34.6	30.9	27.6	0.6102	0.8979	0.7557	0.1880
1979	14.5	34.0	27.4	36.9	0.2711	0.4002	0.4189	0.1479
1980	17.3	36.5	30.7	32.7	0.6221	0.5903	0.6628	0.3820
1981					0.3700	0.4028	0.3252	0.3660
1982					0.4099	0.4958	0.5077	0.4473
1983					0.6527	0.5663	0.5815	0.5390
1984					0.6707	0.8203	0.7916	0.5590
1985					0.3807	0.8198	0.7020	0.2923
1986					0.2752	0.8123	0.7724	0.3101
1987					0.3860	0.8540	0.8228	0.4604
1988					0.5863	0.8904	0.8912	0.4707
1989					0.3127	0.9959	0.9213	0.5968
1990					0.2339	0.8957	0.8082	0.5035
1991					0.8828	0.9658	0.7956	0.5154
1992					-	0.7605	0.7255	0.4745
1993					-	0.8263	0.7778	0.4758
1994					-	0.4784	0.3147	0.3386

- Impossible to estimate the coverage rate

Table 3-2. Catch and CPUE (MT) statistics for purse seiners of Korea in the SPC area

Year	Fishing effort		Yellowfin		Skipjack		Bigeye		Others	Total	
	Day	Haul	Catch	Per day	Catch	Per day	Catch	Per day	Catch	Catch	Per day
1980	34	34	68	2.6	476	11.8				544	16.0
1981	206	209	582	1.6	1,462	7.0				2,044	9.9
1982	552	568	2,042	5.9	10,167	16.1				12,209	22.1
1983	409	409	799	6.9	15,417	32.5				16,216	39.7
1984	720	767	416	5.0	13,767	14.7				14,183	19.7
1985	437	570	1,624	3.4	9,655	21.9				11,279	25.8
1986	768	883	2,427	9.5	25,305	25.8				27,732	36.1
1987	1,718	1,749	17,383	10.7	40,918	23.4	410	0.1	41	58,752	34.2
1988	1,895	1,900	15,365	8.2	64,032	33.7				79,397	41.9
1989	2,527	2,533	34,532	13.0	80,903	32.7	234	0.1	85	115,754	45.8
1990	3,994	4,187	34,765	9.4	138,460	33.7	118	0.2		173,343	43.4
1991	5,549	8,304	55,416	11.2	171,951	29.6	4	0.1	147	227,518	41.0
1992	5,284	7,502	66,982	12.2	115,290	22.2	15	0.1		182,287	34.5
1993	4,413	6,208	52,659	11.1	73,989	17.6				126,648	28.7
1994	4,556	6,352	49,463	9.0	145,541	33.5				195,004	42.8

Table 4-1. Average prices($/ton) for main commercial species of Korean tuna fishery

Year	Albacore	Bigeye	Yellowfin	Skipjack
1990	2,502	4,399	2,477	731
1991	1,575	3,994	1,185	724
1992	3,858	6,510	765	598
1993	1,786	6,662	1,532	825

Table 4-2. Catches and values for main commercial species of Korean tuna fishery in the SPC area

YEAR	Albacore		Bigeye		Yellowfin		Skipjack	
	catch	value	catch	value	catch	value	catch	value
1990	3,062	7,661	16,016	70,454	46,983	116,377	138,460	101,214
1991	1,224	1,928	12,107	48,355	63,663	75,441	171,951	124,493
1992	195	752	14,875	96,836	78,194	59,818	115,290	68,943
1993	79	141	12,580	83,808	60,777	93,110	73,989	61,041

Unit : Catch in MT.

Values in thousand US dollar.