Calculation of the Nominal Catches of vessels Not Elsewhere Included (NEI) within the IOTC Area

By the IOTC Secretariat

Definition

The acronym **NEI** (Not Elsewhere Included) has usually been used to record the catches by vessels or fleets which are not officially reported to the IOTC. This category includes two types of vessels:

1. Catches of vessels reported by persons or organizations other than the flag state or responsible organization: All catches that are not reported directly (by the IOTC Liaison Officers) or indirectly (obtained through the FAO databases and/or Statistical Bulletins and/or scientific papers) are classified under NEI. The catches by European owned purse seiners flying flags of convenience are a good example for they have been reported by the European Liaison Officers since these vessels started operating in the western Indian Ocean (1984). The quality of this set of data is so good as that recording the catches by purse seiners flying EU flags (France, Italy and Spain) for both fleets are dealt with as if they were only one. The Secretariat does not need in this case to do any further data handling being the catches presented in the Data Summary the same as those submitted.
2. Non-reported catches which the Secretariat has to estimate by using the sources available: Fleets not reporting on their fishing activities are widespread. Registries of Foreign Fishing Vessels (see the IOTC Vessel Registry Form in Annex), calls (see the IOTC Foreign Tuna Vessels Activity Form) and landing statistics coming from countries in the region are helpful in assessing this issue. However, the information gathered at IOTC is still scarce and uneven being in some cases impossible to track the fleets down to the year their operations started. Catches by both the Russian owned purse-seiners (now flying Panama flag) and a high number of longliners flying flags of different countries (Belize, Panama, Honduras, etc.) have been fully estimated by the Secretariat.

Estimate of the Nominal Catches by NEI purse seiners

The catches by purse seiners under NEI were estimated differently depending upon where the data were originated:

1. European owned purse seiners: As it was mentioned before the EU scientists process all data regarding the activities of the EU owned purse seiners jointly, irrespective of the flag the vessels are flying. The catches by NEI purse seiners are reported altogether (all flags combined). These data do not require any processing by the Secretariat and therefore the catches are directly input to the database. The following chart shows the catches by these vessels having been reported since the beginning of the operations:

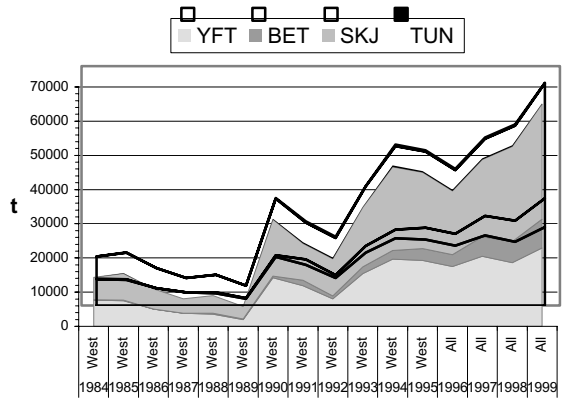


Chart 1: Nominal Catches of the European Owned Purse Seiners Flying Flags of Convenience from 1984 to 1999.

The catches have been increasing over the time amounting to some 65,000 tonnes in 1999 (about 14,000 t in 1984).

The NEI EU PS fleet has been operating under different flags throughout the years. In some cases a single vessel has re-flagged once, twice or more times. The table below shows the number of vessels flying convenience flag per country flag from 1984 to 1999.

As it would be expected, the gradual increase in the catches throughout the years is related to the increase in the number of NEI PS operati

Country / Year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Cote d'Ivoire	5	5	1													
Panama	1	1	1	1	1	1	3	3	3	4	3	3	3	2	2	2
Belize	1	1	1							4	4	4	4	4	4	4
Cayman Islands							1									
Malta							1	1	1	1		1				
Netherlands Antilles														4	4	4
Total	7	7	3	1	1	1	5	5	4	9	7	8	7	10	10	10

Table 1: Number of EU owned purse seiners flying flags of convenience operating in the Indian Ocean from 1984 to 1999 per year and country flag.

2. Russian owned purse seiners: The Russian purse seiners, which were operating under the Soviet Union flag from 1986 to 1991, re-flagged to Liberia in 1992 keeping this flag to 1996. The vessels re-flagged once again in 1997 to Panama, flag which they are using since then. The Table 2 shows the number of Russian owned purse seiners flying flags of convenience which have been operating in the Indian Ocean since 1992.

Country / Year	1992	1993	1994	1995	1996	1997	1998	1999
Liberia	5	4	7	11	10			
Panama						9	9	9
Total	5	4	7	11	10	9	9	9

Table 2: Number of Russian owned purse seiners flying flags of convenience operating in the Indian Ocean from 1984 to 1999 per year and country flag.

The Chart 2 shows the catches by these vessels for the period aforementioned. The Nominal Catches were reported until 1994 having been estimated by IOTC since then. The basic information used for the calculation came from the former IOTC Liaison Officer who sent incomplete catch and effort figures for the years 1996 to 1999 and the number of vessels operating along those years.

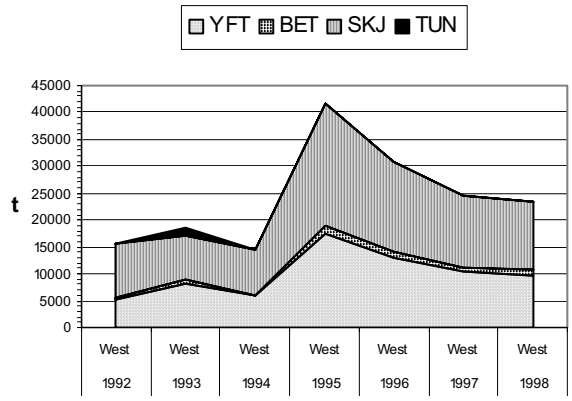


Chart 2: Nominal Catches of the Russian Owned Purse Seiners Flying Flags of Convenience from 1992 to 1998.

The steps given for the calculation of the 1995-98 LBR and PAN nominal catches are showed in Annex along with the data used to estimate those catches. Different sources were used to estimate the catches as the data reported by the former IOTC Liaison Officer (regarding the catches, effort and number of purse seiners operating from 1996 to 1999), nominal catches and catch and effort statistics for the Russian purse seine fleet for the previous years (especially from 1992 to 1994) and the nominal catches per species for the EU purse seiners from 1992 to 1998.

Estimate of the Nominal Catches by NEI longliners

The Secretariat has been estimating the catches by NEI longliners since 1985. The basic data used for the calculation of these catches were and still are scarce and uneven. This implies making so much assumptions and data handling in the process of estimating the catch that the final figures obtained could not be looked at but carefully.

The longline NEI fleet can be roughly split into two components:

1. Longliners which the GRT (Gross Registered Tonnage) is above 100 tonnes: This fleet is almost fully made up by freezing or deep-freezing longliners whose skippers are usually bound to submit the catches to the country of the flag the vessel is flying. The Distant Water Fishing Nations (DWFN) have been usually reporting the data on nominal catches and catch and effort statistics to IOTC. Nevertheless, the catches by longliners above 100 GRT flying flags of convenience have never been reported to IOTC nor estimated so far. The only data available are from calls and/or landing statistics in some ports of the Indian Ocean (as Port Louis in Mauritius and Victoria in Seychelles), and from lists of vessels which catches were fully or partially sent to the Japanese or American markets. The first reports of a longliner flying flag of convenience operating in the Indian Ocean are from the AFRI (Albion Fisheries Research Institute) in 1988. Therefore, the catches should at least be estimated since then. The problem to do such an estimate is that nothing is known about how this fleet has been changing over the time, being 1998 and 1999 the only years which enough data were available to "fairly" estimate the catches. The catches resulting from that estimate are amazingly high making evident the extent of this problem. The Charts 3 and 4 show the catches estimated for the NEI longline fleet per year and species in the Western and Eastern Indian Ocean, respectively.

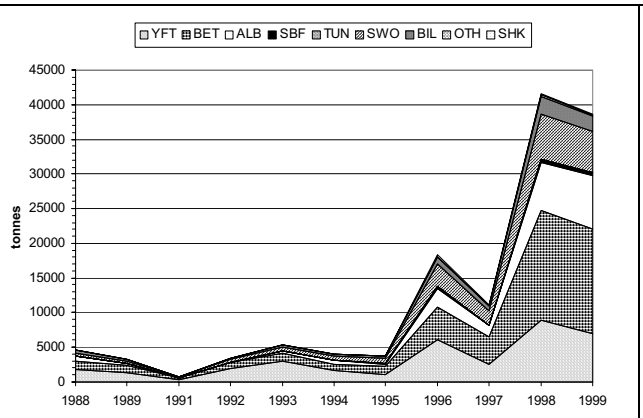


Chart 3: Nominal Catches per species and year for the NEI longliners (which the GRT is above 100 tonnes) operating in the Western Indian Ocean from 1988 to 1999.

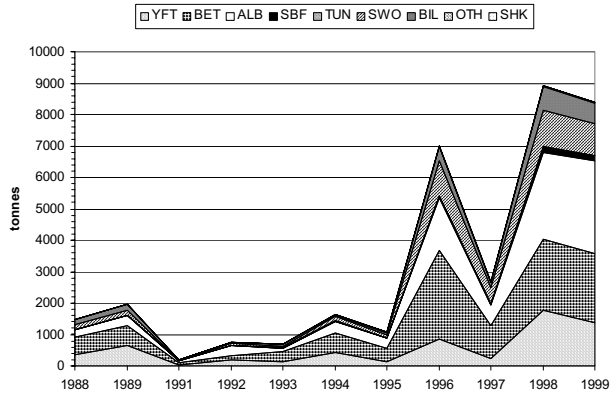


Chart 4: Nominal Catches per species and year for the NEI longliners (which the GRT is above 100 tonnes) operating in the Eastern Indian Ocean from 1988 to 1999.

The number of NEI longliners above 100 GRT estimated as being operating in the Indian Ocean from 1988 to 1999 is shown in Table 3 (more details in relation with this estimate are given in the Annex).

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Number of NEI LL (GRT>100)	17	23	0	3	12	12	20	14	69	46	141	141

Table 3: Total number of NEI Longliners which GRT is above 100 tonnes operating in the Indian Ocean from 1988 to 1999.

All steps given for the calculation of these catches are shown in Annex.

2. Longliners which the GRT is below 100 tonnes: The number of small longliners operating in the Indian Ocean has been constantly increasing since they first appeared, by the mid eighties. This fleet is almost fully made up by Taiwanese owned longliners although some Chinese longliners are also operating since 1995. The characteristics of the vessels and the way of operating is very similar being the target species the yellowfin and the bigeye which are generally kept in crushed ice (seldom in refrigerated sea water) to be unloaded to processing plants in different ports of the Indian Ocean, where they are graded and, if complying with the 'sashimi' quality standards, air-freighted to Japan.

   The fresh tuna was declared as main product for the Japanese 'sashimi' market in the end of 1986 (information from the Indonesian Company Perikanan Samodra Besar). This measure caused a

sudden decrease in frozen tuna products and surely stimulated the operations of small fresh tuna longliners. 1986 were therefore considered as starting point for the estimation of the catches and number of longliners operating.

While the Chinese vessels have been reporting on its activities since they first operated in the Indian Ocean, this is not the case with the Taiwanese longliners (below 100 GRT) which indeed are not bound to report on the catches and landings to Taiwan.

Another point which is worth to mention here is that the coastal countries have been putting more and more pressure on the ship owners for changing the flag of their vessels by the flag of the country which they are operating from. This change has already taking place in countries as Pakistan, Oman or Indonesia. The fact that more and more vessels are flying flags of coastal countries implies a better monitoring and reporting of their catches by those countries which also implies a better access of the Secretariat to those data.

Although the vessels have been using different ports of landing throughout the time, the most of the activity occurs in the Eastern Indian Ocean, being Indonesia, Malaysia, Thailand and Sri Lanka the countries which ports are most visited.

The calculation of the catches by this component of the fleet has been split relying upon the country which port or ports the vessels are operating from. The reasons for this are primarily two:

- **a.** The data available for estimating the catches are usually different for each country and so the sources consulted. Considering the different accuracy of the data obtained which depends upon the basic data used and the number of assumptions done throughout the process it was thought better to present the data separately.
- **b.** Several sources were consulted to assess whether single vessels used ports in different countries to unload their catches. 1998 and 1999 vessel and call registries from Thai (Phuket), Malay (Pinang) and Indonesian (especially Benoa and Jakarta) ports were consulted in order to check this (the sources being the sampling programs and/or national registries) realizing that the vessels do not use to call to more than one port throughout the year (being indeed attached to a single Shipping Agency).

The following countries were dealt with:

INDONESIA: Although longliners have been operating from Indonesia since the early sixties (Japanese longliners), the fresh tuna fleet appeared only in the mid eighties. For the first record of a NEI longliner operating from Indonesia was in 1988 the catches have been estimated since that year. It is also worth to mention that no foreign vessels are allowed to exploit the Indonesian EEZ or to call to ports in that country since January 1st, 2000. This regulation implemented by the Indonesian Government has been effective before that date for no foreign longliners are reported to operate from Indonesian ports since 1997 (information from the CSIRO sampling program in Benoa).

The following sources were used to estimate the catches:

- **a.** CSIRO Sampling Programme in Benoa (and Tim Davis Personal Communications)
- **b.** Catch monitoring of the fresh tuna caught by the Bali-Based LL fishery, by T.L.O. Davis et al., 1996 and 1997 Reports.
- **c.** “Tentang Perkembangan kapal perikanan berbendera Indonesia dan asing dengan izin Direktorat Jenderal Perikanan" (List of Indonesian and foreign fishing vessels issuing permits to operate from Indonesian ports during the years 1992 and 1993), Jakarta.
- **d.** Statistik Perikanan Indonesia (Fisheries Statistics of Indonesia), Jakarta. (Issues no. 14, 15, 16, 22 and 23).
- **e.** Report on the recent Development of Tuna Longline Fisheries Based in Jakarta – Particular Reference to Tuna Longliner from Taiwan, K. Ishida and T. Yamamoto (Fourth South East Asia Tuna Conference, 27-30 November 1990, Bangkok, Thailand).
- **f.** Development of Fisheries for Tunas and Tuna-Like Fish in Indonesia, with Particular Reference to the Jakarta-Based Tuna Longline Fishery, by K.Ishida et al., IPTP, Colombo, 1994.
- **g.** Review of tuna fishery in the western part of Indonesian waters - Indian Ocean side (Nurzali Naamin, RIMF, Jakarta) on Proceedings of the 5th Expert Consultation on Indian Ocean Tunas.
- **h.** Review of Indonesian Tuna Statistics, by G.Carrara and J.Uktolseja (based on the work by J.Moron in 1994 for IPTP).

i. Recent trend of tuna fisheries in Indonesia with special reference to Indian Ocean side" (Nurzali Naamin, RIMF, Jakarta) on Proceedings of the Expert Consultation on Stock Assessment on Tunas in the Indian Ocean

j. Data from "Perikanan Samodra Besar" (Brochure).

k. Sampling Systems in the Indonesian Indian Ocean Tuna Fishery (Report from C.P. Mathews and A. Ghofar)

The Chart 5 shows the catches estimated for the NEI longliners operating from Indonesian ports and fishing in the Indian Ocean for the period 1986-99 while the Table 4 shows the number of NEI longliners estimated to operate on those years.

Nominal catches above 10,000 tonnes were estimated for the years 1989 to 1994. Detailed information on how the catches were estimated can be found in Annex.

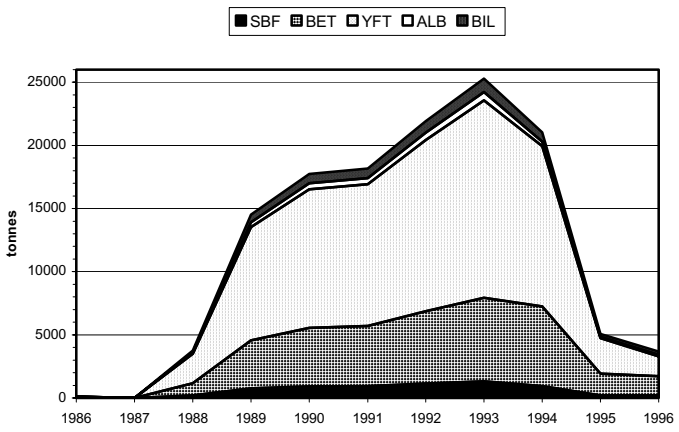


Chart 5: Nominal Catches of the NEI tuna longliners operating from Indonesian ports and fishing in the Eastern Indian Ocean from 1986 to 1999.

	1986	1988	1989	1990	1991	1992	1993	1994	1995	1996
Number of NEI LL (GRT>100)	2	71	276	337	346	417	481	400	111	67

Table 4: Total number of NEI Longliners operating from Indonesian ports and fishing in the Eastern Indian Ocean from 1986 to 1999.

MALAYSIA (Pulau Pinang): Penang is the only port in Malaysia where landings from tuna longliners have been reported to date. The landing activity in Pinang can be split into three different periods:

a. From 1963 to 1976: Landings from freezing longliners were recorded in that port. The catches of these vessels, mostly belonging to DWFN and above 100 GRT, were reported to the IOTC for the countries concerned.

b. From 1976 to 1986: No longline activity was recorded at Pinang shifting the former vessels to Singapore.

c. From 1986 to date: The port of Pinang reopened to landings from foreign longliners in 1986. The vessels which have been operating since that date are those which catches have to be estimated, i.e. small tuna longliners (below 100 GRT) mostly from Taiwan preserving the fish in crushed ice.

1989 was the first year the catches were estimated by IOTC. The data used to estimate the cathes from 1989 to 1994 were from a sampling program running in Malaysia at that time. The catches after 1994 have been estimated from the following sources:

a. Fisheries Research Institute of Pulau Pinang (FRI)

b. IOTC Sampling Programs

c. CSIRO Reports and personal communications

d. Landings of Indian Ocean Tuna by Foreign vessels in Malaysia (Badariah Binti Mohd Ali) in Proc. 6th Expert Consultation.

The Chart 6 shows the catches estimated for the NEI longliners based in Pulau Pinang from 1989 to 1999. It is important to note that the landings estimated were even higher than those recorded in Indonesia being the highest landing recorded in 1994 (amounting to some 37,000 tonnes). Regarding the species composition of the catch it is also worth of mention the higher and higher

catches of bigeye tuna recorded over the period. The difference between the relative catches of yellowfin and bigeye tunas recorded in 1994 and 1995 is due to the different ways the catches were estimated. However, it was thought not to re-estimate the catches before 1995 until more information become available from the sampling program.

The number of NEI longliners below 100 GRT estimated to operate in the Eastern Indian Ocean from 1988 to 1999 is shown in the Table 5. 1994 was the year the highest number of longliners was estimated being the trend a decreasing one from that year both onwards and backwards.

In light of these estimates it is clear that Pulau Pinang has been and currently is one of the most important landing places of fresh tuna in the Indian Ocean.

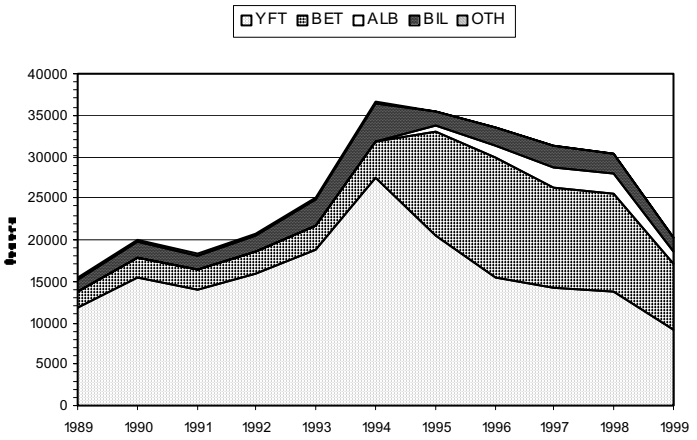


Chart 6: Nominal Catches of the NEI tuna longliners operating from Pulau Pinang (Malaysia) and fishing in the Eastern Indian Ocean from 1989 to 1999.

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Number of NEI LL (GRT>100)	292	378	347	393	475	698	774	612	548	495	329	292

Table 5: Total number of NEI Longliners based in Pulau Pinang (Malaysia) and fishing in the Eastern Indian Ocean from 1989 to 1999.

THAILAND (Phuket): Small tuna longliners started using the port of Phuket to unload their catches in August 1994. The catches after that date have been constantly increasing (see the Chart 7). Whether these vessels were based in other ports of the Indian Ocean before or came from the Pacific is not clear although a possible explanation for this is that vessels before based in Indonesian Ports migrated to other ports in the Indian Ocean to avoid re-flagging to the Indonesian flag (see Indonesia). Indeed, the year the foreign fleet started unloading in Phuket (1994) is the same the number of foreign longliners (and so their catches) operating from Indonesian ports start decreasing. It is therefore possible that as some of the foreign vessels operating from Indonesia re-flagged to Indonesia to comply with the new regulations, others simply chose other ports of landing to avoid doing the same.

The main source providing the data for the calculation of these catches have been the AFDEC through papers presented to the 7th Expert Consultation on Indian Ocean Tunas and the First Working Party on Data Collection and Statistics and through personal communications and reports from the sampling program which is currently running in Phuket.

The information on total catches the research institutions usually gather, if

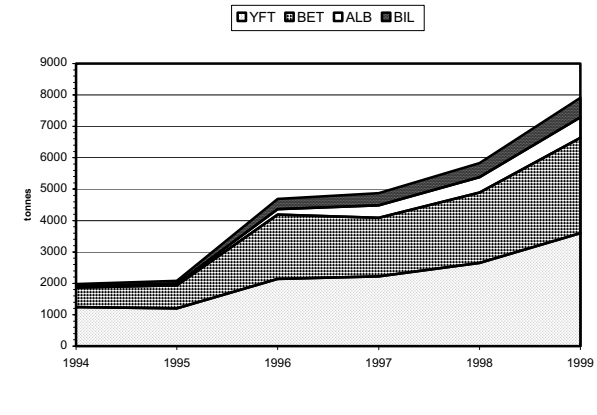


Chart 7: Nominal Catches of the NEI tuna longliners operating from Phuket (Thailand) and fishing in the Eastern Indian Ocean from 1994 to 1999.

are not from the field, are either from the Port Authority or the Customs. These figures are usually underestimated including in the first case the catches on-board estimated by the skipper (usually lower than the real amount especially if the payment of fees relies upon it) and in the second only the part of the catch that is exported to foreign markets (which in case of these vessels usually amounts to about the 70-75% of the catch going through the processing plants, the incidental catches excluded).

The number of NEI longliners below 100 GRT estimated to be based in Phuket operating in the Eastern Indian Ocean from 1988 to 1999 is shown in the Table 6. As it was mentioned before the landing activities in Phuket have been increasing throughout the years which an increase also in the number of vessels operating.

	1994	1995	1996	1997	1998	1999
Number of NEI LL (GRT>100)	63	82	210	242	251	297

Table 6: Total number of NEI Longliners based in Phuket (Thailand) and fishing in the Eastern Indian Ocean from 1994 to 1999.

SRI LANKA(Colombo): 1990 was the first year which catches from foreign tuna longliners were reported in Sri Lanka. These catches were estimated until 1993 as all longliners changed to fly the Sri Lanka flag since then. This fleet was reported to operate in the Western Indian Ocean.

It seems that about 80 tuna longliners are currently operating from Sri Lanka (reports from Shipping Agencies' representatives dealing with tuna longliners in other countries) but any estimate of the catch is impossible taking into account that nothing is know about that fleet. Indeed it is possible that these vessels be flying the Sri Lanka flag (although no longline catches have been reported to IOTC by Sri Lanka so far).

INDIA, PAKISTAN, OMAN AND YEMEN: Longline landings by foreign vessels below 100 GRT (mostly Taiwanese) were estimated by IOTC from 1989 to 1992. The vessels operating from ports in Pakistan and Oman were bound to change the flags to the country flags and therefore no more estimates were needed.

The fleet based in India was made up by longliners flying the Honduras and Panama flags (1985-92), only Honduras (1993 to 1995, the catches were input under Honduras) or Hong Kong (1996 and 1997, catches entered under India). Only the catches from 1985 to 1992 are dealt with here.

Regarding the fleet based in Yemen, it is not clear whether the activities by these longliners still continue or not. At this stage it is impossible to say whether the whole foreign longline fleet below 100 GRT operating in the Western Indian Ocean re-flagged (to fly the flag of the hosting country) or not. In case any foreign longliners be still operating it is not know which ports they are calling to.

The Charts 7 and 8 show the catches by longline vessels based in Sri Lanka, Pakistan, Oman and Yemen during the period 1985 to 1994. The number of vessels operating has not been estimated due to the scarce data available.

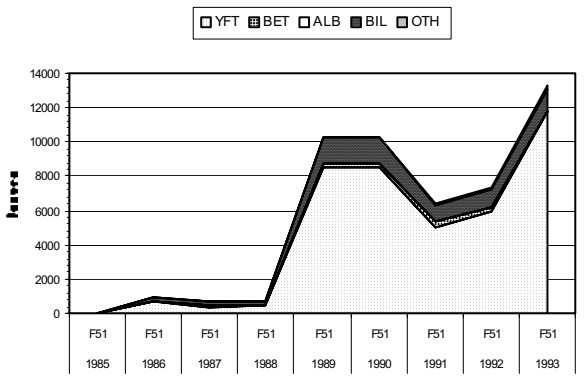


Chart 7: Nominal Catches per species and year for the NEI longliners based in India, Sri Lanka, Oman, Pakistan and Yemen operating in the Western Indian Ocean from 1985 to 1993.

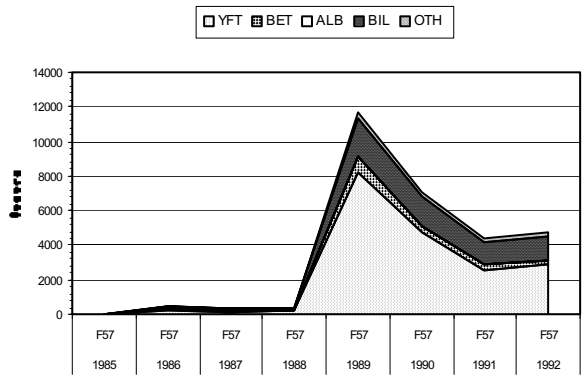


Chart 8: Nominal Catches per species and year for the NEI longliners (which the GRT is above 100 tonnes) operating in the Eastern Indian Ocean from 1985 to 1992.

Whatever be the case an estimate of the catches by small longliners in the Western Indian Ocean will be needed for the most of the countries have not been reporting on longline activities, regardless of the flag or flags the fleet based in each country ports was flying.

Annex

Russian owned Purse Seine fleet

(1)

A/ DATA REPORTED BY THE FORMER LIAISON OFFICER

Total fishing days reported (1996)	1065
Catch reported (1996)	9974 MT
Mean catch per fishing day	9.37 MT/FDAY

Data reported by the Liaison Officer (LO). Mean catches per vessel per day at sea are similar and reliable if compared with the mean catches per fishing day provided by the LO for the year 1996 (the slight difference might be due to the different types of effort used, days at sea in the first case and fishing days in the second one).

B/ DATA FROM IOTC CATCH AND EFFORT DATABASE (SUN & LBR)

YEAR	EFFORT	CATCH	MEAN CATCH PER DAY
1985		432	
1986		3	
1987		42	
1988		14	
1989		143	
1990		7	
1991		8	
1992	826	8329	10.08
1993	716	8185	11.43
TOTAL	1542	16514	10.71

C/ DATA FROM IOTC NOMINAL CATCHES AND FISHING CRAFT STATISTICS DATABASES EUROPEAN FLEET (FRA & ESP PS)

YEAR	no PS	CATCH	MEAN	
1992	33	185,185	5,612	1.0043
1993	35	198,442	5,670	1.0147
1994	39	212,342	5,445	0.9744
1995	35	243,442	6,955	1.2448
1996	39	222,066	5,694	1.0190
1997	42	211,890	5,045	0.9029
1998	35	168,295	4,808	0.8605
TOTAL	258	1,441,662	5,588	1.0000

Factor representing the difference between the mean catch per vessel for the series 1992 to 1998 and the mean catch per vessel in each particular year.

D/ RUSSIAN OWNED FLEET (SUN, LBR & PAN)

YEAR	no PS	CATCH	MEAN
1990	9	6769	752
1991	9	8927	992
1992	5	15753	3,151
1993	4	18430	4,608
1994	7	14372	2,053
1995	11		0
1996	10		0
1997	9		0
1998	9		0
TOTAL	16	48,555	3,035

The number of Russian owned purse seiners operating in the Indian Ocean was provided by the Liaison Officer along with the total catches between 1990 and 1994. The number of purse seiners operating during 1996, not provided, was estimated as the mean of 1995 and 1997 numbers.

Only the 1992 to 1994 data were used for the calculation of the mean catch per vessel per year.
A figure of 3,035 tonnes per vessel and year was obtained.

(1) Calculation of the mean catches per vessel: this calculation was only possible for the years were both the number of vessels operating and the nominal catches were reported. Taking into account the unrealistic figures obtained for 1990 and 1991 (probably due to the fact that the total number of vessels operating was known but not the total catch) these data were discarded. So, the 1992 to 1994 figures were used for the calculation. A mean value of 3035 MT per year and vessel was obtained. This match quite well with the 1996 data reported by the IOTC liaison officer, the only were Effort and Catches were present. A value of 9.37 MT per fishing day is obtained from these data. This means that a vessel should be fishing some 324 days a year to attain these catches. Considering that the Russian PS are almost always at sea (even to tranship their catches) the figure is not thought unrealistic. These data match also pretty well with those in the CE database which result in mean catches per day (day at sea) of about 10.71 MT for the years 1992 and 1993.

(2)

	FROM **D/**		FROM **C/**	TOTAL CATCHES
	NUMBER OF PS	MEAN CATCH	FACTOR	
1995	11	3,035	1.2448	41552
1996	10	3,035	1.0190	30923
1997	9	3,035	0.9029	24659
1998	9	3,035	0.8605	23503

(2) Calculation of the total catches per year from 1995 to 1998: The 1995 catches were recalculated for the values appeared to be really low if compared with the number of vessels operating. The number of vessels operating during 1996 was estimated as the mean value between that number in the preceding and following years.
For the calculation of the total catches per year the EU PS records were used as follows:
a. Calculation of the mean catch per vessel per year from 1992 to 1998 (which no major changes occurred regarding the fishing strategy of the fleet).
b. Calculation of the mean catch per vessel and year for the entire series.
c. Relationship between the mean catch for the series and the mean catch for each particular year.
The number of Russian owned PS for a given year were afterwards multiplied by the mean catch per vessel (Russian PS: 3035 MT) and by the factor obtained for that year (EU PS fleet).

(3)

E/ DATA FROM IOTC NOMINAL CATCHES DATABASE EUROPEAN FLEET (FRA & ESP PS) SPECIES COMPOSITION (EXCLUDING FRZ)

YEAR	YFT	SKJ	BET	ALB	TOTAL
1992	83006	91870	7446	2863	185185
1993	87138	99679	10411	1214	198442
1994	78931	120085	11261	2065	212342
1995	104368	118678	19485	911	243442
1996	95000	106364	18258	1217	220839
1997	92112	94405	23597	1568	211682
1998	59084	87580	20903	728	168295
TOTAL	599639	718661	111361	10566	1440227

F/ DATA FROM IOTC NOMINAL CATCHES DATABASE RUSSIAN OWNED FLEET (SUN & LBR PS) SPECIES COMPOSITION (EXCLUDING TUN AND FRZ)

YEAR	YFT	SKJ	BET	ALB	TOTAL
1992	5149	9984	397	40	15570
1993	8079	7995	952	37	17063
1994	5836	8243	280	3	14362
1995					
1996					
1997					
1998					
TOTAL	19064	26222	1629	80	46995

(FROM **E/**)

G/ YEARLY PROPORTIONS AMONG THE SPECIES

YEAR	YFT	SKJ	BET	ALB
1992	0.448	0.496	0.040	0.015
1993	0.439	0.502	0.052	0.006
1994	0.372	0.566	0.053	0.010
1995	0.429	0.488	0.080	0.004
1996	0.430	0.482	0.083	0.006
1997	0.435	0.446	0.111	0.007
1998	0.351	0.520	0.124	0.004
TOTAL	0.416	0.499	0.077	0.007

(FROM **G/**)

I/ RELATIONSHIP BETWEEN THE MEAN AND THE YEARLY PROPORTIONS FOR THE SPECIES

YEAR	YFT	SKJ	BET	ALB
1995	1.030	0.977	1.035	0.510
1996	1.033	0.965	1.069	0.751
1997	1.045	0.894	1.442	1.010
1998	0.843	1.043	1.606	0.590

Factor representing the difference between the mean catches per species per year for the series 1992 to 1998 and the mean catches per species in each particular year (from 1995 to 1998).

(FROM **F/**)

H/ YEARLY PROPORTIONS AMONG THE SPECIES

YEAR	YFT	SKJ	BET	ALB
1992	0.331	0.641	0.025	0.003
1993	0.473	0.469	0.056	0.002
1994	0.406	0.574	0.019	0.000
1995				
1996				
1997				
1998				
TOTAL	0.406	0.558	0.035	0.002

J/ CALCULATION OF THE 1995-98 YEARLY PROPORTIONS FROM THE MEAN VALUES FOR THE SERIES 1992-94 (**H/**) AND THE RELATIONSHIP BETWEEN THE MEAN AND THE YEARLY PROPORTIONS PER SPECIES AND YEAR (**I/**)

YEAR	YFT	SKJ	BET	ALB	TOTAL
1995	0.418	0.545	0.036	0.001	1.000
1996	0.419	0.539	0.037	0.001	0.996
1997	0.424	0.499	0.050	0.002	0.974
1998	0.342	0.582	0.056	0.001	0.981

(FROM **J/**)

K/ FINAL PROPORTIONS AMONG SPECIES

YEAR	YFT	SKJ	BET	ALB
1995	0.418	0.545	0.036	0.001
1996	0.421	0.541	0.037	0.001
1997	0.435	0.512	0.051	0.002
1998	0.349	0.593	0.057	0.001

TOTAL (FROM **(2)**) BREAK INTO SPECIES RELYING ON THE PROPORTIONS OBTAINED IN **K/**

L/ FINAL ESTIMATE OF THE CATCHES PER SPECIES

YEAR	YFT	SKJ	BET	ALB	TOTAL
1995	17364	22660	1492	36	41552
1996	12922	16864	1110	27	30923
1997	10305	13448	885	21	24659
1998	9821	12817	844	20	23503

(3) Calculation of the catches per species from 1995 to 1998: A similar method was used to calculate these figures.

a. The catches per species from 1992-94 for the Russian owned PS were used to calculate the relative proportions among the species.

b. This was also done for the series 1992-98 for the EU PS fleet and the corresponding factors calculated depending upon the species in the same way as for the total catches.

c. Final proportions were calculated from the data obtained in b).

d. The total catch for each year was finally multiplied by the proportions in c) for that year to obtain the catches per species.

FRZ and TUN catches were not considered for their catches had been unevenly reported (sometimes reported sometimes omitted) throughout the period and, if reported, do not correspond normally to total catches.

Longline boats which the GRT is above 100 tonnes

(1)

FROM THE IOTC VESSEL REGISTRY RECORDS
A/ NUMBER OF LONGLINERS ABOVE 100 GRT FLYING FLAGS OF CONVENIENCE OPERATING IN THE INDIAN OCEAN DURING 1998-99

FLAG	NUMBER
HONDURAS	60
EQUATORIAL GUINEA	22
BELIZE	42
KENYA	3
PANAMA	2
RUSSIA	5
SINGAPORE	5
SAINT VINCENT	1
VENEZUELA	1
TOTAL	141

Longliners belonging to NEI fleets unloading or transhipping their catches in ports of the Indian Ocean during 1998-99. The data are from Mauritius (registries of call and landings), Reunion (France), Japan (list of vessels operating in the Indian ocean which catches were partially or fully exported to Japan), Seychelles (Vessel Registry from the Seychelles Fishing Authority) and ICCAT (list of vessels operating in the Indian ocean which catches were partially or fully exported to United States).

The bulk of the NEI longline fleet operating in the Indian Ocean is made up by vessels from Honduras, Belize and Equatorial Guinea (this is in accordance also with the AFRI data on **B/**.

All those longliners are assumed to be above 100 GRT.

Detailed information on the names of the vessels and the source providing the information can be found in **NEI VR 28-8-00**

(1) Estimate of the number of NEI longliners above 100 GRT operating in the Indian Ocean from 1988 to 1999: The data in the table below (**B/**) are not complete being the only source the AFRC. The data in the right table (**A/**), which comes from different sources, are more reliable. Therefore, as the only source for longline NEI activity from 1988 to 1997 was the AFRC, the total number of longliners in Table **B/** was raised by multiplying this number by the factor obtained by dividing the 1998 total number of vessels in table **A/** by the total number obtained for that same year in table **B/** (F= 2.88). It is possible that the number of vessels before 1996 be underestimated taking into account the dramatic increase in the number of NEI longliners reported by the AFRC between 1995 and 1996. As no more data were available, these numbers were kept as they were.

FROM THE IOTC VESSEL REGISTRY RECORDS (ALL DATA PROVIDED BY THE ALBION FISHERIES RESEARCH INSTITUTE OF MAURITIUS)
B/ NUMBER OF LONGLINERS ABOVE 100 GRT FLYING FLAGS OF CONVENIENCE CALLING TO PORT LOUIS FROM 1988 TO 1999

FLAG / YEAR	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
BELIZE										1	24	
GUINEA										1	2	
HONDURAS	6	8		1	4	4	7	5	16	12	23	16
MOZAMBIQUE										1		
VANUATU										1		
OTHERS									8			33
TOTAL	6	8		1	4	4	7	5	24	16	49	49

"OTHERS" includes the flags of Belize, Guinea, Mozambique, Panama, San Marino, Singapore and Vanuatu.

C/ RAISING FACTOR TO APPLY TO THE TOTALS IN **B/**

TOTAL IN **A/**	TOTAL IN **B/** (1998)	FACTOR (**A/**) / (**B/**)
141	49	2.88

D/ ESTIMATED NUMBER OF LONGLINERS ABOVE 100 GRT FLYING FLAGS OF CONVENIENCE OPERATING IN THE INDIAN OCEAN FROM 1988 TO 1999 (TOTALS IN **B/** BY FACTOR IN **C/**)

FLAG / YEAR	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
TOTAL	17	23	0	3	12	12	20	14	69	46	**141**	141

(2)

FROM THE IOTC NOMINAL CATCHES AND FISHING CRAFT STATISTICS DATABASES
E/ NUMBER OF TAIWANESE LONGLINERS (ABOVE 100 GRT) REPORTED AS OPERATING IN THE INDIAN OCEAN SINCE 1985, CATCHES PER AREA AND MEAN CATCHES ESTIMATED PER YEAR AND FOR THE WHOLE PERIOD.

TWN	NUMBER OF TWN	TWN LL CATCHES			MEAN CATCH
		WEST	EAST	TOTAL	
1985	127	13916	19608	33524	263.97
1986	153	36209	20498	56707	370.63
1987	168	45042	21575	66617	396.53
1988	187	49208	16103	65311	349.26
1989	263	37366	22367	59733	227.12
1990	272	53527	11198	64725	237.96
1991	253	65975	16693	82668	326.75
1992	296	87135	19525	106660	360.34
1993	318	146897	18747	165644	520.89
1994	340	67608	27592	95200	280.00
1995	289	75560	21750	97310	336.71
1996	272	72062	27785	99847	367.08
1997	307	73791	17852	91643	298.51
1998	310	91579	19612	111191	358.68
1999	301	82541	17902	100443	333.70

The number of vessels operating was estimated on the basis of 1992 and 1994 figures since that number is not available

F/ ESTIMATE OF THE NEI LONGLINE CATCHES IN THE INDIAN OCEAN FROM 1988 TO 1999 (TOTAL NUMBERS FROM **D/** AND MEAN CATCHES FROM **E/**)

YEAR	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CATCH	6030	5228	0	940	4148	5996	5640	4845	25351	13744	50574	47051

(2) Estimate of the total catches by NEI longliners above 100 GRT operating in the Indian Ocean from 1988 to 1999: All NEI longliners above 100 GRT operating in the Indian Ocean were considered as owned by Taiwanese and so the mean catches per vessel for the Taiwanese fleet were used to estimate the total catches over the period. The number of vessels estimated in **D/** for each year was therefore multiplied by the mean catch obtained for that year in **E/**. Even though it is known that the most of this fleet is made up by former Taiwanese vessels is quite risky to do assumptions like this for the number of vessel concerned is really high, especially for the last four years of the series. Therefore, these results have to be looked at carefully (being the final figures subject to high levels of uncertainity).

(3)

G/ CATCHES BY NEI LONGLINERS ABOVE 100 GRT PER SPECIES AND IOTC AREA FROM 1988 TO 1999

CATCHES LL TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1988	F51	8440	13293	173	405	2082	1990		0	0	21	3897	0	18907	49208
	F57	2608	6072	62	331	753	912		0	0	38	1504	0	3823	16103
	TOTAL IO	11048	19365	235	736	2835	2902		0	0	59	5401	0	22730	65311

% TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1988	F51	0.1292	0.2035	0.0026	0.0062	0.0319	0.0305	0.0000	0.0000	0.0000	0.0003	0.0597	0.0000	0.2895	0.7534
	F57	0.0399	0.0930	0.0009	0.0051	0.0115	0.0140	0.0000	0.0000	0.0000	0.0006	0.0230	0.0000	0.0585	0.2466
	TOTAL IO	0.1692	0.2965	0.0036	0.0113	0.0434	0.0444	0.0000	0.0000	0.0000	0.0009	0.0827	0.0000	0.3480	1.0000

ESTIMATE LL NEI		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1988	F51	779.2	1227.3	16.0	37.4	192.2	183.7	0.0	0.0	0.0	1.9	359.8	0.0	1745.6	4543.3
	F57	240.8	560.6	5.7	30.6	69.5	84.2	0.0	0.0	0.0	3.5	138.9	0.0	353.0	1486.8
	TOTAL IO	1020.0	1787.9	21.7	68.0	261.7	267.9	0.0	0.0	0.0	5.4	498.7	0.0	2098.6	6030.0

CATCHES LL TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1989	F51	3567	12830	1445	206	1106	1264		0	0	41	2160	0	14747	37366
	F57	3530	7104	45	359	829	893		0	0	55	1910	1	7641	22367
	TOTAL IO	7097	19934	1490	565	1935	2157		0	0	96	4070	1	22388	59733

% TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1989	F51	0.0597	0.2148	0.0242	0.0034	0.0185	0.0212	0.0000	0.0000	0.0000	0.0007	0.0362	0.0000	0.2469	0.6256
	F57	0.0591	0.1189	0.0008	0.0060	0.0139	0.0149	0.0000	0.0000	0.0000	0.0009	0.0320	0.0000	0.1279	0.3744
	TOTAL IO	0.1188	0.3337	0.0249	0.0095	0.0324	0.0361	0.0000	0.0000	0.0000	0.0016	0.0681	0.0000	0.3748	1.0000

ESTIMATE LL NEI		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1989	F51	312.2	1123.0	126.5	18.0	96.8	110.6	0.0	0.0	0.0	3.6	189.1	0.0	1290.8	3270.6
	F57	309.0	621.8	3.9	31.4	72.6	78.2	0.0	0.0	0.0	4.8	167.2	0.1	668.8	1957.8
	TOTAL IO	621.2	1744.8	130.4	49.5	169.4	188.8	0.0	0.0	0.0	8.4	356.2	0.1	1959.6	5228.4

CATCHES LL TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1991	F51	6617	23440	999	228	1214	1517		73	0	22	4073	122	27670	65975
	F57	6485	5518	245	85	201	345		43	0	12	642	80	3037	16693
	TOTAL IO	13102	28958	1244	313	1415	1862		116	0	34	4715	202	30707	82668

% TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1991	F51	0.0800	0.2835	0.0121	0.0028	0.0147	0.0184	0.0000	0.0009	0.0000	0.0003	0.0493	0.0015	0.3347	0.7981
	F57	0.0784	0.0667	0.0030	0.0010	0.0024	0.0042	0.0000	0.0005	0.0000	0.0001	0.0078	0.0010	0.0367	0.2019
	TOTAL IO	0.1585	0.3503	0.0150	0.0038	0.0171	0.0225	0.0000	0.0014	0.0000	0.0004	0.0570	0.0024	0.3714	1.0000

ESTIMATE LL NEI		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1991	F51	75.3	266.6	11.4	2.6	13.8	17.3	0.0	0.8	0.0	0.3	46.3	1.4	314.7	750.4
	F57	73.8	62.8	2.8	1.0	2.3	3.9	0.0	0.5	0.0	0.1	7.3	0.9	34.5	189.9
	TOTAL IO	149.0	329.4	14.1	3.6	16.1	21.2	0.0	1.3	0.0	0.4	53.6	2.3	349.3	940.2

CATCHES LL TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1992	F51	2824	19891	600	878	2163	1371		47	0	29	7953	34	51345	87135
	F57	8279	4116	370	52	578	326		35	0	47	1040	40	4642	19525
	TOTAL IO	11103	24007	970	930	2741	1697		82	0	76	8993	74	55987	106660

% TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1992	F51	0.0265	0.1865	0.0056	0.0082	0.0203	0.0129	0.0000	0.0004	0.0000	0.0003	0.0746	0.0003	0.4814	0.8169
	F57	0.0776	0.0386	0.0035	0.0005	0.0054	0.0031	0.0000	0.0003	0.0000	0.0004	0.0098	0.0004	0.0435	0.1831
	TOTAL IO	0.1041	0.2251	0.0091	0.0087	0.0257	0.0159	0.0000	0.0008	0.0000	0.0007	0.0843	0.0007	0.5249	1.0000

(3) Estimate of the catches per species per IOTC Area by NEI longliners above 100 GRT operating in the Indian Ocean from 1988 to 1999: The catches per species and IOTC Area were calculated on the basis of the Taiwanese catches reported in those years.No catch for the year 1990 was estimated since no NEI LL were reported to call to Port Louis. It is not known whether the dramatic increase in the catch occurred in 1996 (if compared with the 1995 catches), which is a consecuence of a similar increase in the number of vessels, was real or not. It is possible that this be due to more NEI vessels calling to Port Louis since that year (while they were calling to other ports before but operating in the Indian Ocean too) or to an improvement in the AFRI statistics. If the last is true the catches before 1996 would be underestimated. Taking into account that the only years which more information became available to the Secretariat were 1998 and 1999 it is also possible that the catches estimated for 1996 and 1997 be underestimated.

On the other hand it will be needed to check on the reliability of the information coming from Japan and USA regarding the vessels having exported tunas caught in the Indian Ocean to these countries.

ESTIMATE LL NEI		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1992	F51	109.8	773.5	23.3	34.1	84.1	53.3	0.0	1.8	0.0	1.1	309.3	1.3	1996.6	3388.3
	F57	321.9	160.1	14.4	2.0	22.5	12.7	0.0	1.4	0.0	1.8	40.4	1.6	180.5	759.2
	TOTAL IO	431.7	933.5	37.7	36.2	106.6	66.0	0.0	3.2	0.0	3.0	349.7	2.9	2177.1	4147.6

CATCHES LL TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1993	F51	9434	30279	1041	183	2586	4014		360	915	78	14228	445	84249	147812
	F57	2456	9263	234	59	665	715		261	116	140	1117	60	3777	18863
	TOTAL IO	11890	39542	1275	242	3251	4729		621	1031	218	15345	505	88026	166675

% TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1993	F51	0.0566	0.1817	0.0062	0.0011	0.0155	0.0241	0.0000	0.0022	0.0055	0.0005	0.0854	0.0027	0.5055	0.8868
	F57	0.0147	0.0556	0.0014	0.0004	0.0040	0.0043	0.0000	0.0016	0.0007	0.0008	0.0067	0.0004	0.0227	0.1132
	TOTAL IO	0.0713	0.2372	0.0076	0.0015	0.0195	0.0284	0.0000	0.0037	0.0062	0.0013	0.0921	0.0030	0.5281	1.0000

ESTIMATE LL NEI		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1993	F51	339.4	1089.2	37.4	6.6	93.0	144.4	0.0	12.9	32.9	2.8	511.8	16.0	3030.6	5317.1
	F57	88.3	333.2	8.4	2.1	23.9	25.7	0.0	9.4	4.2	5.0	40.2	2.2	135.9	678.5
	TOTAL IO	427.7	1422.4	45.9	8.7	116.9	170.1	0.0	22.3	37.1	7.8	552.0	18.2	3166.4	5995.6

CATCHES LL TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1994	F51	8404	16845	533	357	1127	2333	248	555	593	57	10190	170	26789	68201
	F57	6003	10887	142	65	293	482	101	106	75	31	2264	23	7195	27667
	TOTAL IO	14407	27732	675	422	1420	2815	349	661	668	88	12454	193	33984	95868

% TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1994	F51	0.0877	0.1757	0.0056	0.0037	0.0118	0.0243	0.0026	0.0058	0.0062	0.0006	0.1063	0.0018	0.2794	0.7114
	F57	0.0626	0.1136	0.0015	0.0007	0.0031	0.0050	0.0011	0.0011	0.0008	0.0003	0.0236	0.0002	0.0751	0.2886
	TOTAL IO	0.1503	0.2893	0.0070	0.0044	0.0148	0.0294	0.0036	0.0069	0.0070	0.0009	0.1299	0.0020	0.3545	1.0000

ESTIMATE LL NEI		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1994	F51	494.4	991.0	31.4	21.0	66.3	137.3	14.6	32.7	34.9	3.4	599.5	10.0	1576.0	4012.3
	F57	353.2	640.5	8.4	3.8	17.2	28.4	5.9	6.2	4.4	1.8	133.2	1.4	423.3	1627.7
	TOTAL IO	847.6	1631.5	39.7	24.8	83.5	165.6	20.5	38.9	39.3	5.2	732.7	11.4	1999.3	5640.0

CATCHES LL TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1995	F51	7725	23959	427	484	1722	3014	494	1098	1201	53	16007	104	20473	76761
	F57	6484	8686	104	86	440	623	202	208	152	53	2254	14	2596	21902
	TOTAL IO	14209	32645	531	570	2162	3637	696	1306	1353	106	18261	118	23069	98663

% TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1995	F51	0.0783	0.2428	0.0043	0.0049	0.0175	0.0305	0.0050	0.0111	0.0122	0.0005	0.1622	0.0011	0.2075	0.7780
	F57	0.0657	0.0880	0.0011	0.0009	0.0045	0.0063	0.0020	0.0021	0.0015	0.0005	0.0228	0.0001	0.0263	0.2220
	TOTAL IO	0.1440	0.3309	0.0054	0.0058	0.0219	0.0369	0.0071	0.0132	0.0137	0.0011	0.1851	0.0012	0.2338	1.0000

ESTIMATE LL NEI		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1995	F51	379.3	1176.4	21.0	23.8	84.6	148.0	24.3	53.9	59.0	2.6	786.0	5.1	1005.3	3769.1
	F57	318.4	426.5	5.1	4.2	21.6	30.6	9.9	10.2	7.5	2.6	110.7	0.7	127.5	1075.4
	TOTAL IO	697.7	1602.9	26.1	28.0	106.2	178.6	34.2	64.1	66.4	5.2	896.6	5.8	1132.7	4844.5

CATCHES LL TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1996	F51	10328	18628	132	281	1647	1968	313	1195	916	42	13134		24394	72978
	F57	6602	11192	39	147	533	998	57	258	85	17	4486		3456	27870
	TOTAL IO	16930	29820	171	428	2180	2966	370	1453	1001	59	17620		27850	100848

% TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1996	F51	0.1024	0.1847	0.0013	0.0028	0.0163	0.0195	0.0031	0.0118	0.0091	0.0004	0.1302	0.0000	0.2419	0.7236
	F57	0.0655	0.1110	0.0004	0.0015	0.0053	0.0099	0.0006	0.0026	0.0008	0.0002	0.0445	0.0000	0.0343	0.2764
	TOTAL IO	0.1679	0.2957	0.0017	0.0042	0.0216	0.0294	0.0037	0.0144	0.0099	0.0006	0.1747	0.0000	0.2762	1.0000

ESTIMATE LL NEI		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1996	F51	2596.3	4682.7	33.2	70.6	414.0	494.7	78.7	300.4	230.3	10.6	3301.6	0.0	6132.2	18345.3
	F57	1659.6	2813.5	9.8	37.0	134.0	250.9	14.3	64.9	21.4	4.3	1127.7	0.0	868.8	7006.0
	TOTAL IO	4255.9	7496.2	43.0	107.6	548.0	745.6	93.0	365.3	251.6	14.8	4429.3	0.0	7001.0	25351.3

CATCHES LL TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1997	F51	10778	27140	263	240	2607	1549	401	729	602	23	13562		16740	74634
	F57	4426	7005	32	80	383	560	22	94	223	4	3601		1634	18064
	TOTAL IO	15204	34145	295	320	2990	2109	423	823	825	27	17163		18374	92698

% TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1997	F51	0.1163	0.2928	0.0028	0.0026	0.0281	0.0167	0.0043	0.0079	0.0065	0.0002	0.1463	0.0000	0.1806	0.8051
	F57	0.0477	0.0756	0.0003	0.0009	0.0041	0.0060	0.0002	0.0010	0.0024	0.0000	0.0388	0.0000	0.0176	0.1949
	TOTAL IO	0.1640	0.3683	0.0032	0.0035	0.0323	0.0228	0.0046	0.0089	0.0089	0.0003	0.1851	0.0000	0.1982	1.0000

ESTIMATE LL NEI		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1997	F51	1598.0	4023.9	39.0	35.6	386.5	229.7	59.5	108.1	89.3	3.4	2010.7	0.0	2481.9	11065.5
	F57	656.2	1038.6	4.7	11.9	56.8	83.0	3.3	13.9	33.1	0.6	533.9	0.0	242.3	2678.2
	TOTAL IO	2254.2	5062.4	43.7	47.4	443.3	312.7	62.7	122.0	122.3	4.0	2544.6	0.0	2724.2	13743.7

CATCHES LL TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1998	WEST	15519	34695	591	324	3142	1391	498	938	571	81	14304		19525	91579
	EAST	6053	5003	151	133	569	871	15	369	28	4	2525		3891	19612
	TOTAL IO	21572	39698	742	457	3711	2262	513	1307	599	85	16829		23416	111191

% TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1998	WEST	0.1396	0.3120	0.0053	0.0029	0.0283	0.0125	0.0045	0.0084	0.0051	0.0007	0.1286	0.0000	0.1756	0.8236
	EAST	0.0544	0.0450	0.0014	0.0012	0.0051	0.0078	0.0001	0.0033	0.0003	0.0000	0.0227	0.0000	0.0350	0.1764
	TOTAL IO	0.1940	0.3570	0.0067	0.0041	0.0334	0.0203	0.0046	0.0118	0.0054	0.0008	0.1514	0.0000	0.2106	1.0000

ESTIMATE LL NEI		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1998	WEST	7058.6	15780.6	268.8	147.4	1429.1	632.7	226.5	426.6	259.7	36.8	6506.0	0.0	8880.7	41653.7
	EAST	2753.1	2275.6	68.7	60.5	258.8	396.2	6.8	167.8	12.7	1.8	1148.5	0.0	1769.8	8920.3
	TOTAL IO	9811.8	18056.2	337.5	207.9	1687.9	1028.8	233.3	594.5	272.4	38.7	7654.5	0.0	10650.5	50574.0

CATCHES LL TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1999	WEST	16197	32418	335	163	3133	1069	436	1137	384	4	12518		14747	82541
	EAST	6317	4675	86	67	567	669	13	341	19		2209		2939	17902
	TOTAL IO	22514	37093	421	230	3700	1738	449	1478	403	4	14727		17686	100443

% TWN		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1999	WEST	0.1613	0.3228	0.0033	0.0016	0.0312	0.0106	0.0043	0.0113	0.0038	0.0000	0.1246	0.0000	0.1468	0.8218
	EAST	0.0629	0.0465	0.0009	0.0007	0.0056	0.0067	0.0001	0.0034	0.0002	0.0000	0.0220	0.0000	0.0293	0.1782
	TOTAL IO	0.2241	0.3693	0.0042	0.0023	0.0368	0.0173	0.0045	0.0147	0.0040	0.0000	0.1466	0.0000	0.1761	1.0000

ESTIMATE LL NEI		ALB	BET	BIL	BLM	BLZ	MLS	OTH	SBF	SHK	SKJ	SWO	TUN	YFT	TOTAL
1999	WEST	7587.3	15185.8	156.9	76.4	1467.6	500.8	204.2	532.6	179.9	1.9	5863.9	0.0	6908.1	38665.4
	EAST	2959.1	2190.0	40.3	31.4	265.6	313.4	6.1	159.7	8.9	0.0	1034.8	0.0	1376.7	8386.0
	TOTAL IO	10546.4	17375.8	197.2	107.7	1733.2	814.1	210.3	692.4	188.8	1.9	6898.7	0.0	8284.8	47051.4

Longline boats which the GRT is below 100 tonnes operating from ports in Indonesia

(1)

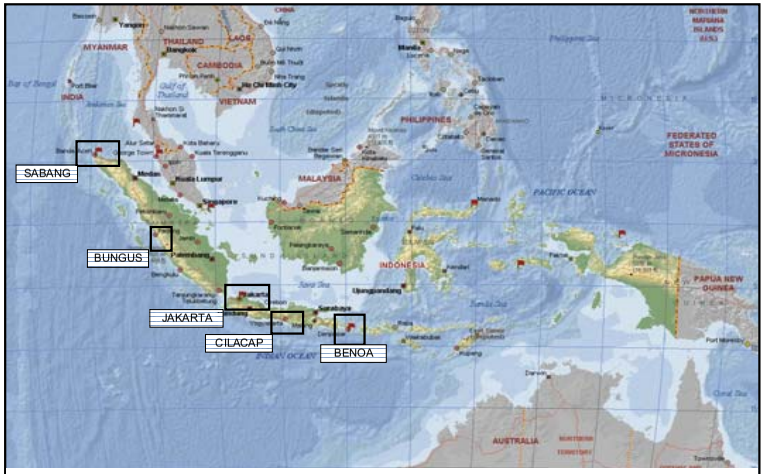
FROM "TENTANG PERKENBANGAN KAPAL PERIKANAN BERBENDERA INDONESIA DAN ASING DENGAN IZIN DIREKTORAT JENDERALI PERIKANAN" (DGF, INDONESIA)

A/ NUMBER OF FOREIGN LONGLINERS OPERATING FROM INDONESIA DURING THE YEARS 1992 AND 1993.

1992	TWN		HND		SIN		VCT		THA		JPN		KOR	
	>100 GT	<100 GT	>100 GT	<100 GT	>100 GT	<100 GT	>100 GT	<100 GT	>100 GT	<100 GT	>100 GT	<100 GT	>100 GT	<100 GT
BENOA	5	321	1	1	2	1	1			7	3	23		
JAKARTA	8	85		2										
SABANG		3								96				
BITUNG	13	92		1	1					1		5	2	2
TANJUNG		3								1				
AMBON		1												
BIAK													1	
TOTALS	26	505	1	4	3	1	1	0	0	105	3	28	3	2
	TWN	531	HND	5	SIN	4	VCT	1	THA	105	JPN	31	KOR	5

1993	TWN		HND		SIN		VCT		THA		JPN		KOR	
	>100 GT	<100 GT	>100 GT	<100 GT	>100 GT	<100 GT	>100 GT	<100 GT	>100 GT	<100 GT	>100 GT	<100 GT	>100 GT	<100 GT
BENOA	5	376	1	1	1	2	1			7	7	21		2
JAKARTA	8	92		1										
SABANG		3								183				
BUNGUS		3												
BITUNG	20	95		1	1					1		5	2	2
TANJUNG		4								1				
BIAK													1	
TOTALS	33	573	1	3	2	2	1	0	0	192	7	26	3	4
	TWN	606	HND	4	SIN	4	VCT	1	THA	192	JPN	33	KOR	7

The ports highlighted in yellow are considered as being used by longliners operating in the Indian Ocean (C.Mathews report, page 7 (**k**))



D/ Main ports of operation in Indonesia for the tuna longliners fishing in the Indian Ocean

Totals are only indicated when the information was either not available or irrelevant.

SAME SOURCE THAN **A/**

B/ NUMBER OF INDONESIAN TUNA LONGLINERS OPERATING IN THE INDIAN AND PACIFIC OCEANS DURING 1992 AND 1993.

	1992	1993
SAMUDERA HINDIA	255	345
SAMUDERA PASIFIK	1	
L. BANDA	14	18
L. MALUKU	25	23
L. SULAWESI	9	16
KALBAR	2	2
L.C. SELATAN	1	19
UNKNOWN	1	
TOTAL	**308**	**423**

The vessels operating in the Indian Ocean are highlighted in yellow.

FROM **A/** AND **B/**

E/ NUMBER OF NEI LONGLINERS OPERATING IN THE INDIAN OCEAN VERSUS THE TOTAL NUMBER OF FOREIGN AND INDONESIAN LONGLINERS OPERATING IN THAT OCEAN DURING THE YEARS 1992 AND 1993.

1992	INDIAN OCEAN				TOTAL INDIAN AND PACIFIC OCEANS			
	NEI	FOREIGN	IDN	TOTAL	NEI	FOREIGN	IDN	TOTAL
BENOA	327	358						
JAKARTA	87	95						
SABANG	3	3						
BUNGUS								
TOTAL	417	456	256	712	515	577	308	885
1993	INDIAN OCEAN				TOTAL INDIAN AND PACIFIC OCEANS			
	NEI	FOREIGN	IDN	TOTAL	NEI	FOREIGN	IDN	TOTAL
BENOA	382	417						
JAKARTA	93	101						
SABANG	3	3						
BUNGUS	3	3						
TOTAL	481	524	364	888	582	655	423	1078

The percentage of foreign longliners operating in Indonesia (both oceans) in relation to the total number (67%) match fairly well with the percentage obtained for the vessels operating in the Indian Ocean (from **F/**) in that same year (71%).

SAME SOURCE THAN **A/**

C/ NUMBER OF FOREIGN AND INDONESIAN LONGLINERS OPERATING FROM INDONESIAN PORTS IN 1991

	FOREIGN	IDN	TOTAL
1991	446	216	662

No detailed information was available for this year.

PERSONAL COMMUNICATION FROM TIM DAVIS (CSIRO)

G/ NUMBER OF INDONESIAN AND FOREIGN LONGLINERS OPERATING FROM BENOA FROM 1986 TO 1999

Year	TOTAL LL	Foreign LL
1986	28	
1987	48	
1988	106	
1989	131	
1990	132	
1991	158	
1992	180	
1993	291	
1994	242	
1995	472	96
1996	528	58
1997	561	0
1998	502	0
1999	485	0

The number of foreign vessels operating from Benoa is available only since 1995. No activity was reported since 1997 for the foreign fleet.

FROM "REVIEW OF TUNA FISHERY IN THE WESTERN PART OF INDONESIAN WATERS - INDIAN OCEAN SIDE" (TABLE 1, PAGE 12), BY NURZALI NAAMIN RIMF, JAKARTA, ON PROCEEDINGS OF THE 5th EXPERT CONSULTATION ON INDIAN OCEAN TUNAS.

F/ NUMBER OF TUNA LONGLINERS FISHING IN THE INDIAN OCEAN (1986-91)

Year	Number of tuna LL			Catch (t)	Catch /Boat (t)
	IDN	Foreign	Total		
1986	34	2	36	120	3.33
1987	46	0	46	487	10.59
1988	71	78	149	511	3.43
1989	112	302	414	8023	19.38
1990	132	369	501	13968	27.88
1991	158	378	536	13731	25.62

These catches per boat per year are though to be rather low and quite unreliable if compared with the data provided by the CSIRO and those obtained from the sampling programmes in Phuket and Pinang which longliners of the same characteristics call to.

The number of foreign tuna longliners fishing in the Indian Ocean was used to estimate the number of NEI longliners operating in that Ocean (from **E/**).

(1) Calculation of the number of NEI, other foreign and Indonesian tuna longliners operating in the Indian and Pacific oceans from 1986 to 1996: The basic data used to estimate the number of NEI longliners operating in the Indian Ocean came mainly from two volumes published by the Indonesian Directorate General of Fisheries (DGF) which included lists of national and foreign fishing vessels operating from Indonesian ports during the years 1992 and 1993. The following data were recorded in the Bulletins:

a-. Name of the vessel,
b-. Gear,
c-. Country Flag,
d-. Gross Registered Tonnage (GRT),
e-. Port or ports of operation.

The data resulting from the counting of vessels recorded as longliners are displayed in **A/** (Foreign Fleet) and **B/** (Indonesian Fleet). The foreign longliners were classified depending upon the following criteria:

a-. Country flag: Longliners from Taiwan (TWN), Honduras (HND), Singapore (SIN), Saint Vincent and the Grenadines (VCT), Thailand (THA), Japon (JPN) and South Korea (KOR) made up the longline foreign fleet operating during those years.
b-. Port of Registration: Eight ports were used for the fleet, namely Benoa, Jakarta, Sabang, Bungus, Bitung, Tanjung, Ambon and Biak. The first port recorded was chosen in case of vessels registered to operate in two or more ports (according to C.Mathews longliners registered to operate in more than one port seldom call to the second or third ports in the list).
c-. Gross Registered Tonnage (GRT): The fleet was separated depending upon whether the GRT was above or below 100 tonnes.

The following vessels whithin **A/** were considered as longliners fishing in the Indian Ocean which catches had to be estimated and aggregated to the NEI catch:

a-. All longliners operating from Benoa, Jakarta, Bungus and Sabang were considered as fishing in the Indian Ocean (information from C.Mathews, on page 7 of the report). This ports are shown in **D/**.
b-. All longliners from Taiwan which the GRT was below 100 tonnes were considered as NEI. The reason for this is that Taiwan has usually been reporting to IOTC on the activities of all tuna longliners above 100 GRT operating in the Indian Ocean. The small longliners, on the contrary, do not even report on their activities to the Taiwanese activities and therefore should be considered as NEI.
c-. All longliners from Honduras, Singapore and Saint Vincent were considered as NEI for this countries have never reported any data to IOTC.
d-. All longliners from Japan and Korea were not considered as NEI. Nevertheless, taking into account that the most of this vessels had GRTs below 100 tonnes it would be convenient to confirm that their catches were reported to IOTC.

FROM **C/**, **E/**, **F/** AND **G/**

H/ PROPORTION OF FOREIGN AND INDONESIAN LONGLINERS OPERATING FROM 1986 TO 1999

	INDIAN OCEAN				PACIFIC OCEAN				TOTAL			
	IDN	FOREIGN	NEI/FOR	NEI/TOT	IDN	FOREIGN	NEI/FOR	NEI/TOT	IDN	FOREIGN	NEI/FOR	NEI/TOT
1986	0.94	0.06										
1987	1.00	0.00										
1988	0.48	0.52										
1989	0.27	0.73										
1990	0.26	0.74										
1991	0.29	0.71							0.33	0.67		
1992	0.36	0.64	0.91	0.59	0.30	0.70	0.81	0.57	0.35	0.65	0.89	0.65
1993	0.41	0.59	0.92	0.54	0.31	0.69	0.77	0.53	0.39	0.61	0.89	0.54
1994	0.60	0.40										
1995	0.80	0.20										
1996	0.89	0.11										
1997	1.00											
1998	1.00											
1999	1.00											

1986 to 1991 data from **F/** (Indian Ocean), 1991 data from **C/** (Total), 1992 and 1993 data from **E/** and 1995 to 1999 data from **G/** (Benoa only). No data available for 1994. 1994 proportions were estimated as the mean value between 1993 and 1995 data. It is known that the most of the foreign fleet changed to Indonesian flag during 1994 and 1995 (information from Tim Davis, CSIRO).

FROM **F/**

I/ CALCULATION OF THE NUMBER OF FOREIGN AND NEI VESSELS OPERATING IN THE INDIAN OCEAN FROM 1986 TO 1999

	FOREIGN	NEI
1986	2	2
1987	0	0
1988	78	71
1989	302	276
1990	369	337
1991	378	346
1992	456	417
1993	524	481
1994	436	400
1995	121	111
1996	73	67
1997		
1998		
1999		

Number of foreign longliners operating from **F/** and estimate on the number of NEI longliners according to 1992 proportions in **H/**.

No estimate needed. Data from **E/**.

Total number of longliners in **G/** raised by the factor resulting by dividing the total number of foreign vessels operating in the Indian Ocean in 1993 (from **E/**) by the total number of vessels operating from Benoa in that year (from **G/**).
Number of NEI vessels estimated from 1993 NEI/FOR factor in the Indian ocean (from **H/**).

Number of foreign longliners in **G/** raised by the factor resulting by dividing the total number of longliners operating in the Indian Ocean in 1993 (from **E/**) by the number of longliners operating from Benoa in that year (from **G/**).
Number of NEI vessels estimated from 1993 NEI/FOR factor in the Indian ocean (from H/).

No foreign longline activity has been reported in Benoa since 1997 (**G/**). This was assumed for the whole Indian Ocean too.

(2)

DATA FROM THE CSIRO: PAPER "CATCH MONITORING OF THE FRESH TUNA CAUGHT BY THE BALI-BASED LONGLINE FISHERY" AND E-MAIL FROM TIM DAVIS.

J/ TABLE 3. ESTIMATED LANDINGS OF TUNAS AND BILLFISH AND EXPORT SBT (TONNES DRESSED WEIGHT) IN THE BALI-BASED LONGLINE FISHERY.

	1993	%	1994	%	1995	%	1996	%	1997	%	1998	%
Export SBF	811		440.7		360.9		612.3		781.3		774.1	
Total SBF	1190.2	5.1	787.7	4.4	721.8	3.8	1398.6	5.5	1922.1	6.8	1908.5	7
Total BET	6182.4	26.3	5357.3	30	6537	34.3	10544.8	41.4	10120.9	35.8	9744.7	35.8
Total YFT	14600.9	62	10825.4	60.6	10597	55.7	11033.7	43.3	12040	42.6	11535.3	42.3
Total ALB	716.2	3	337.3	1.9	462.8	2.4	1032.2	4.1	2375.1	8.4	2366.2	8.7
Total BIL	848.6	3.6	543.4	3	722.8	3.8	1464.6	5.7	1814	6.4	1692.6	6.2
TOTAL	23538.3		17851		19041.5		25474		28272.2	100	27247.3	100

K/ ICCAT CONVERSION FACTORS:

YFT; BET (GGT TO RNI 1.13

SBF (GGT TO RND) 1.16 CONSIDERING THAT SBF AND BFT MAY HAVE SIMILAR CONVERSION FACTORS.

BIL (TAL TO RND) 1.3158 All BIL RAISED AS IF THEY WERE SWO (WHICH IS THE SPECIES MOST CAUGHT)

e-. All Thai longliners were considered as not being fishing for tunas but for other species. Three types of longline are recorded as being used by the Indonesian fleet (in the Fisheries Statistics of Indonesia, DGF), tuna longlines, drift longlines (other than tuna longlines) and set longlines. The Thai fleet, whith GRTs mostly below the 40 tonnes, which was concentrated in Sabang during that period, were thought more likely using longlines targeting species other than tuna. On the other hand Thailand has never reported to the IOTC catches of tuna under longlines. However, taking into account the high number of vessels concerned it is recommended to confirm this.

Regarding the Indonesian longliners (**B/**), these vessels were classified regarding the ocean fished for no information about the ports of landing was available.

The only information available for the year 1991 is shown in **C/** refering to the total number of foreign and Indonesian vessels operating in that year.

The table **E/** shows the number of NEI, Foreign (including NEI), Indonesian and Total number of longliners operating in the Indian Ocean and in the whole area during the years 1992 and 1993.

Data coming from other sources are showed in **F/** and **G/**, the first from the RIMF (Research Institute for Marine Fisheries, Indonesia) and the second from the CSIRO (sampling programme in Benoa). While the figures in **F/** match pretty well with those in **C/** (regarding 1991, the only year which the data can be compared), this is not the case with the data from the CSIRO and that from the DGF.

Thus, the factor obtained by dividing the total number of longliners operating in the Indian Ocean during 1991 in **F/** and the total number of longliners operating from Indonesia that same year in **C/** match with that obtained by doing the same operation in **E/** for the year 1992. These results are shown in the table below:

	FOR IO/ FOR TOT	IDN IO/ IDN TOT	TOT IO/ TOTAL
1992	0.79	0.81	0.80
1993	0.85	0.73	0.81

The data in **G/** does not match at all with those in the DGF Bulletins being the total number of vessels operating from Benoa reported by the CSIRO for the year 1992 (180) much lower than that concerning only the foreign vessels reported by the DGF (358).
Although these data came from the field it is thought that the number of vessels is underestimated, at least for the series 1986-94. The dramatic increase in the number of vessels operating from Benoa occurred between 1994 and 1995 is thought to be more the product of a better estimate by the CSIRO than a real increase in numbers. This assumption is also supported by the dramatic decrease in the mean catches per vessel per year occurred between 1994 and 1995 (in **M/**).

To estimate the mean catches the total catches and the number of vessels operating from Benoa from 1993 to 1998, both provided by the CSIRO (in **G/** and **M/**), were used. The mean catches per vessel per year obtained from 1995 to 1998 are much more reliable and in accordance with the data obtained from the sampling programmes in Phuket and Pinang (resulting in similar mean catches per vessel per year). The slightly higher mean catch per vessel registered in 1998 in relation with the 1995-97 catches could be a consecuence of the strong ENSO affecting this area being 1998 almost free of winds (especially during the Southeast Monsoon season) which implied that more vessels stayed fishing in the Indian Ocean instead of shifting to the Pacific.
If the number of longliners operating from Benoa in 1993 reported by the DGF is used for the calculation of the mean catches per vessel for that year instead of the CSIRO figures (**G/**) the result is much more reliable and in accordance to the 1995-98 values (**N/**).
The figures in **G/** were therefore considered accurate only from 1995 onwards being the figures in **E/** and **F/** used for the years before (it was thought unlikely that a foreign vessel registered to operate in one port, which normally implies the payment of fees, did not do so finally).

The proportions between the number of Indonesian, Foreign and NEI longliners and the total number of longliners operating in the Indian, Pacific and whole area are shown in **H/**. The proportion between the number of NEI and Foreign longliners are also shown. These data were obtained from the different sources available.

The following points are worth to mention:

a-. The total number of longliners has been constantly increasing: the most complete series showing this increase is that from the CSIRO (**G/**)

b-. The number of foreign longliners operating from Indonesia increased dramatically from 1986 to 1993 showing a decreasing trend afterwards which was due to more and more vessels changing their flags to the Indonesian flag. No foreign longliners have been reported to operate in the Indian Ocean since 1997.

c-. The relationship between the number of NEI and foreign longliners is supposed not to have changed over the time: Although this relationship could only be established for the years 1992 and 1993 (which share very similar proportions) it was thought unlikely this relationship to change for the years before or after these two.

The final estimates regarding the number of NEI longliners operating in the Indian Ocean from 1986 to 1999 are shown in **I/**. The way these numbers were estimated are explained in the comments attached to the table.

FROM **J/** AND **K/**

L/ CALCULATION OF ROUND WEIGHTS ASSUMING THAT YFT, BET AND SBF ARE GGT (GILLED AND GUTTED), ALB IS RND (ROUND) AND BIL SPECIES ARE TAL (HEADED AND TAILED).

	1993	%	1994	%	1995	%	1996	%	1997	%	1998	%
SBF	1380.6	0.05	913.7	0.05	837.3	0.04	1622.4	0.06	2229.6	0.07	2213.9	0.07
BET	6986.1	0.26	6053.7	0.30	7386.8	0.34	11915.6	0.41	11436.6	0.36	11011.5	0.36
YFT	16499.0	0.62	12232.7	0.60	11974.6	0.55	12468.1	0.43	13605.2	0.42	13034.9	0.42
ALB	716.2	0.03	337.3	0.02	462.8	0.02	1032.2	0.04	2375.1	0.07	2366.2	0.08
BIL	1116.6	0.04	715.0	0.04	951.1	0.04	1927.1	0.07	2386.9	0.07	2227.1	0.07
TOTAL	26698.5	1.00	20252.5	1.00	21612.6	1.00	28965.4	1.00	32033.4	1.00	30853.6	1.00

FROM **L/** AND **G/**

M/ ESTIMATE OF THE MEAN CATCH PER VESSEL PER SPECIES PER YEAR IN BENOA FROM 1986 TO 1996

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
SBF	2.7	2.7	2.7	2.7	2.7	2.7	2.7	4.7	3.8	1.8	3.1	4.0	4.4
BET	13.8	13.8	13.8	13.8	13.8	13.8	13.8	24.0	25.0	15.7	22.6	20.4	21.9
YFT	32.5	32.5	32.5	32.5	32.5	32.5	32.5	56.7	50.5	25.4	23.6	24.3	26.0
ALB	1.4	1.4	1.4	1.4	1.4	1.4	1.4	2.5	1.4	1.0	2.0	4.2	4.7
BIL	2.2	2.2	2.2	2.2	2.2	2.2	2.2	3.8	3.0	2.0	3.6	4.3	4.4
TOTAL	52.6	52.6	52.6	52.6	52.6	52.6	52.6	91.7	83.7	45.8	54.9	57.1	61.5

1986 to 1992 total mean catches calculated as the mean of 1995-97 values. Breakdown by species as in 1993.

N/ RE-CALCULATION OF 1993 MEAN CATCHES PER VESSEL PER SPECIES:

NUMBER OF FOREIGN VESSELS IN BENOA IN RELATION TO THE TOTAL NUMBER OF FOREIGN VESSELS: 0.80

ESTIMATE OF THE TOTAL NUMBER OF VESSELS OPERATING FROM BENOA IN 1993: 707

	1993
SBF	2.0
BET	9.9
YFT	23.3
ALB	1.0
BIL	1.6
TOTAL	37.8

The fact that this figure be slightly under that obtained for 1995 may be due to less Indonesian vessels operating from Benoa than the number which was estimated (see the comment on the right).

Assuming that the proportion between the number of vessels operating from Benoa and the total number of vessels operating in the Indian Ocean is the same for foreign (which the data is available in **E/**) and Indonesian vessels (which only the total number is available).

FROM **F/** AND **M/**

O/ ESTIMATE OF THE CATCHES BY NEI TUNA LONGLINERS IN THE INDIAN OCEAN FROM 1986 TO 1996

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
SBF	5.0	0.0	194.0	751.0	917.6	939.9	1133.9	1307.9	949.0	196.4	205.6
BET	25.2	0.0	981.4	3799.9	4642.9	4756.1	5737.6	6618.2	6287.2	1733.0	1509.8
YFT	59.4	0.0	2317.8	8974.1	10965.1	11232.5	13550.4	15630.0	12704.4	2809.3	1579.8
ALB	2.6	0.0	100.6	389.6	476.0	487.6	588.2	678.5	350.3	108.6	130.8
BIL	4.0	0.0	156.9	607.3	742.1	760.2	917.0	1057.8	742.6	223.1	244.2
TOTAL	96.2	0.0	3750.7	14521.9	17743.6	18176.4	21927.1	25292.4	21033.5	5070.4	3670.1

Data calculated according to 1992 mean catches in **M/**.

(2) Calculation of the catches per species per year by NEI tuna longliners fishing in the Indian Ocean: The only set of data reliable was that coming from the Sampling Programme in Benoa (conducted by the CSIRO). Catches per species and year were only available for the series 1993 to 1998. These data were first of all raised for the weights recorded referred to processed weights, not to total weights. The species caught for these longliners usually undergo the same processing and therefore all the catch reported for one species was raised by the same factor and so for each species. The raising factors applied in each case are shown in **K/** (from ICCAT). These raising factors will be replaced by those obtained from the IOTC sampling programmes currently running in Phuket and Pinang.

Mean catches per species per vessel per year were afterwards calculated from the new round weights per species obtained (from **J/**), and from the number of longliners operating from Benoa (from **G/**) during the years which catches were available.

As it was mentioned before (in **(1)**) irrealistic figures were obtained for the years 1993 and 1994 which mean catches were much over the 1995 to 1998 ones. These mean values were then discarded and the mean values resulting from adding the 1995 to 1997 (why the 1998 values were not included is explained in **(1)**) total mean catches per species applied to all years before 1995 (as no catches were available for the series 1986 to 1992).

Considering the fleet concerned and the market of destination ("sashimi" auctions in Japan) it was assumed that no difference in species composition occurred among the different ports of landing (since the only data available were from Benoa). Therefore, the catches were raised from 1993 to 1996 in relation to the species breakdown in L/ in each year.

The 1993 species composition was used as a basis for the calculation of the 1986 to 1992 catches for no catches were available for those years. It is important to point out here the change in the relative proportions in the catch occurred between the yellowfin and the bigeye. While the quantity of yellowfin in the catch was more or less stable in 1993 and 1994, amounting to about the 60% of the total catches (**L/**), this quantity has been constantly decreasing since then amounting in 1998 to the 42% of the total catch. The bigeye tuna, on the contrary, showed an inverse pattern, with more and more specimens whithin the catch since 1994. Indeed, the data retrieved from two Shipping Agencies in Phuket and Pinang regarding the landing sheets of 41 longliners unloading in those ports during 1999 brought more catches for the Bigeye (about the 60-65%) than for the Yellowfin (25-30%). These were thought enough reasons to assume 1986 to 1992 catches being more similar to 1993 catches.

The final results of the estimate are shown in **O/**. As it was mentioned in the text, no estimation was done from 1997 onwards for no foreign vessels were reported to operate from Benoa (which was extended to the whole Indian Ocean) since then.

Longline boats which the GRT is below 100 tonnes operating from ports in Malaysia

(1)

DATA FROM THE FISHERIES RESEARCH INSTITUTE OF PENANG, MALAYSIA (FRI)

A/ NUMBER OF LANDINGS AND TOTAL CATCHES (IN TONS) LANDED IN PINANG DURING THE YEARS 1990-95 AND 1998-99.

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1990	Landings	152	112	109	92	68	47	50	48	62	141	117	141	1139
	Catches	1390	1096	1028	702	442	201	649	319	483	1128	992	1113	9543
1991	Landings	145	122	81	67	65	63	71	73	68	88	90	173	1106
	Catches	1648	1337	745	459	676	498	440	516	901	778	668	2040	10706
1992	Landings	180	124	84	59	70	45	54	50	75	84	87	149	1061
	Catches	1940	1246	777	598	584	362	438	432	704	733	1365	1762	10941
1993	Landings	128	98	102	83	65	34	52	33	47	58	62	121	883
	Catches	1361	971	1073	708	591	320	577	203	288	398	572	1028	8090
1994	Landings	123	112	129	91	33	31	31	50	55	86	160	99	1000
	Catches	1206	971	1042	562	168	177	136	337	151	359	848	703	6660
1995	Landings	175	180	97										452
	Catches	1489	1292	569										3350
1996	Landings													
	Catches													
1997	Landings													
	Catches													
1998	Landings	333	203	229	171	123	113	101	74	87	128	216	209	1987
	Catches	3467	2195	2159	1571	928	879	1517	580	907	993	1343	1323	17862
1999	Landings	280	221	219	183	126	119	118	150	172	185	226	286	2285
	Catches	1710	1355	1330	1273	744	840	752	856	1048	1089	1370	1677	14044

DATA FROM BADARIAH BINTI MOHD ALI IN PROCEEDINGS OF THE 6th EXPERT CONSULTATION ON INDIAN OCEAN TUNAS

B/ LANDINGS OF INDIAN OCEAN TUNA BY FOREIGN VESSELS IN MALAYSIA

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	Catches	1716	2005	1415	1394	1023	1765	1798	3004	1018	1401	1886	2635	21060
1994	Catches	3318	2867	3010	2521	2772	3000	436	1529	1585	2154	4172	3582	30946
1995	Catches	3714	1557	1379	1538	614	1654							10456

FROM KIM STOVERUP (IPTP)

C/ LL CATCHES ESTIMATED FOR THE FLEET UNLOADING TO PINANG FISHING PORT (1989-94)

	Y	A	YFT	BET	ALB	SKJ	KGX	SFA	SWO	BIL	OTH	TOTAL	SHK
Penang/Singapore	1989	F57	11860	1877	10	0	37	0	0	1457	120	15360	318
Penang/Singapore	1990	F57	15360	2430	13	0	48	0	0	1886	155	19892	411
Penang/Singapore	1991	F57	14090	2229	12	0	44	0	0	1730	142	18247	377
Penang/Singapore	1992	F57	15963	2526	13		50			1960	161	20674	427
Penang/Singapore	1993	F57	18701	2959	15	0	56	0	0	3075	164	24971	
Penang/Singapore	1994	F57	27477	4348	22	0	82	0	0	4518	241	36688	

FROM **A/**, **B/** AND **C/**

D/ COMPARISON FRI - MOHD ALI - KIM DATA

	TOTAL CATCHES		
YEAR	FRI	MHD.ALI	KIM
1989			15360
1990	9543		19892
1991	10706		18247
1992	10941		20674
1993	8090	21060	24971
1994	6660	30946	36688
1995			
1996			
1997			
1998	17862		
1999	14044		

FROM **D/**

E/ DIFFERENCE FRI - MOHD ALI - KIM DATA

	FACTORS		
YEAR	FRI	MHD.ALI	KIM
1989	0.00	0.00	1.00
1990	0.48	0.00	1.00
1991	0.59	0.00	1.00
1992	0.53	0.00	1.00
1993	0.32	0.84	1.00
1994	0.18	0.84	1.00
1995			
1996			
1997			
1998			
1999			
AVERAGE 1990-92 FRI/KIM			0.531898

Minor difference between the second and thrid columns which are due to the raising from processed (Mhd.Ali paper) to round weight for the species involved.
The difference between the FRI and other data are quite surprissing especially in 1993 and 1994. The problem is that no relationship can be establish between this first source and the other two. It is possible that the FRI records only refer to target species recorded but even so the difference is higher than expected. The mean value obtained for the years 1990 to 1992 (FRI) was applied to raise the 1998 and 1999 catches . 1993 and 1994 data seem incomplete and so were not considered.
Another problem is the arrival of Chinese vessels to Indian Ocean ports (especially Phuket and Pinang) which catches are reported. The landings in Phuket and Pinang include the catches by Chinese vessels since 1995.
As the catches are not available by flag state these should be removed after the calculation of total catches in Phuket and Pinang.
The breakdown by species obtained from the data on the landing sheets retrieved in Pinang was used to calculate the species breakdown for 1998 and 1999.

(1) Calculation of the catches unloaded by NEI longliners in Pulau Pinang: The basic data used for the calculation of the catches by longliners unloaded to Pulau Pinang were from the Fisheries Research Institute of Pulau Pinang (**A/,** FRI; 1989 to 1999 landings and catches), IPTP estimates by Kim Stoverup from data obtained from a Sampling Programme (**C/,** 1989 to 1994 catches) and from a paper presented by Badariah Binti mohd Ali on the 6th Expert Consultation on Indian Ocean Tunas (**B/**, 1993-95 catches). While the data previously estimated (**C/**) was left unchanged no estimate of catches was possible for the years before 1989 for no information was available on landings, nor on catches. It is know that the landing activity in Pinang resumed in 1986 and therefore it is possible that some landings by this fleet occurred from 1986 to 1988. Taking into account the small number of NEI vessels operating from Indonesian ports during those years (2 in 1986 and 78 in 1988) it is not though that the catches landed in Pinang be high.

On the other hand, the data from IPTP referred to the Taiwanese fresh tuna longliners unloading to Singapore and Pinang while the current estimate only deals with the catches unloaded in Pinang. Nevertheless, it is though that less and less vessels have been unloading to Singapore over the years due to lower shipping and chandling costs in other ports (as Pinang, Phuket and ports in Indonesia).

While the data in **B/** and **C/** match fairly well this is not the case with such data and those in **A/** (see **D/**). The data in **C/** were considered more reliable for they come from the field (sampling program) matching indeed with those in **B/**. It is thought that the reason for this missmatch was that the information in **A/** referred only to part of the landings. The mean catches per landing are, on the contrary, thought accurate, if not too high.

E/ shows the factors obtained by dividing the highest catches reported (which are thought to be the most accurate) by the other two sets of catches. As the catches after 1994 were to be estimated from the FRI data these had to be raised by the corresponding factor. This factor was calculated as the mean of 1990 to 1992 values for the figures obtained in 1993 and 1994 seemed really inaccurate.

The data whithin the frame were not used for the calculation of the 1998-99 catches by the reasons explained in the comments. On the other hand taking into account that the catches previously estimated (IPTP) brought similar figures than such provided by the CSIRO (sampling program in Benoa) it was thought better not to use the data from the IOTC sampling programs until more information become available.

Therefore, the data in **K/** were used to obtain the catches per species for the years 1995 to 1999. Since no landing of catches of Southern bluefin tuna have been reported in Penang (only 800 kg where reported by the CSIRO in 1999 which was negliged) this species was removed for the calculation of the landings in Pinang (see **L/** and **M/**). The new catches estimated for 1998 and 1999 are shown in **N/**. The 1998 factors were used for the calculation of the 1999 catches per species. Taking into account the almost equal figures obtained for the years 1997 and 1998 it is not thought that 1998

and 1999 catches be too different.

FROM THE SAMPLING PROGRAM

F/ CATCHES BY SPECIES FROM THE LANDING SHEETS (Pinang, 1999)

PORT	YEAR	FLAG	YFT	BET	ALB	BLZ	BLM	MLS	MAR	SWO	MSC	TOTAL
PENANG	1999	CHN	113808	260079	592	5234	185	803		4699	486	385886
		IDN	1908									1908
		TWN	87598	180544		14042	738	2158		13802	183	299065
		TOTAL	203314	440623	592	19276	923	2961		18501	669	686859

FROM ICCAT

G/ RAISING FACTORS

RAISING FACTORS USED	YFT	BET	ALB	BLZ	BLM	MLS	MAR	SWO	MSC
ROUND TO ROUND (RND)			1.00						1.00
GILLED AND GUTTED TO RND	1.13	1.13							
HEADED AND TAILED TO RND				as MAR	as MAR	as MAR	1.20	1.3158	

Excluding IDN

FROM **F/** AND **G/**

H/ CATCHES RAISED

PORT	YEAR	FLAG	YFT	BET	ALB	BLZ	BLM	MLS	MAR	SWO	OTH	TOTAL
PENANG	1999	CHN	128603	293889	592	6281	222	964	0	6183	486	437220
		TWN	98986	204015	0	16850	886	2590	0	18161	183	341670
		TOTAL	227589	497904	592	23131	1108	3553	0	24344	669	778889

FROM **H/**

I/ RELATIVE PROPORTION OF THE SPECIES IN THE CATCH

PORT	YEAR	FLAG	YFT	BET	ALB	BLZ	BLM	MLS	MAR	SWO	OTH	TOTAL
PENANG	1999	CHN	0.294	0.672	0.001	0.014	0.001	0.002	0.000	0.014	0.001	1.000
		TWN	0.290	0.597	0.000	0.049	0.003	0.008	0.000	0.053	0.001	1.000
		TOTAL	0.292	0.639	0.001	0.030	0.001	0.005	0.000	0.031	0.001	1.000

FROM **D/**, **E/** AND **H/**

J/ NEW CATCHES ESTIMATED FOR 1998 AND 1999

PORT	YEAR	FLAG	YFT	BET	ALB	BLZ	BLM	MLS	MAR	SWO	OTH	TOTAL
PENANG	1998	ALL	9812	21467	26	997	48	153	0	1050	29	33582
	1999	ALL	7715	16878	20	784	38	120	0	825	23	26404

The change in target species from YFT to BET is clear if 1999 (about 64% BET versus 30% YFT) and 1994 (about 12% BET versus 75% YFT) estimated data are compared.
The difference is also big if the data are compared with those obtained by the CSIRO (36% BET versus 42% YFT in 1998) for the fleet based in Indonesia (see below). As the information from the landing programmes only come from two processing plants it was thought safer to use the CSIRO data till more information be available from the sampling programmes. Taking into account that the SBF is seldom unloaded in both Phuket and Pinang, this species was removed for the calculation.

As no complete information or no information at all was available for the years 1995 to 1997 the total catches for these years were calculated in relation to 1994 and 1998 values. The 1994 were thus decreased of the factor in **O/** and this repeated for the other two years. The CSIRO percentages were afterwards applied for the calculation of the catches per species (**P/**).

The new catches estimated for the series 1995 to 1999 are shown in **T/**. An important point worth of mention is that longliners from China (mainland) joined the Taiwanese longliners in 1994 and therefore their catches have been accounted for in Phuket and Pinang (the two ports where this fleet is supposed to be based). Considering that China has been reporting on the activities of these longliners since the date they first arrived these catches should be removed from the estimate. This removal will be done here to avoid repeating the same exercise twice (indeed there is not disaggregated information on the landings by Chinese longliners per port.

The catches reported by the Chinese Liaison Officer to IOTC are shown in **Q/**. The series 1995 to 1998 had to be modified in light of an e-mail sent by the LO who informed that these catches referred to processed weights on the contrary of 1999 ones which had been raised. The new figures are shown in **F/** (the raising factors applied being those of the ICCAT).

It is thought that the species composition of the catch by both fleets is similar being the higher catch rates of the Taiwanese vessels the only difference. The only data available, from the sampling programs (**I/**), shows all species caught by Chinese and Taiwanese longliners sharing very similar values. Considering this and the fact that more species had been reported by the Chinese, which avoided substracting the catches species by species, the total catches reported by the Chinese were then proportionally substracted from those estimated in Pinang for the years 1995 to 1999.

The new estimates are shown in **U/**.

DATA FROM THE CSIRO: PAPER "CATCH MONITORING OF THE FRESH TUNA CAUGHT BY THE BALI-BASED LONGLINE FISHERY" AND E-MAIL FROM TIM DAVIS.

K/ TABLE 3. ESTIMATED LANDINGS OF TUNAS AND BILLFISH AND EXPORT SBT (TONNES DRESSED WEIGHT) IN THE BALI-BASED LONGLINE FISHERY.

	1993	%	1994	%	1995	%	1996	%	1997	%	1998	%
SBF	1380.6	0.05	913.7	0.05	837.3	0.04	1622.4	0.06	2229.6	0.07	2213.9	0.07
BET	6986.1	0.26	6053.7	0.30	7386.8	0.34	11915.6	0.41	11436.6	0.36	11011.5	0.36
YFT	16499.0	0.62	12232.7	0.60	11974.6	0.55	12468.1	0.43	13605.2	0.42	13034.9	0.42
ALB	716.2	0.03	337.3	0.02	462.8	0.02	1032.2	0.04	2375.1	0.07	2366.2	0.08
BIL	1116.6	0.04	715.0	0.04	951.1	0.04	1927.1	0.07	2386.9	0.07	2227.1	0.07
TOTAL	26698.5	1.00	20252.5	1.00	21612.6	1.00	28965.4	1.00	32033.4	1.00	30853.6	1.00

FROM **K/**

L/ CATCHES BY SPECIES EXCLUDING THE SBF

YEAR	FLAG	BET	YFT	ALB	BIL	TOTAL
1993	ALL	6986	16499	716	1117	25318
1994	ALL	6054	12233	337	715	19339
1995	ALL	7387	11975	463	951	20775
1996	ALL	11916	12468	1032	1927	27343
1997	ALL	11437	13605	2375	2387	29804
1998	ALL	11012	13035	2366	2227	28640

FROM **L/**

M/ PROPORTION BY SPECIES EXCLUDING THE SBF

YEAR	FLAG	BET	YFT	ALB	BIL	TOTAL
1993	ALL	0.28	0.65	0.03	0.04	1.00
1994	ALL	0.31	0.63	0.02	0.04	1.00
1995	ALL	0.36	0.58	0.02	0.05	1.00
1996	ALL	0.44	0.46	0.04	0.07	1.00
1997	ALL	0.38	0.46	0.08	0.08	1.00
1998	ALL	0.38	0.46	0.08	0.08	1.00

FROM **D/**, **E/** AND **M/**

N/ NEW CATCHES FOR 1998 AND 1999

PORT	YEAR	FLAG	BET	YFT	ALB	BIL	TOTAL
PENANG	1998	ALL	12912	15284	2775	2611	33582
	1999	ALL	10152	12017	2181	2053	26404

1998 and 1994 estimated catches are quite similar. As no data was available on 1995 to 1997 catches the 1994 catch (higher of about 3000 t) was gradually decreased from 1995 to 1997.
The CSIRO estimates were used to calculate the catches by species for each year.

FROM **N/** AND **C/**

O/ DIFFERENCE BETWEEN 1994 AND 1998 CATCH

Difference 1994 - 1998 estimated catches:	3106.2
Decreasing factor (starting on 1994 catches)	776.5

FROM **O/**, **C/** AND **M/**

P/ ESTIMATE OF THE 1995 TO 1997 CATCHES

PORT	YEAR	FLAG	BET	YFT	ALB	BIL	TOTAL
PENANG	1995	ALL	12769	20699	800	1644	35911
	1996	ALL	15311	16021	1326	2476	35135
	1997	ALL	13184	15684	2738	2752	34358

FROM THE IOTC NOMINAL CATCHES DATABASE (REPORTED BY THE LIAISON OFFICER)

Q/ CATCHES BY CHINESE LLrs IN THE IO (UNLOADING MOSTLY TO PHUKET AND PINANG)

Processed weights (1995-98)

AREA	YEAR	GEAR	ALB	BET	BIL	OTH	SHK	SWO	YFT	TOTAL
F57	1995	LL		127		87		62	128	404
F57	1996	LL		453		272		205	428	1358
F57	1997	LL		688		279		220	1515	2702
F57	1998	LL		369		360		101	1986	2816
F51	1999	LL	88	69				8	129	294
F57	1999	LL	101	2113	287	712	187	262	2206	5868
		TOTAL	189	3819	287	1710	187	858	6392	13442

Round weights (1999)

FROM **Q/** AND **G/**

R/ RAISING OF 1995 TO 1998 CATCHES (PROCESSED WEIGHTS REPORTED)

AREA	YEAR	GEAR	ALB	BET	BIL	OTH	SHK	SWO	YFT	TOTAL
F57	1995	LL	0	144	0	87		82	145	457
F57	1996	LL	0	512	0	272		270	484	1537
F57	1997	LL	0	777	0	279		289	1712	3058
F57	1998	LL	0	417	0	360		133	2244	3154

FROM **Q/** AND **R/**

S/ CATCHES TO BE REMOVED FROM THE CATCHES OBTAINED

YEAR	CATCH
1995	457
1996	1537
1997	3058
1998	3154
1999	6162

The total catches obtained before were substracted by each year catch in this table and the total per species recalculated again. It was thought safer not substracting species by species for the catches reported by the Chinese are currently being reviewed, especially concerning the proportions between YFT and BET which do not match at all with the data obtained from the sampling programmes (were a good sample of the Chinese fleet was considered (36 longliners in 1999 out of 84 operating in the IO).

FROM **N/** AND **P/**

T/ TOTAL CATCHES ESTIMATED FOR THE SERIES 1995-99 (CHINESE AND TAIWANESE LONGLINERS)

PORT	YEAR	FLAG	BET	YFT	ALB	BIL	TOTAL
PENANG	1995	ALL	12769	20699	800	1644	35911
	1996	ALL	15311	16021	1326	2476	35135
	1997	ALL	13184	15684	2738	2752	34358
	1998	ALL	12912	15284	2775	2611	33582
	1999	ALL	10152	12017	2181	2053	26404

FROM **T/** AND **S/**

U/ NEW ESTIMATED CATCHES AFTER THE REMOVAL OF THE CHINESE CATCHES

PORT	YEAR	FLAG	BET	YFT	ALB	BIL	TOTAL
PENANG	1995	ALL	12606	20436	790	1623	35455
	1996	ALL	14641	15320	1268	2368	33597
	1997	ALL	12011	14288	2494	2507	31300
	1998	ALL	11699	13849	2514	2366	30428
	1999	ALL	7783	9213	1672	1574	20242

The Chinese catches were all removed from the Penang estimated LL catches although the Chinese fleet had been using both Phuket and Penang as ports of landing. Therefore, all catches estimated in Phuket will be considered as Taiwanese catches (NEI).

(2)

FROM LL IDN SHEET (**M/**)

V/ ESTIMATE OF THE MEAN CATCH PER VESSEL PER SPECIES PER YEAR IN BENOA FROM 1986 TO 1996

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
TOTAL	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6	45.8	54.9	57.1	61.5

FROM **C/**, **U/** AND **V/**

W/ ESTIMATE ON THE NUMBER OF NEI LONGLINERS OPERATING FROM PINANG FROM 1989 TO 1999

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
TOTAL	292	378	347	393	475	698	774	612	548	495	329

(2) Number of NEI longliners operating from Pulau Pinang from 1989 to 1999: To estimate the number of NEI longliners operating from Pinang it was assumed that the vessels unloading to that port operated in a similar way than those unloading to Indonesian ports. The mean catches per vessel per year estimated for the fleet unloading to Indonesian ports (**V/**)were therefore used to estimate the number of vessels operating (**W/**).

The figures obtained are thought quite high, especially for the years 1993 to 1998. It is possible that the vessels based in Pinang stayed using this port more than those in Indonesia (being therefore higher the catches unloaded per vessel per year in Pinang). This could be assessed when more information become available from the sampling programs.

Longline boats which the GRT is below 100 tonnes operating from ports in Thailand

(1)

FROM SAMPLING PROGRAMME
A/ NUMBER OF FOREIGN LONGLINERS OPERATING FROM PHUKET AND NUMBER OF LANDINGS RECORDED FROM 1994 TO 1999.

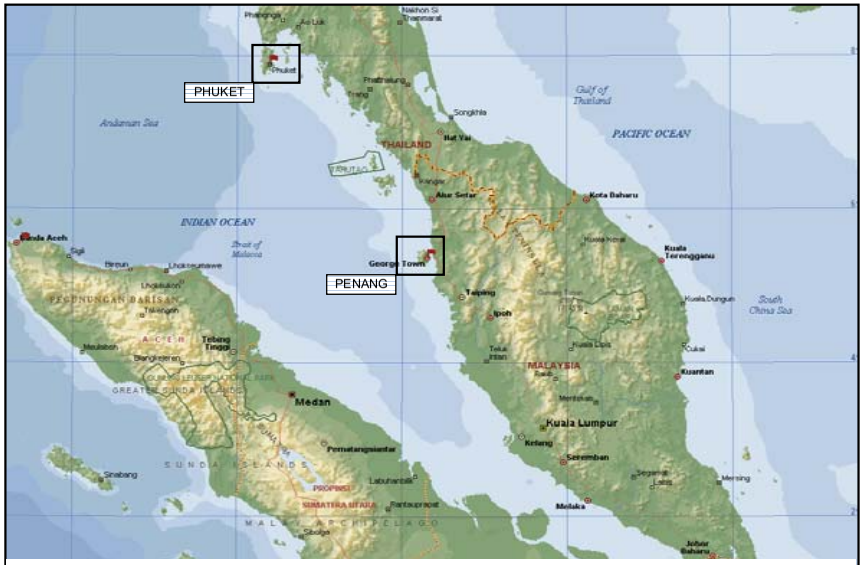
YEAR	LANDINGS	no LL	CATCH	LAN*LL	CATCH*LL	CAT*LAN
1994	102	63	1050	1.61	16.62	10.29
1995	178	82	1106	2.18	13.55	6.21
1996	546	210	2496	2.60	11.88	4.57
1997	557	242	2591	2.30	10.70	4.65
1998	698	251	3102	2.79	12.38	4.44
1999	885	297	4205	2.98	14.14	4.75
TOTAL	2966	1145	14549	2.59	12.71	4.91

1992 was the only year the information on the number of vessels operating was available. The number of vessels for other years was estimated on the basis of 1992 value.

The annual catches per vessel seem quite low if compared with the information retrieved from the shipping agencies which brought values of about 40 tonnes unloaded per vessel in 1999.

(1) Calculation of the number of longliners based in Phuket from 1994 to 1999: The first record of a fresh tuna longliner calling and unloading in Phuket was in August 1994. More and more longliners have been calling to this port since then. The number of longliners estimated to have been operating during those years is showed in **A/**. The information provided by the AFDEC (Andaman Sea Fisheries Development Center of Phuket) regarding the landings and vessels operating during that period could not be fully used because of the high numbers of records lacking of the name of the vessel, its national registration number or both of them. The information in a paper presented by Praulai Chantawong to the Working Party on data Collection and Statistics (Mahe, 1999) was instead used. As 1992 was the only year the information was available the number of vessels operating during all other years had to be estimated from that year (as a proportion between the number of landings and the number of longliners operating).

While the mean catches per landing per year are quite in agreement with the data obtained from the landing sheets recovered (for 1999) this is not the case with the mean catches per vessel per year which are much lower than the values obtained from those sheets which brought mean catches of about 40 tonnes per vessel per year for the fleet unloading in Phuket during 1999.



B/ Main ports of operation in Malaysia and Thailand for the tuna longliners fishing in the Indian Ocean

(2)

FROM THE LANDING SHEETS RETRIEVED IN PHUKET (SAMPLING PROGRAMS
B/ CATCHES PER SPECIES (IN KG) DURING 1999

PORT	YEAR	FLAG	YFT	BET	MAR	SWO	TOTAL
PHUKET	1999	CHN	157665	332584	19847	48816	558912

FROM LL MYS IN E/
C/ RAISING FACTOR TO APPLY

Penang Raising Factor (1990-92)	0.531898

Taking into account that all vessels which landing sheets were monitored during 1999 in Phuket were Chinese it was thought better not to use these data for the estimate even thought it seems that the Taiwanese and Chinese vessels operate in similar ways.

DATA FROM AFDEC
D/ NUMBER OF LANDINGS FORMERLY REPORTED BY PRAULAI CHANTAWONG

no landings	1994	1995	1996	1997	1998	Total
1st quarter		46	148	267	237	698
2nd quarter		18	73	92	102	285
3rd quarter	3	22	142	32	114	313
4th quarter	69	101	204	167	202	743
Total	72	187	567	558	655	2039

FROM **A/** AND **C/**
F/ TOTAL CATCHES RAISED ACCORDING TO PINANG ESTIMATES

	1994	1995	1996	1997	1998	1999
CATCH	1974	2079	4692	4870	5833	7906

The catches previously reported by the AFDEC are slightly different than those recently submitted (sampling program in Phuket). The last report was thought more accurate and then those values used to estimate the total catches.

DATA FROM AFDEC
E/ CATCHES UNLOADED FORMERLY REPORTED BY PRAULAI CHANTAWONG

CATCH	1994	1995	1996	1997	1998	Total
1st quarter		480	1287	1415	1299	4481
2nd quarter		89	377	453	435	1354
3rd quarter	10	114	416	104	470	1114
4th quarter	612	732	823	660	811	3638
	622	1415	2903	2632	3015	10587

FROM LL IDN IN **L/** (SAMPLING PROGRAM IN BENOA)
G/ SPECIES COMPOSITION IN THE LANDINGS BY LONGLINERS IN BENOA (INDONESIA)

YEAR	FLAG	BET	YFT	ALB	BIL	TOTAL
1993	ALL	0.28	0.65	0.03	0.04	1.00
1994	ALL	0.31	0.63	0.02	0.04	1.00
1995	ALL	0.36	0.58	0.02	0.05	1.00
1996	ALL	0.44	0.46	0.04	0.07	1.00
1997	ALL	0.38	0.46	0.08	0.08	1.00
1998	ALL	0.38	0.46	0.08	0.08	1.00

These values were used to estimate the catches per species per year. 1999 catches were estimated on the basis of 1998 values.

FROM **F/** AND **G/**
H/ NEW CATCHES ESTIMATED FOR THE PERIOD 1994-99

YEAR	FLAG	BET	YFT	ALB	BIL	TOTAL
1994	ALL	618	1248	34	73	1974
1995	ALL	739	1198	46	95	2079
1996	ALL	2045	2140	177	331	4692
1997	ALL	1869	2223	388	390	4870
1998	ALL	2243	2655	482	454	5833
1999	ALL	3040	3598	653	615	7906

(2) Calculation of the catches unloaded in Phuket per species per year from 1994 to 1999: The catches reported by the AFDEC both the former (**D/** and **E/**) and the new values (**A/**) are thought underestimated. As it was not known to which extent these catches had been underestimated and taking into account that the information on catches gathered by the AFDEC in Phuket and the FRI in Pinang was from the same source (Customs) the factor calculated to raise the catches reported by the FRI was also used to raise those reported by the AFDEC. The catches reported to the Customs usually refer only to the part of the catch that is exported which does not vary a lot among the different landing sites (amounting to about the 70-75% of the catch which goes through the processing plants).

After calculating the total catches (**F/**) the values from the CSIRO (**G/**, sampling program in Benoa) were used to estimate the total catches per species per year. The values obtained are shown in **H/**. As the catches by Chinese longliners in the Indian Ocean were removed from the total catches estimated in Pinang no more data handling is needed in this case.