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TREND OF TUNA LANDINGS IN THE INDIAN OCEAN*

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ABSTRACT

Species composition of tunas and tuna-like fishes, their catch by different gears, catch trend of different species from 1952 to 1985 from different areas in the Indian Ocean are elaborately discussed in this paper.

INTRODUCTION

FAO STATISTICS shows that the world catch of marine fish was 75 million tonnes (t) for 1985. This was an increase of 17% over 1979. Tuna and tuna-like species including seerfish and billfish contributed 3,153 thousand tonnes for 1985. This was an increase of 28% over 1979. The total catch of tuna and tuna-like fishes in the Indian Ocean for 1985 was 495 thousand tonnes. This was an increase of 90% over 1979. In the Atlantic and Pacific Oceans, the catches of tuna and tuna-like fishes increased 31% and 18% over 1979, respectively. The highest increase in the catch of tuna and tuna-like fishes was in the Indian Ocean (Table 1).

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CATCH COMPOSITION

In the Indian Ocean, there are 20 species of tuna and tuna-like fishes including 11 species of tunas, 4 species of seerfish and 5 species of billfish (Table 2).

Figure 1 shows the catch composition by species. The dominant species in the Indian Ocean are skipjack and yellowfin tunas representing 27.8% and 19.1%, respectively, of the total. Small tunas including longtail, kawakawa, frigate, bullet tuna, Indo-Pacific bonito and also unclassified tunas consists of 20% out of the total. Seerfish consisting of narrowbarred king mackerel and Indo-Pacific mackerel and wahoo shares 15.0% of the total. Billfish consisting of marlins, sailfish and swordfish shares only 2.7%.

Comparing the catch composition between 1974 and 1986, there have been percentage

TABLE 1. *Catch of tuna and tuna-like fishes in the world (in tonnes)*

Ocean	1979	1980	1981	1982	1983	1984	1985
Indian Ocean	260	276	285	354	381	431	495
%	100	106	110	136	147	166	190
Atlantic Ocean	460	515	559	638	614	541	604
%	100	112	122	139	133	118	131
Pacific Ocean	1741	1842	1805	1796	1943	2137	2053
%	100	106	104	103	112	123	118
Total	2462	2635	2650	2789	2939	3111	3153
%	100	107	108	113	119	126	128
World total catch of marine fish	63,798	64,468	66,680	68,287	68,091	78,603	74,825

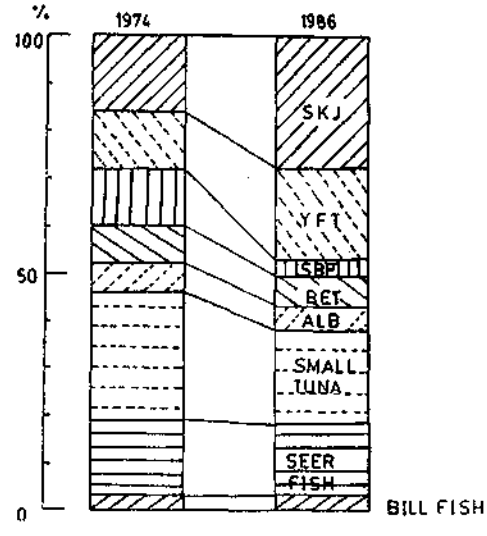

FIG. 1. Species composition in the catch.

increases in skipjack tuna and yellowfin tuna and percentage decreases in southern bluefin tuna, bigeye tuna, albacore and small tunas. These changes resulted from increased catch of purse-seiners which have started their operation since around 1980.

CATCH COMPOSITION BY GEAR

The industrial fishery in the Indian Ocean started in the early 1950's by Japanese longliners to catch tunas and billfishes. Thereafter, Taiwanese and Korean longliners followed their operation. In 1974 the total catch of longliners from these three countries reached

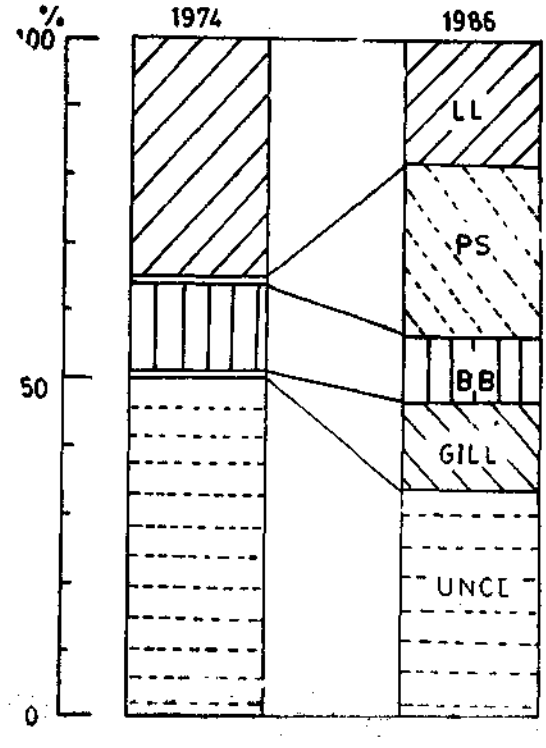

FIG. 2. Catch composition by different gears.

TABLE 2. *Catch (in tonnes) by species*

Species		1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
INDIAN OCEAN						FAO area 51 & 57 combined								
YFT	..	28297	28390	30090	50898	44683	36982	34064	36435	46828	60663	93503	100768	109890
BET	..	21183	30959	23659	31511	47379	31027	31303	32378	39144	44168	35604	41949	40621
ALB	..	14964	5361	6170	9713	16653	16211	11637	13233	23205	17180	15119	9628	28031
SBF	..	30543	21273	26866	26359	17122	16944	24205	26065	29136	36741	30163	28002	20024
SKJ	..	39502	35165	38612	30294	30461	33916	45835	45792	52620	61594	101922	136303	159530
LOT	..	2126	2421	3046	3305	1936	4589	3215	5710	15337	15957	16329	23694	20797
KAW	..	15832	16756	16529	15019	9660	14480	8282	23113	25507	21322	29080	29947	27953
FRI	..	0	0	0	0	0	0	0	0	0	0	0	2466	1626
BLT	..	0	0	0	0	0	0	0	0	0	0	0	617	67
FRZ	..	6006	4057	2708	3086	1661	1701	1595	2908	4946	5630	9287	3318	10772
BIP	..	0	0	0	0	0	0	0	0	0	0	0	2762	0
TUN	..	36476	28616	38578	39738	38433	41968	55578	34403	46069	42855	33392	58526	51130
Sub Total	..	194929	172998	186258	209923	207988	197818	215714	220037	282792	306110	364399	437980	470441
COM	..	12850	11557	14364	17003	17914	20481	16018	34978	43333	47428	43359	57719	57037
GUT	..	759	498	315	100	157	245	182	13661	15570	15685	14479	19340	13831
STS	..	0	0	0	0	0	0	0	279	165	230	225	76	2575
WAH	..	0	0	0	0	0	0	0	0	1	61	713	59	6
KGX	..	25570	23801	28531	23081	21050	30798	34200	4511	7971	5422	3963	16140	12375
Sub Total	..	39179	35856	43210	40184	39121	51524	50400	53429	67040	68826	62739	93334	85824
BUM	..	1374	2286	1550	1429	2605	2534	2440	2692	2416	3146	3410	3397	2613
BLM	..	53	30	13	92	68	87	180	147	173	297	334	438	1410
MLS	..	1932	1161	833	1755	2803	2468	3025	3121	1559	1891	2148	4150	3213
SAI	..	245	438	384	148	219	248	312	172	163	149	126	1220	1228
SWO	..	726	983	774	923	1631	1424	1197	1395	1597	1952	1807	2943	2511
BIL	..	2406	852	1240	1453	2214	3356	2663	3165	4978	2648	3257	3407	4907
Sub Total	..	6736	5750	4794	5800	9540	10117	9817	10692	10836	10083	11082	15555	15882
Gear Total														
LL	..	82470	75309	71089	102292	116763	89428	85455	86353	109369	116339	94518	98916	103181
BB	..	31829	22154	26694	21131	18351	23092	28307	27187	25863	33218	45185	56323	54069
PS	..	1156	2808	1877	1542	3151	2010	2308	3420	16663	32356	112628	140261	147331
GILL	..	1306	1374	1931	1986	245	1397	1551	3873	25457	43888	38269	71739	74072
UNCL	..	124083	112959	132671	128956	118139	143532	158310	163325	183316	159218	147620	179630	193493
TOTAL	..	240844	214604	234262	255907	256649	259459	275931	284158	360668	385019	438220	546869	572147

thousand t in 1986 which is almost double the catch in 1972. This is due mainly to increased catch in Maldives.

The purse seiner's operation in the western Indian Ocean has started around 1980. The catch level has increased in accordance with the increased efforts. Their target species are skipjack and yellowfin tunas. The catch of skipjack tuna in 1986 was almost 160 thousand t, half of which was caught by the purse seine fishery. Good catch rates were reported in 1987.

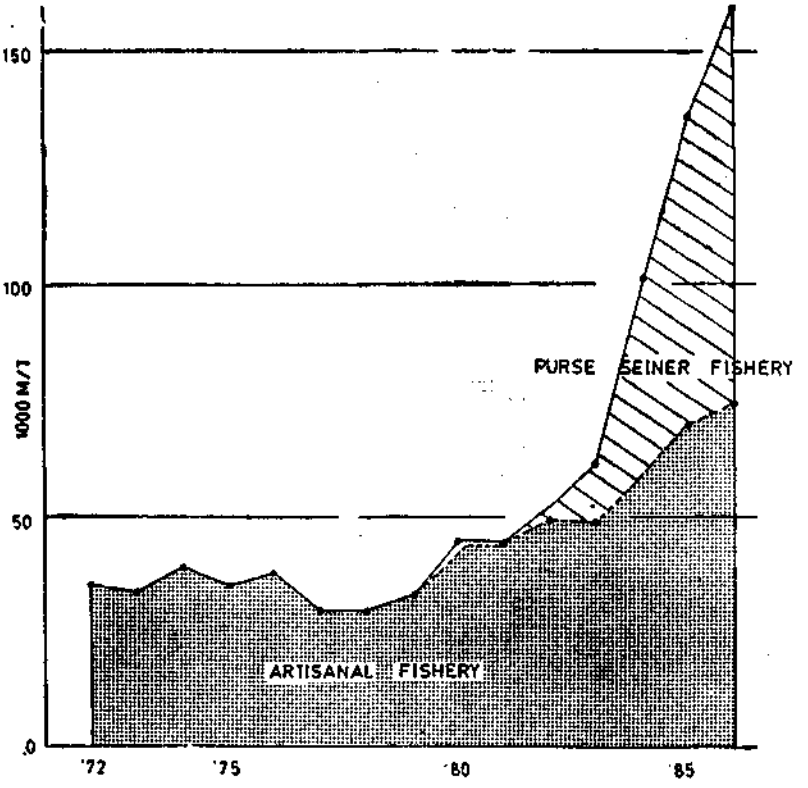

FIG. 5. Catch trend of Skipjack tuna in the Indian Ocean from 1972 to 1985.

Few catches of skipjack tuna are reported from longliners. The catch records from China (Taiwan), Japan and Korea shows that the catch are less than 100 t on average per year.

Yellowfin tuna

Yellowfin tuna is also one of the dominant species together with skipjack tuna in the Indian Ocean.

Fig. 7 shows the fishing grounds for longliners, purse seiners and artisanal fisheries. The fishing ground for longline fishery distributes widely in the whole Indian Ocean, for purse seine fishery only in the western Indian Ocean and for artisanal fishery in such coastal areas as the north and western Sumatra, Sri Lanka, Maldives, Lakshadweep Islands, Pakistan, Iran, Oman, Yemen and Somalian waters.

Longline fishery started in the early 1950's. The highest catch of yellowfin tuna caught by longliners was reported in 1968 as 77 thousand t.

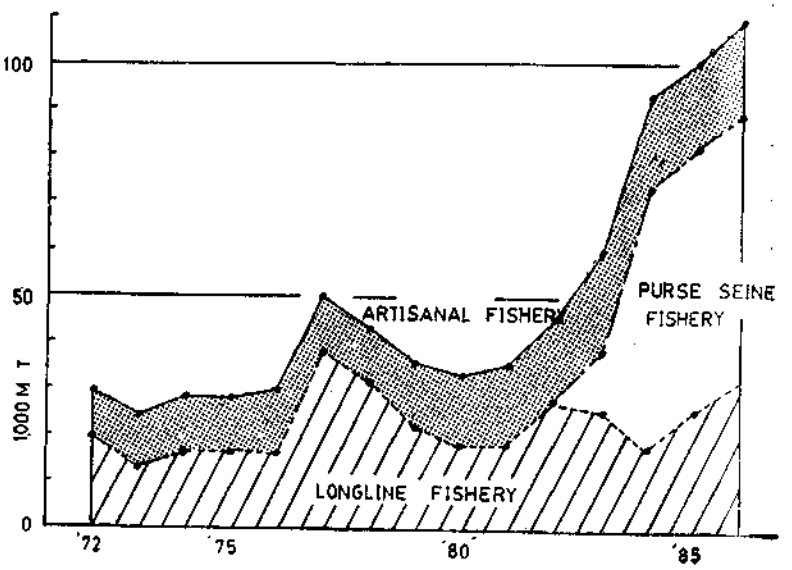

FIG. 6. Catch trend of Yellowfin tuna in the Indian Ocean from 1972 to 1985.

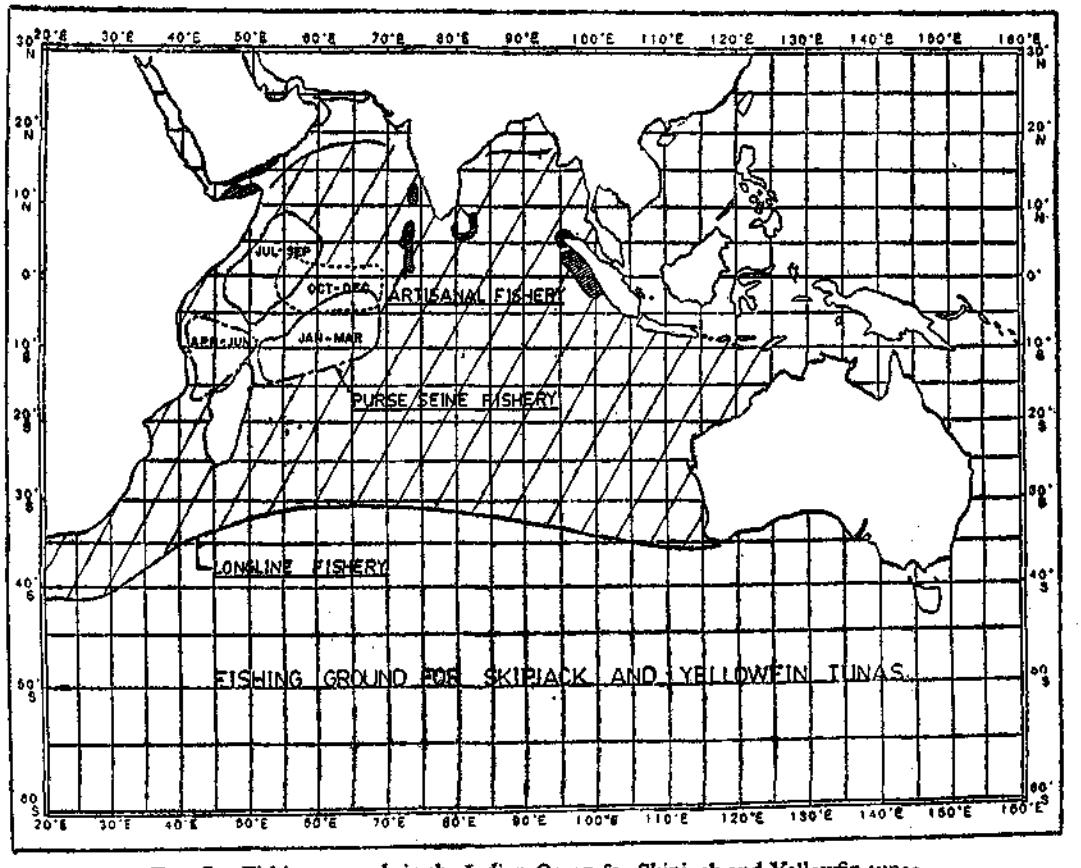

FIG. 7. Fishing grounds in the Indian Ocean for Skipjack and Yellowfin tunas.

Japanese and Korean longliners are presently aiming to catch bigeye tuna rather than yellowfin tuna. A deep water longline fishing technique was adapted to increase the catch of bigeye tuna in the late 1970's in the Indian Ocean. Recently, Taiwanese have also intensified their catch on bigeye tuna.

Albacore is marketed as white meat tuna and is mainly used as material for canning. Skipjack tuna is also used as material for canning, but can only be marketed as light-meat tuna and is sold at a lower price than albacore.

Fig. 12 shows the catch trend of albacore

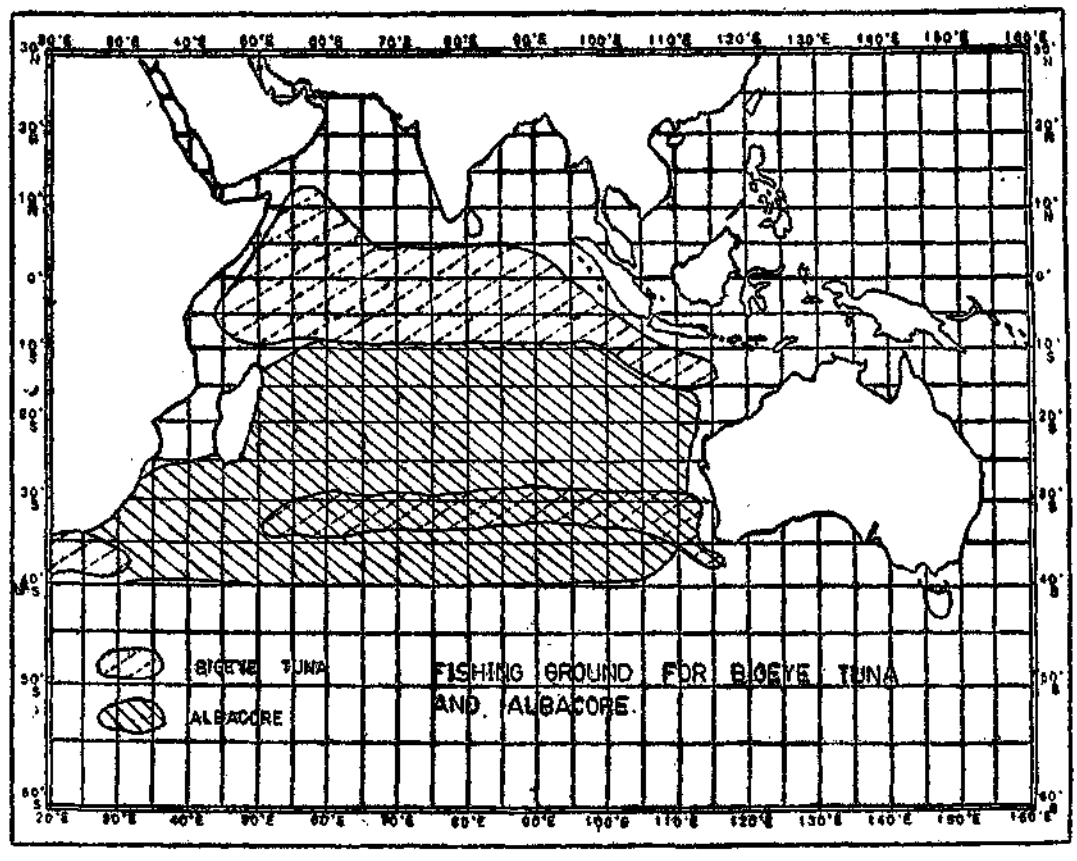

FIG. 10. Fishing ground for Bigeye tuna and Albacore.

Albacore

The fishing ground of albacore in the Indian Ocean as shown in Fig. 10, is located in the southern part of the Indian Ocean between 10° S and 40°S.

which were exclusively caught by longliners upto 1984. There were some minor catch by purse seiners. A gill netting fleet from China (Taiwan) has started its operation to catch albacore in the Indian Ocean since 1984.

The catch by gill netters was 15,176 t in 1986 which was more than the longline catch.

Taiwanese longliners were operating in the Indian Ocean aiming to catch albacore from their fishing ports at Reunion and Port Louis. Japanese and Korean longliner's catch of albacore are very low and was only 17% of the total in 1986.

Small tunas

Dominant species in this category in the Indian Ocean are longtail tuna, kawakawa and frigate tuna. These are neritic species and are caught by artisanal fisheries.

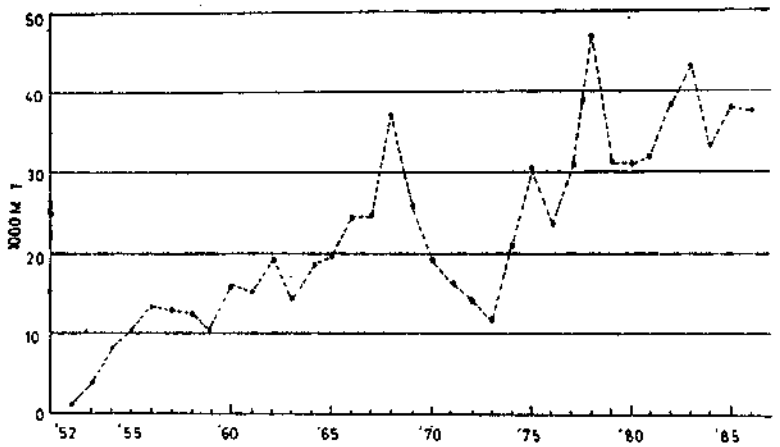

FIG. 11. Catch trend of Bigeye tuna caught by longliners in the Indian Ocean from 1952 to 1985.

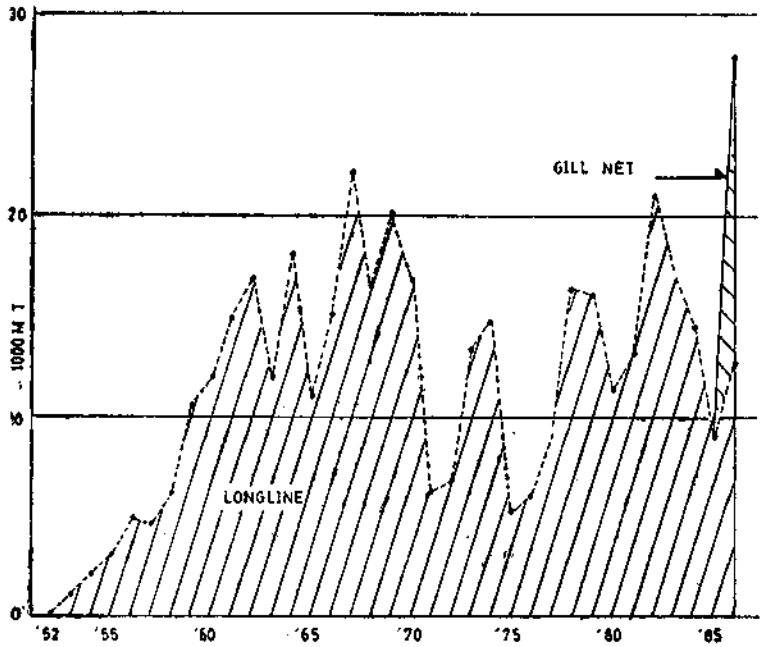

FIG. 12. Catch trend of Albacore in the Indian Ocean from 1952 to 1985.

Iran, Pakistan, UAE, India and Thailand produce most of the longtail tuna in this area. The total catch of longtail tuna was 20 thousand t in 1986. It has shown an increasing tendency in the catch in these countries.

Kawakawa is very common in the Indian Ocean. Major producing countries are India, Iran, Maldives, Pakistan, Sri Lanka, UAE, Yemen, Comoros and Seychelles. The total catch in these countries was 28 thousand t for 1986. Catch levels have fluctuated from year to year and it is uncertain whether the catch tendency is for an increase or decrease. A problem with this species is inclusion of landings as frigate tuna in some cases and as unclassified tuna in other cases.

Frigate tuna are also very common and can be seen more or less in every coastal country in the Indian Ocean. There is also a statistical problem as mentioned in the section of kawakawa. Due to the above reason, it is difficult to detect the catch tendency of this species.

As a whole for small tunas, as shown in Fig. 13, it can be said that the catch has been on an upward trend. But it should be noted that the upward trend was partly attributed to the development and improvement of the statistical data collection system in some countries.

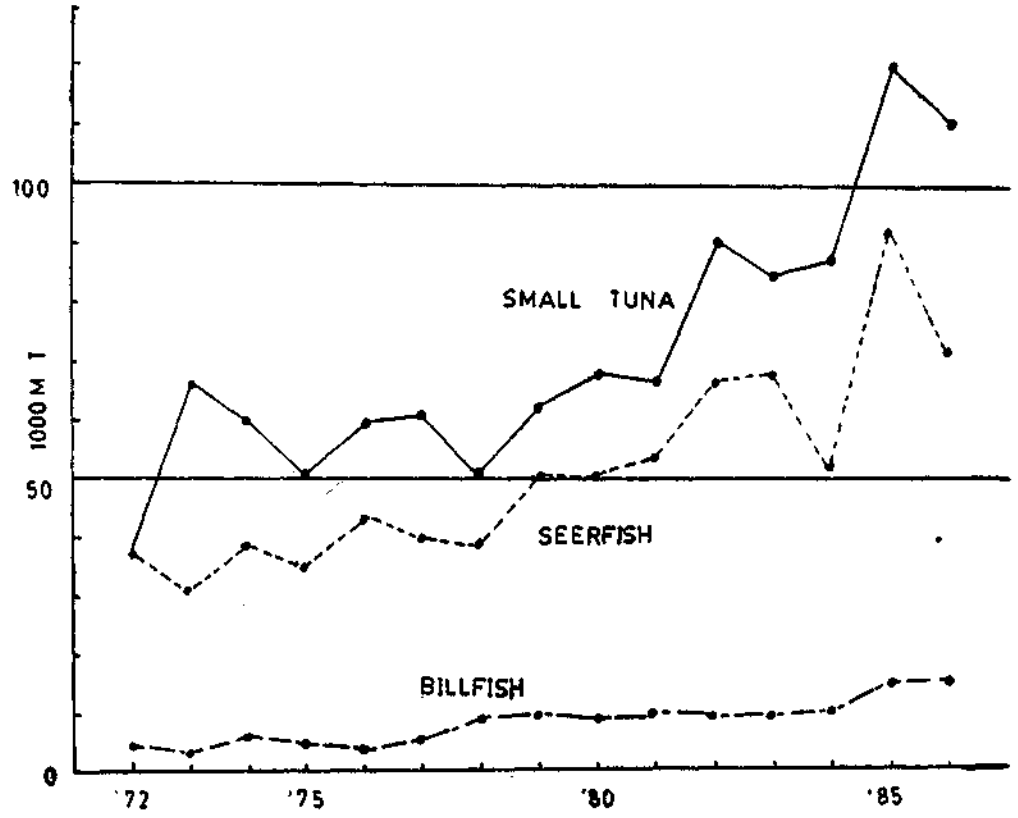

FIG. 13. Catch trend of small tunas, seerfishes and Billfishes in the Indian Ocean from 1972 to 1985.

Seerfish

Under seerfish, there are two popular species, narrow-barred king mackerel *Scomberomorus*

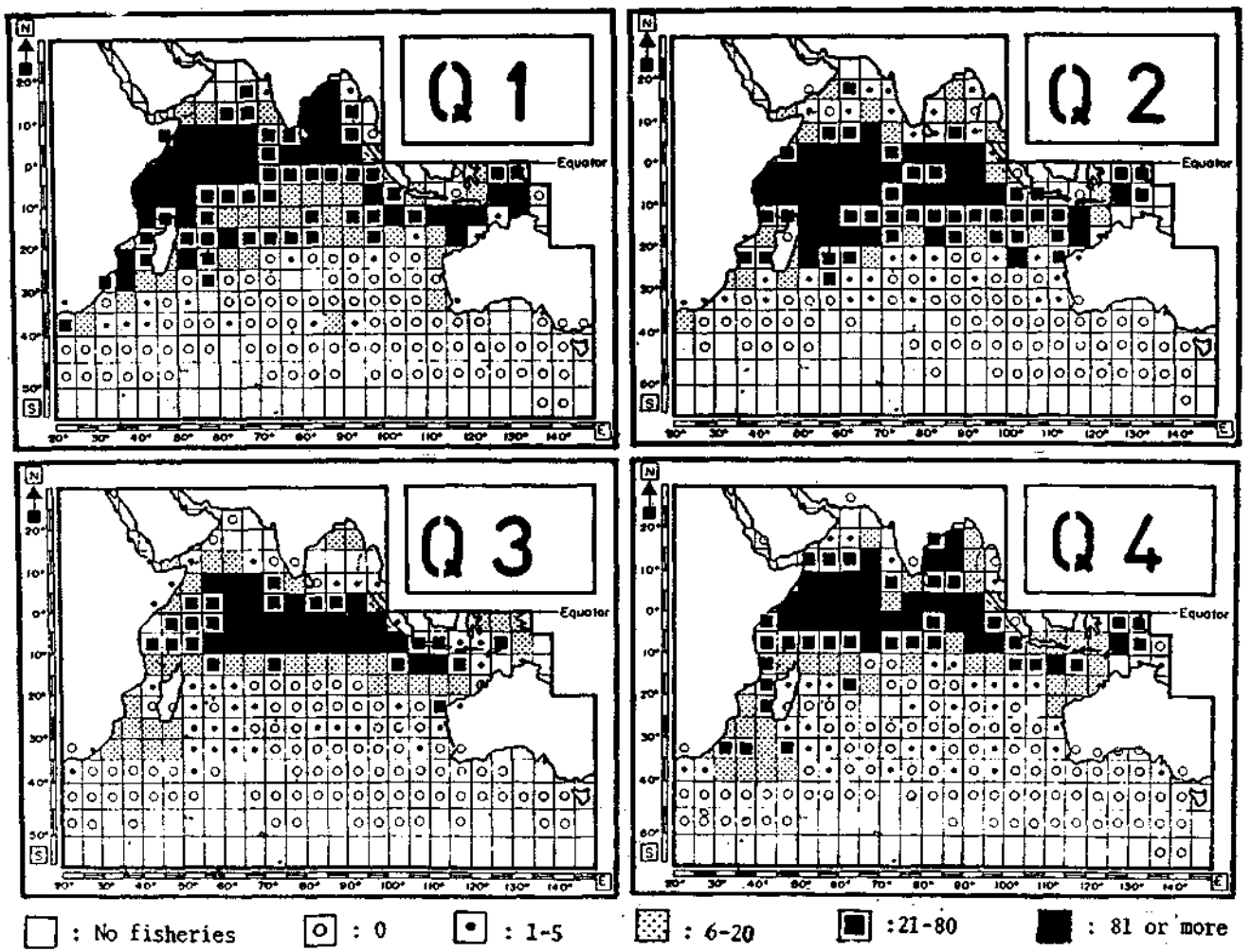

FIG. 14. Quarterly average (1975-1982) catch (in number) for Blue marlin.

commerson and Indo-Pacific king mackerel *S. guttatus*. In some countries, these are classified into one category as seerfish in the statistics.

The major producing countries of these species in the area are Australia, India, Indonesia, Oman, Pakistan, U.A.E., Yemen, Sri Lanka, Saudi Arabia, Tanzania and Thailand.

As shown in Fig. 13 the catch of seerfish has been on an upward trend as a whole. Also, it should be noted that a statistical improvement contributed partly to the increased catch.

Billfish

Under billfish, there are 5 popular species in the Indian Ocean, *i.e.*, blue marlin, black marlin, striped marlin, sailfish and swordfish. Although these are caught by artisanal fisheries in coastal area, many of them are caught by longliners from China (Taiwan), Japan and Korea. There are also sport fishermen to catch these species. In Kenya and Mauritius, there are clubs for such sport fishermen.

Fishing grounds for each species for longlining are shown in Fig. 14 to 18.

Sri Lanka has improved its data collection for billfish since 1984, which contributed to the increased catch statistics. There are many fields to be improved in data collection system for these species in coastal countries.

According to the statistics collected by IPTP, as shown in Fig. 13, the catch of billfish, all species combined did not fluctuate, but increased slightly during the past 10 years.

Conclusion

A catch is a product obtained through fishing. Fishing is an economical activity. Fishermen or fishing industries will get incomes or profits through fisheries. Thus, the catch reflects socio-economic conditions surrounding fisheries. Such elements as price of fish, consumers purchasing power, operation cost of fishing (fuel price and wage price of crew) and fishing technology, etc. concern directly or indirectly with the catch.

Tuna and tuna-like species are presently utilized widely not only as table fish to local people, but also as export items to such fish markets as Japanese sashimi, American and European canning. Tuna is called ' sea chicken' as a competitor with chicken. Statistics reveal that US seafood consumption has been increasing from 12.3 pounds to 14.5 pounds per capita consumption between 1982 and 1985. There is good demand for tuna and tuna-like fishes in the world. This demand would be further increased with the increasing population and a good reputation that sea food is favourable for the health of human being.

The present status of resources of tuna and tuna-like species were discussed at the Expert Consultation on Stock Assessment of Tunas in the Indian Ocean in Colombo, December 1986. Following are the summaries of discussions at the Expert Consultation for the status of resources by species.

The fishery of *southern bluefin tuna* is at present under control by three countries *i.e.*, Australia, Japan and New Zealand. It is presumed that there is a large population of *skipjack tuna* in the Indian Ocean. Thus, this fish is likely to be able to yield more production. *Bigeye tuna* resources was highly exploited by longline fishery with the deep-longline technique. It appears that without a new breakthrough in fishing technology that can target on an underexploited part of the stock, further increase in fishing effort will not result in a substantial increase in catch. *Albacore* were also exploited by longliners at a high catch level. A continuation of current catch levels should not have much impact on the status of the stock. However, the increased

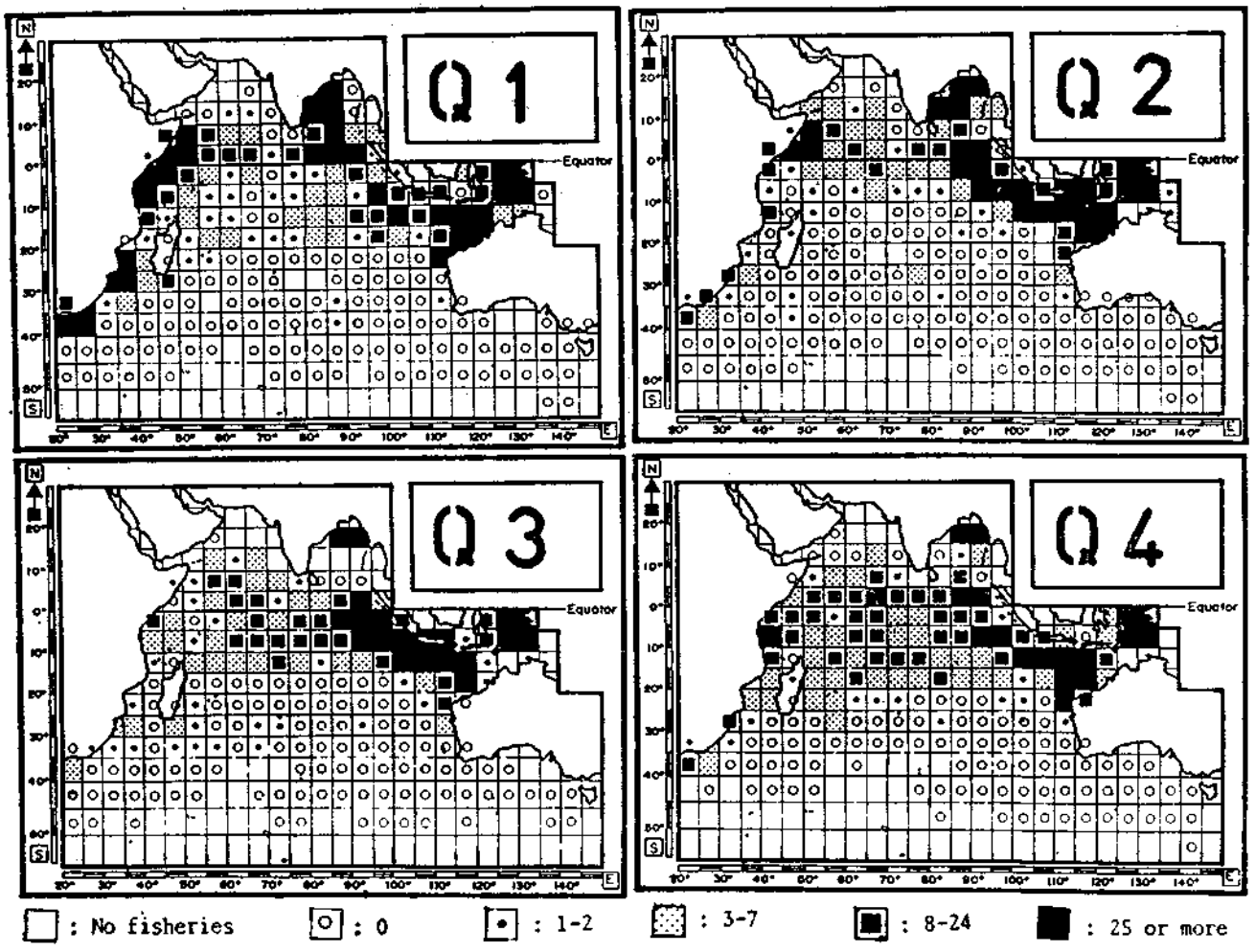

FIG. 15. Quarterly average (1975-1982) catch (in number) for Black marlin.

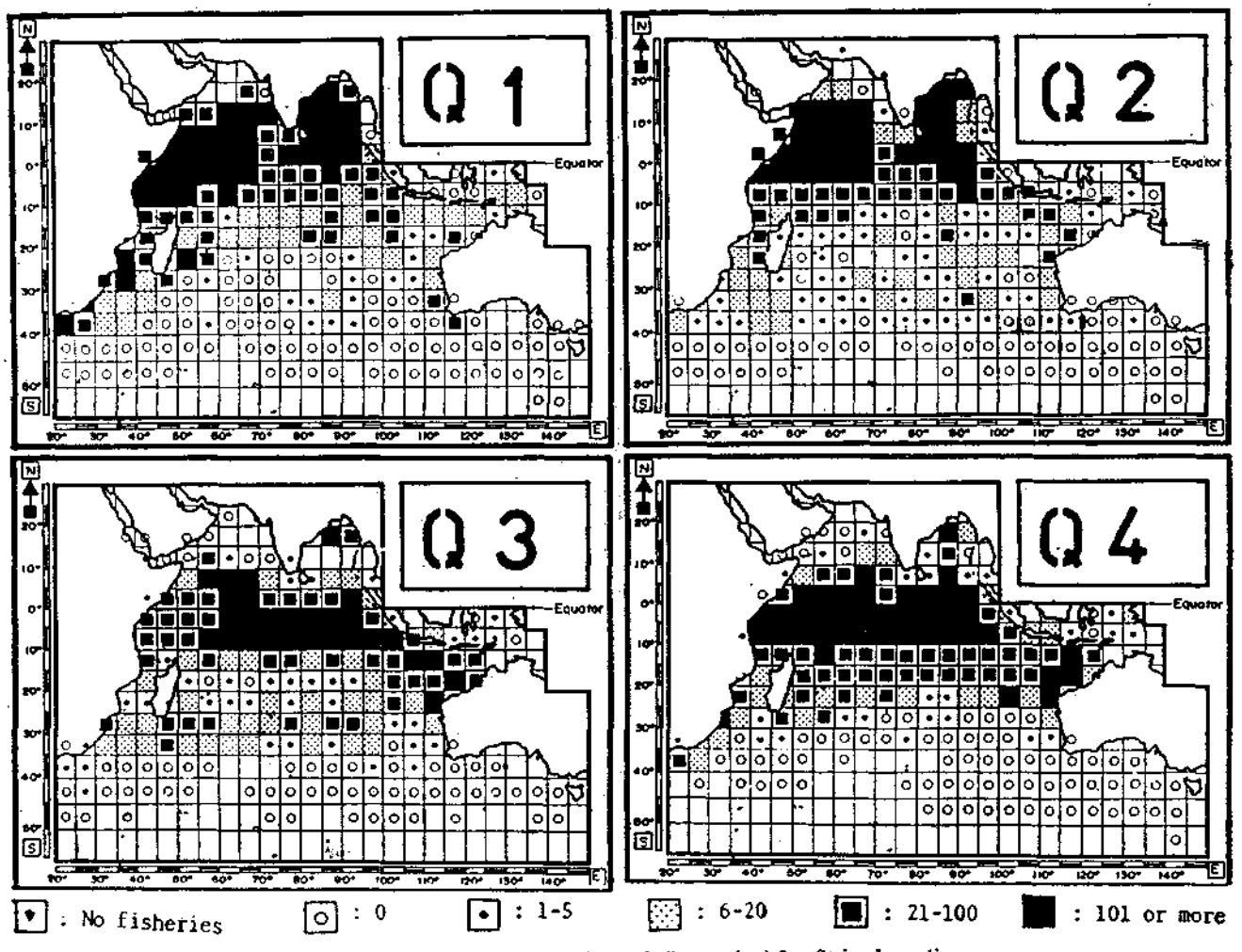

FIG. 16. Quarterly average (1975-1982) catch (in number) for Striped marlin.

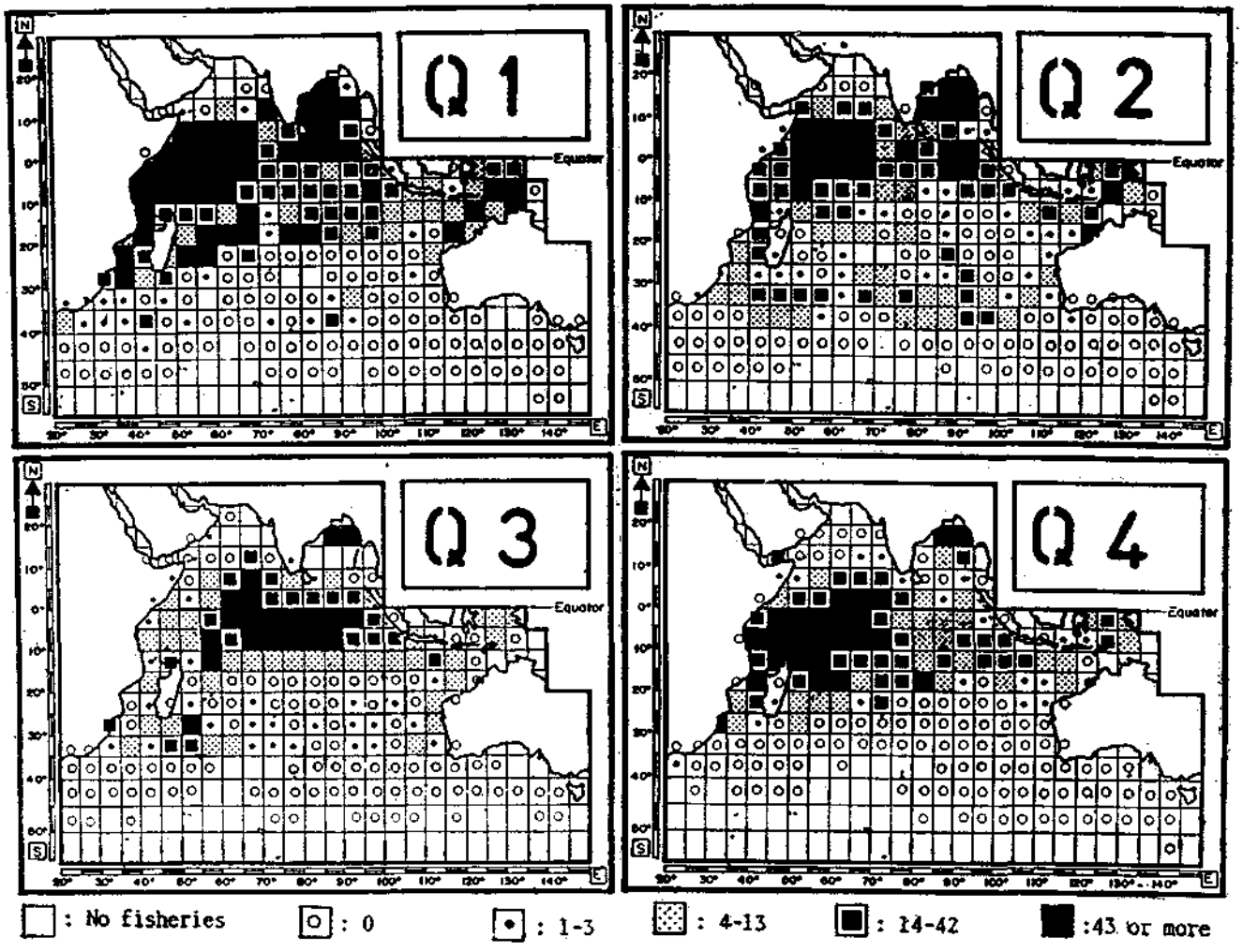

FIG. 17. Quarterly average (1975-1982) catch (in number) for Sailfish.

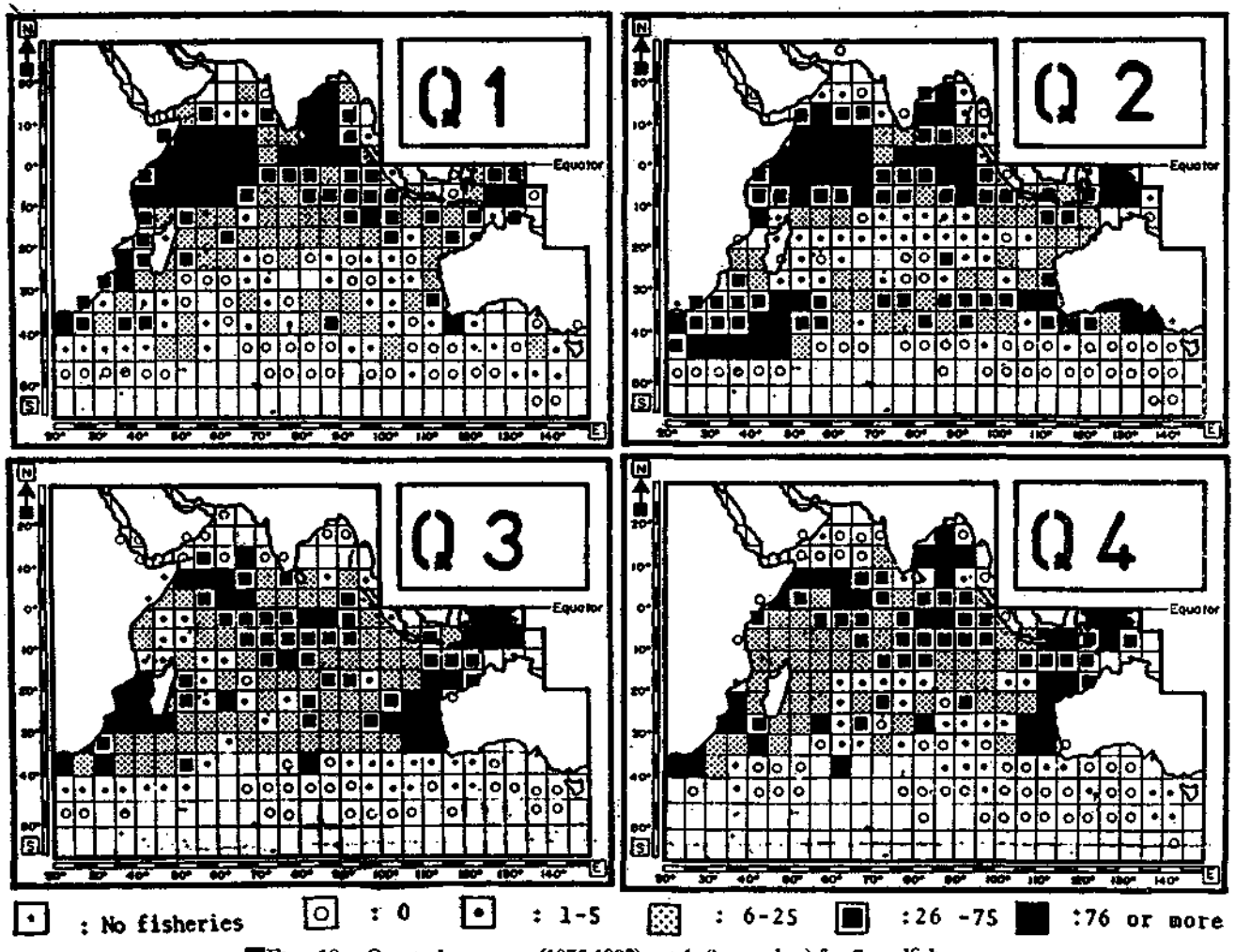

FIG. 18. Quarterly average (1975-1982) catch (in number) for Swordfish.

fishing efforts by gill netters which has been introduced into the Indian Ocean since 1984/, 1985, might have given some impact to the stock status. This requires close monitoring to assess the status of this resource.

Yellowfin tuna: Are currently captured by longline, purse seine and artisanal fisheries in the Indian Ocean. The Expert Consultation could not conclude any definite status for this species due to lack of data on several key parameters.

Small tunas: It stated that stock assessment study is an extremely difficult task because of lack of information on stock structure for each of these species. However, it also stated as hypothetical status that significant increase in the production of longtail tuna can be expected with the expansion of the present fishery off the northwest coast of India and off Bangladesh and Burma. Production of kawakawa can also be expected to increase from these areas. The potential yield of *Auxis* species could be the highest of all tropical small tunas in the Indian Ocean.

Seerfish: Although seerfish fisheries are so important in the region, potential of seerfish catch is unknown and considerable effort is required to evaluate these resources.

Billfish: Due to incomplete statistical information, it was far from starting discussion on potentiality for these fishes.

In order to meet increasing demands, tuna fisheries will be further developed in the Indian Ocean in both industrial and artisanal fisheries. However, owing to the nature of highly migratory species, these resources need to be closely monitored on a global basis to prevent over exploitation. Further improvement and development of data collection on catch/effort and biological parameters is highly recommended as a basis for stock analyses.