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**REVIEW OF FISHERY PRODUCTION, PROVISIONAL ESTIMATION
OF POTENTIAL YIELD AND THE SITUATION OF FISHERIES
IN THE SOUTHEAST ASIAN REGION - 1976 to 1989**

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Training Department
Southeast Asian Fisheries Development Center

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1. Introduction

The South China Sea Area in Southeast Asia is one of the most important areas for marine capture fisheries in the world. Marine capture fisheries in the region amounted to 8,291,000 MT in 1989, accounting for 9.67% of the world total. This paper describes the trends of marine capture fishery production in the region from 1976 to 1989, and, in Part 2, provides provisional estimations of potential yield on the basis of the relationship between catch data and their percentage of the whole during those years. The catch data used was obtained from the Fishery Statistical Bulletins for the South China Sea Area. This paper also provides, in Part 3, summary notes on two topics; the regional fisheries situation from 1976 to 1989; and the catch trends and provisionally estimated potential yield in each country during those years.

Fishery Statistical Bulletins for the South China Sea Area have been published annually by SEAFDEC from 1976 to 1989. The objective of the Bulletins is to provide standardized classifications and definitions of fishery statistics for data comparison and analysis. The Bulletins also provide country data for fisheries management planners, administrators and scientists who engage in research, development and conservation of the fishery resources and fishing industries of the region. For easier understanding of the components of fisheries, and trends of marine capture fishery in the South China Sea Area during the years from 1984 to 1988, please refer to previous papers published in 1992 - Fisheries in the South China Sea Area from 1984 to 1988 by P. Wongsanga and H. Yanagawa (SEAFDEC TD/SP/16), and Marine Capture Fishery Production in the South China Sea Area from 1984 to 1988 by H. Yanagawa (SEAFDEC TD/SP/17).

The Bulletins cover the South China Sea, Fishing Area 71, as designated by the FAO, and the territorial waters of the Andaman Sea belonging to Malaysia and Thailand.

A list of marine species can be referred to in Appendix 2 (p.xv to xvii) of the Explanatory Notes at the beginning of each Bulletin.

Finally, we would like to express our sincere thanks to Dr. Thiraphan Bhukaswan, Secretary General of SEAFDEC, for his critical comments on the present study.

2. Marine Capture Fishery Production and Potential Yield in the Southeast Asian Region

This part describes the trends for total marine catch, catch by type of fishing gear and catch by major species group from 1976 to 1989 in the Southeast Asian Region. It also provides provisionally estimated potential yields on the basis of 14 years of regional catch trend data.

2.1 Trends of marine capture fishery production

Regional marine capture fishery production is shown in Table 1. Figures for Brunei before 1987 include imported quantities, and figures for Taiwan before 1984 include catches from outside the South China Sea Area.

The total marine catch in the region increased from 5,770,000 MT in 1976 to 6,601,000 MT in 1977 and then remained constant in 1978. It decreased to 6,198,000 MT in 1979 and 6,120,000 MT in 1980, but increased to 7,164,000 MT in 1983, before decreasing again to 6,664,000 MT in 1984. After 1984, total production showed a steady increase to 7,297,000 MT in 1986 and 8,291,000 MT in 1989.

The percentage of the total catch achieved by each country from 1976 to 1989 remained fairly constant, with the exceptions of Taiwan and Viet Nam with decreases, and Indonesia with an increase. In 1976 figures were as follows: Thailand, 24.1% (1,388,000 MT) at the top; followed by the Philippines, 19.5% (1,127,000 MT); Indonesia, 18.7% (1,082,000 MT); Viet Nam, 14.5% (837,000 MT); Taiwan, 11.7% (673,000 MT); Malaysia, 8.4% (483,000 MT); Hong Kong, 2.6% (151,000 MT); Singapore, 0.3% (15,800 MT); Kampuchea, 0.2% (10,800 MT); and Brunei, 0.03% (2,000 MT).

In 1983 figure were: Thailand, 28.7% (2,055,000 MT) at the top; followed by Indonesia, 23.5% (1,682,000 MT); Philippines, 18.0% (1,290,000 MT); Taiwan, 9.6% (687,000 MT); Malaysia, 9.6% (686,000 MT); Viet Nam, 7.7% (553,000 MT); Hong Kong, 2.5% (181,000 MT); Singapore, 0.3% (19,100 MT); Kampuchea, 0.07% (5,100 MT); and Brunei, 0.07% (5,000 MT).

The latest data in 1989 was: Thailand, 28.6% (2,371,000 MT) at the top; followed by Indonesia, 27.4% (2,272,000 MT); the Philippines, 18.3% (1,520,000 MT); Malaysia, 10.5% (874,000 MT); Viet Nam, 7.5% (618,000 MT); Taiwan, 4.6% (384,000 MT); Hong Kong, 2.8% (234,000 MT); Singapore, 0.1% (10,600 MT); Kampuchea, 0.08% (6,500 MT); and Brunei, 0.02% (1,800 MT).

During this period from 1976 to 1989, the combined catches of three main countries (Thailand, Indonesia and the Philippines) accounted for: 62.3% of the total in 1976, 70.2% in 1983, and 74.3% in 1989.

2.2 Marine catch by type of fishing gear

Marine catch by type of fishing gear from 1977 to 1989 is shown in Table 2. Data was obtained from six countries - Taiwan, Hong Kong, Indonesia (data was not available between 1977 and 1982, and 1984 and 1986), Malaysia, the Philippines (data was not available in 1989), and Thailand. Fishing gear was classified into ten categories: Surrounding net, Seine net, Trawl, Gill net, Lift net, Trap, Hook-and-line, Push net, Shellfish and seaweed collecting gear, and others.

The Trawl catch, the most dominant over the 13 years, was 2,161,000 MT in 1977, remained constant in 1978, and decreased to 1,863,000 MT in 1979. It then remained constant until 1984, fell to 1,694,000 MT in 1985, but increased to over 2,000,000 MT between 1986 and 1989. The mean value over the 13 years was 1,955,000 MT, ranging between 1,694,000 MT (1985) and 2,380,000 MT (1987).

The Surrounding net catch was 33,000 MT in 1977, showed a dramatic increase to 524,000 MT in 1978 and reached 740,000 MT in 1979. It fell to 256,000 MT in 1980, however, and then varied slightly until 1983. In 1984, the catch increased dramatically to 1,015,000 MT, and further increased to 1,590,000 MT in 1988. The mean value was 793,000 MT, ranging between 33,000 MT (1977) and 1,591,000 MT (1987).

The Gill net catch was recorded as 154,000 MT in 1977, and showed a dramatic increase to 474,000 MT in 1978; it then remained constant until 1982. In 1983 it doubled to 936,000 MT, fell to 488,000 MT in 1984 and then showed a slight increase to 543,000 MT in 1986. It reached the 1,000,000 MT level in 1987 and 1988, but decreased to 831,000 MT in 1989. The mean value was 609,000 MT, ranging between 154,000 MT (1977) and 1,078,000 MT (1987).

The Hook-and-line catch was 230,000 MT in 1977, it then doubled to 470,000 MT in 1978, but decreased to 367,000 MT in 1979. After 1979, it varied between 359,000 MT and 523,000 MT, with the exception of 711,000 MT in 1983, 871,000 MT in 1987 and 757,000 MT in 1988. The mean value was 501,000 MT, ranging between 230,000 MT (1977) and 871,000 MT (1987).

The Seine net catch recorded 799,000 MT in 1977, 1,274,000 MT in 1983, but only 315,000 MT in 1989. The mean value was 436,000 MT, ranging between 77,000 MT (1979) and 1,274,000 MT (1983). The Lift net catch was 19,000 MT in 1977, 397,000 MT in 1983, and 285,000 MT in 1989. The mean value was 224,000 MT, ranging between 19,000 MT (1977) and 406,000 MT (1988). The Trap catch recorded 138,000 MT in 1977, 253,000 MT in 1983, and 244,000 MT in 1989. The mean value was 155,000 MT, ranging between 69,000 MT (1980) and 306,000 MT (1988).

The Shellfish and seaweed collecting gear catch was 2,000 MT in 1977, 62,000 MT in 1983, and 122,000 MT in 1989. The mean value was 46,000 MT, ranging between 2,000 MT (1977) and 159,000 MT (1987). The Push net catch recorded 11,000 MT in 1977, 20,000 MT in 1983, and 16,000 MT in 1989. The mean value was 20,000 MT, ranging between 7,000 MT (1978) and 42,000 MT (1985).

In 1989, the Trawl catch was the most dominant and accounted for 34.8% of the total (2,132,000 MT); followed by Surrounding net, 20.7% (1,270,000 MT); Gill net, 13.5% (831,000 MT); Hook-and-line, 8.2% (505,000 MT); Seine net, 5.1% (315,000 MT); Lift net, 4.6% (285,000 MT); Trap, 4.0% (244,000 MT); Shellfish and seaweed collecting gear, 2.0% (122,000 MT) Push net, 0.3% (16,000 MT); and others, 6.8% (415,000 MT).

2.3 Marine catch by species group

Marine catch by 22 major species groups from 1976 to 1989 in the Southeast Asian Region is shown in Table 3. The 1979 data from Indonesia was not classified by species groups, and was therefore totaled in the species group category "Others".

The analysis of the mean value of the catch over the 14 years from 1976 to 1989 (13 years data, as 1979 excluded) showed Trash fish was the most dominant, ranging between 764,400 MT (1976) and 1,339,000 MT (1987) with a mean of 1,097,800 MT.

The species groups which showed a mean of over 300,000 MT were as follows: Miscellaneous fish - 583,200 MT, ranging between 378,800 MT (1978) and 696,100 MT (1988); Sardine - 437,100 MT, ranging between 207,800 MT (1985) and 539,500 MT (1989); and Round scad - 375,100 MT, ranging between 192,600 MT (1980) and 464,300 MT (1989).

Those which showed a mean of over 200,000 MT were as follows: Anchovy - 282,100 MT, ranging between 153,800 MT (1977) and 372,300 MT (1989); Non-penaeid prawn - 268,800 MT, ranging between 168,100 MT (1976) and 340,000 MT (1982); and Indian mackerel - 220,100 MT, ranging between 83,000 MT (1977) and 289,700 MT (1989).

Groups with a mean of over 150,000 MT were as follows: Penaeid prawn - 197,600 MT, ranging between 139,400 MT (1980) and 271,100 MT (1988); Eastern little tuna - 176,100 MT, ranging between 99,000 MT (1976) and 245,100 MT (1989); Squid - 160,400 MT, ranging between 112,800 MT (1976) and 220,800 MT (1986); Indo-Pacific mackerel - 155,000 MT, ranging between 91,600 MT (1981) and 180,200 MT (1989); and Selar scad - 153,300 MT, ranging between 101,000 MT (1976) and 186,500 MT (1989).

Means of over 100,000 MT were found in the following groups: Skipjack tuna - 145,500 MT, ranging between 80,000 MT (1976) and 204,800 MT (1986); Threadfin bream - 112,200 MT, ranging between 84,400 MT (1982) and 144,100 MT (1988); Yellowfin tuna - 111,000 MT, ranging between 58,500 MT (1976) and 141,000 MT (1989); Pony fish - 108,800 MT, ranging between 93,200 MT (1981) and 108,600 MT (1988); and Jack-cavalla-trevally - 101,800 MT, ranging between 65,100 MT (1976) and 122,500 MT (1988).

The species groups which showed a mean of over 75,000 MT were as follows: Frigate tuna - 93,200 MT, ranging between 30,400 MT (1976) and 133,700 MT (1989); Drum and croaker - 85,800 MT, ranging between 68,500 MT (1978) and 91,700 MT (1988); Narrow-barred king mackerel - 85,600 MT, ranging between 62,200 MT (1976) and 95,000 MT (1989); Shark - 82,800 MT, ranging between 59,900 MT (1978) and 104,500 MT (1986) and Jellyfish - 76,000 MT, ranging between 6,100 MT (1980) and 221,400 MT (1983).

In 1989, the catch of Trash fish was the most dominant accounting for 16.4% (1,255,400 MT) of the total; followed by Miscellaneous fish, 8.7% (666,400 MT); Sardine, 7.0% (539,500 MT); Round scad, 6.1% (464,300 MT); Anchovy, 4.9% (372,300 MT); Indian mackerel, 3.8% (289,700 MT); Non-penaeid prawn, 3.2% (247,900 MT); Eastern little tuna, 3.2% (245,100 MT); Penaeid prawn, 2.8% (211,000 MT); Selar scad, 2.4% (186,500 MT); Skipjack tuna, 2.4% (180,600 MT); Indo-Pacific mackerel, 2.4% (180,200 MT); Squid, 2.0% (152,000 MT); Yellowfin tuna, 1.8% (141,000 MT); Threadfin bream, 1.8% (140,600 MT); Frigate tuna, 1.7% (133,700 MT); Jack-cavalla-trevally, 1.5% (118,400 MT); Pony fish, 1.4% (107,800 MT); Narrow-barred king mackerel, 1.2% (95,000 MT); Drum and croaker, 1.2% (89,600 MT); Shark, 0.9% (72,400 MT); Jellyfish, 0.9% (67,500 MT); and others, 22.3% (1,707,600 MT).

2.4 Provisional estimation of potential yield in the region

This section describes the recorded Maximum Catch, provisionally Estimated Maximum Potential Yield (A), Estimated Potential Yield (B), the Latest Three Year Mean (C) of the catch, and their related

figures (A-C, B-C), in the Southeast Asian Region (Table 4), on the basis of the relationship between catch data and their percentages from 1976 to 1989. In this paper, estimated negative value is defined as overexploitation and positive value is defined as underexploitation. For the estimation of potential yield, enough data was available from Hong Kong, Indonesia, Malaysia, the Philippines, Singapore and Thailand (results can be referred to in Part 3.2). Other countries such as Brunei, Taiwan, Kampuchea and Viet Nam temporarily used the Maximum Catch as the Estimated Maximum Potential Yield (A) (See Table 4). Eighty percent of the Estimated Maximum Potential Yield was defined as Estimated Potential Yield (B), in this paper.

Potential yields

The latest regional three year mean of catches was 8,154,300 MT, but estimated potential yield was 7,782,000 MT (Table 4). Overexploitation in 1989 was therefore, by this estimation, 372,300 MT. Among the ten countries in the region, five countries, i.e., Taiwan, Hong Kong, Indonesia, Malaysia and Thailand, showed overexploitation; but the other five countries, Brunei, Kampuchea, Philippines, Singapore and Viet Nam, have the potential for increasing their catch.

Examining the estimations by major species groups, Trash fish was the most overexploited at 374,700 MT; followed by Anchovy, 39,900 MT; Eastern little tuna, 39,000 MT; Frigate tuna, 23,200 MT; Sardine, 22,900 MT; Indian mackerel, 22,900 MT; Skipjack tuna, 20,400 MT; Narrow-barred king mackerel, 17,600 MT; Squid, 16,300 MT; Threadfin bream, 15,500 MT; Shark, 6,400 MT; Pony fish, 5,900 MT; Selar scad, 5,600 MT; and Drum and croaker, 4,200 MT (Table 5).

On the other hand, eight species groups showed underexploitation; i.e., Jellyfish at 124,000 MT; followed by Round scad, 64,200 MT; Indo-Pacific mackerel, 51,900 MT; Non-penaeid prawn, 46,200 MT; Miscellaneous fish, 33,200 MT; Yellowfin tuna, 24,300 MT; Penaeid prawn, 12,600 MT; and Jack-cavalla-trevally, 12,300 MT.

The status of each major species group by country is as follows: (countries showing positive figures and therefore under-exploitation of a particular species group, show the potential for increasing the catch of that species e.g. Singapore and Trash fish). Trash fish was overexploited by Thailand (-318,700 MT) and Malaysia (-64,200 MT), but underexploited by the Philippines (6,800 MT) and Singapore (1,300 MT).

Miscellaneous fish was overexploited by Thailand (-32,800 MT), Hong Kong (-15,600 MT) and Malaysia (-2,000 MT), but under-exploited by Indonesia (71,000 MT), Philippines (11,200 MT) and Singapore (1,300 MT).

Sardine was overexploited by Indonesia (-58,200 MT) and Malaysia (-690 MT), but underexploited by Thailand (18,300 MT), the Philippines (15,100 MT), Hong Kong (2,500 MT) and Singapore (50 MT).

Round scad was overexploited by Malaysia (-1,900 MT), but underexploited by Thailand (52,100 MT), Indonesia (9,700 MT), Hong-Kong (4,100 MT) and the Philippines (250 MT).

Anchovy was overexploited by Indonesia (-33,900 MT) and the Philippines (-21,200 MT), but underexploited by Thailand (14,000 MT), Malaysia (1,200 MT) and Singapore (8 MT).

Non-penaeid prawn showed no overexploitation, and under-exploitation by Indonesia (22,200 MT), Malaysia (9,500 MT), Thailand (8,900 MT) and the Philippines (5,500 MT).

Indian mackerel was overexploited by Indonesia (-30,000 MT) and the Philippines (-10,100 MT), but underexploited by Malaysia (11,600 MT), Thailand (5,500 MT) and Singapore (150 MT).

Penaeid prawn was overexploited by Indonesia (-10,500 MT), Malaysia (-3,900 MT) and Hong Kong (-2,200 MT), but underexploited by Thailand (19,600 MT), Philippines (9,200 MT) and Singapore (330 MT).

Eastern little tuna was overexploited by Indonesia (-31,300 MT), Philippines (-5,500 MT) and Thailand (-4,800 MT), but underexploited by Malaysia (2,600 MT).

Squid was overexploited by Thailand (-7,000 MT), Indonesia (-4,000 MT), Malaysia (-3,400 MT) and the Philippines (-2,900 MT), but underexploited by Hong Kong (760 MT) and Singapore (260 MT).

Indo-Pacific mackerel was overexploited by Thailand (-5,500 MT), but underexploited by Indonesia (55,200 MT), the Philippines (2,200 MT) and Malaysia (60 MT).

Selar scad was overexploited by Indonesia (-20,800 MT), but underexploited by the Philippines (7,800 MT), Malaysia (6,600 MT), Thailand (720 MT) and Singapore (120 MT).

Skipjack tuna was overexploited by Indonesia (-17,900 MT) and the Philippines (-2,500 MT), and showed no underexploitation.

Threadfin bream was overexploited by Thailand (-8,800 MT), Hong Kong (-4,900 MT) and Indonesia (-3,100 MT), but underexploited by the Philippines (1,100 MT), Singapore (200 MT) and Malaysia (17 MT).

Yellowfin tuna showed no overexploitation, and underexploitation by the Philippines (19,900 MT), Indonesia (3,700 MT) and Singapore (750 MT).

Pony fish was overexploited by Indonesia (-8,700 MT), but underexploited by the Philippines (2,800 MT).

Jack-cavalla-trevally was overexploited by the Philippines (-6,200 MT) and Thailand (-4,100 MT), but underexploited by Indonesia (20,800 MT), Malaysia (1,300 MT) and Hong Kong (500 MT).

Frigate tuna was overexploited by the Philippines (-23,200 MT), and showed no underexploitation.

Drum and croaker was overexploited by Indonesia (-3,900 MT), Thailand (-2,500 MT), Malaysia (-1,100 MT), Hong Kong (-140 MT) and Singapore (-76 MT), but underexploited by the Philippines (3,400 MT).

Narrow-barred king mackerel was overexploited by Indonesia (-13,700 MT), Thailand (-3,500 MT), Philippines (-2,000 MT) and Hong Kong (-650 MT), but underexploited by Malaysia (2,200 MT).

Shark was overexploited by Indonesia (-7,800 MT), but underexploited by Malaysia (510 MT), Hong Kong (450 MT), Philippines (430 MT) and Singapore (42 MT).

Jellyfish was overexploited by Malaysia (-210 MT), but underexploited by Thailand (115,700 MT) and Indonesia (8,500 MT).

Maximum potential yields

Sustainable increases in regional catches will only be possible if fisheries resources are properly managed. These urgently required management measures could produce a yield of up to 1,573,200 MT more in the future bringing the total catch up to 9,727,500 MT (See Table 4). Of the ten countries, the Philippines shows the highest potential for increased catch at 398,400 MT; followed by Thailand, 383,300 MT; Indonesia, 365,300 MT; Viet Nam, 216,400 MT; Malaysia, 132,100 MT; Hong Kong, 33,800 MT; Taiwan, 22,800 MT; Singapore, 13,200 MT; Kampuchea, 4,300 MT; and Brunei, 3,700 MT.

Provisional estimations of maximum potential yield by species group and by country are shown in Table 6. Trash fish were still overexploited at 154,400 MT in total: 144,800 MT by Thailand and 22,500 MT by Malaysia. Increased catches of 10,900 MT, for the Philippines and 2,000 MT for Singapore are possible. Frigate tuna was also overexploited by 2,200 MT by the Philippines. The other species groups, however, showed some potential for increased catch in the future, if fisheries resources are well managed.

Miscellaneous fish showed some potential for an increase in total catch of 192,400 MT (top country, Indonesia at 172,700 MT); followed by Round scad, 185,700 MT (Thailand at 75,800 MT); Jellyfish, 171,500 MT (Thailand at 150,800 MT); Non-penaeid prawn, 111,400 MT (Indonesia at 46,000 MT); Indo-Pacific mackerel, 103,300 MT (Indonesia at 70,900 MT); Sardine, 91,000 MT (Thailand at 55,900 MT); Penaeid prawn, 62,400 MT (Thailand at 28,200 MT); Yellowfin tuna, 57,200 MT (Philippines at 39,100 MT); Jack-cavalla-trevally, 45,500 MT (Indonesia at 30,400 MT); Indian mackerel, 40,400 MT (Malaysia at 30,000 MT); Anchovy, 35,700 MT (Thailand at 36,200 MT); Selar scad, 35,500 MT (Philippines at 19,000 MT); Skipjack tuna, 19,400 MT (Philippines at 13,100 MT); Pony fish, 18,500 MT (Philippines at 19,500 MT); Threadfin bream, 15,200 MT (Philippines at 12,400 MT); Squid, 14,800 MT (Thailand at 9,000 MT); Drum and croaker, 13,300 MT (Philippines at 6,700 MT); Eastern little tuna, 8,700 MT (Philippines at 6,500 MT); Shark, 5,700 MT (Philippines at 2,400 MT); and Narrow-barred king mackerel, 440 MT (Malaysia at 5,400 MT).

3. Summary Notes

3.1 Situation of fisheries in the Southeast Asian Region

3.1.1 Fishery production in the region

Fishery production includes not only all catches of capture fishery in marine, brackishwater and freshwater but also aquaculture production in the region. Data was obtained from all ten countries: Brunei, Taiwan, Hong Kong, Indonesia, Kampuchea, Malaysia, Philippines, Singapore, Thailand and Viet Nam. Value data was obtained from eight countries, but not from Kampuchea and Viet Nam where data was not available.

As shown in Fig. 1, the total fishery production in the region in quantity from 1976 to 1980, 1983, 1986 and 1989 showed a rising trend. It increased from 7.18 million MT in 1976 to 10.9 million MT in 1989. In terms of value, the production in the region also showed an initial rising trend from US\$ 3,140 million in 1976 to US\$ 6,832 million in 1986 but figures declined to US\$ 6,565.7 million in 1989. The reason for this decline was the unavailability of value data from Indonesia in 1989 as shown in Fig. 2.

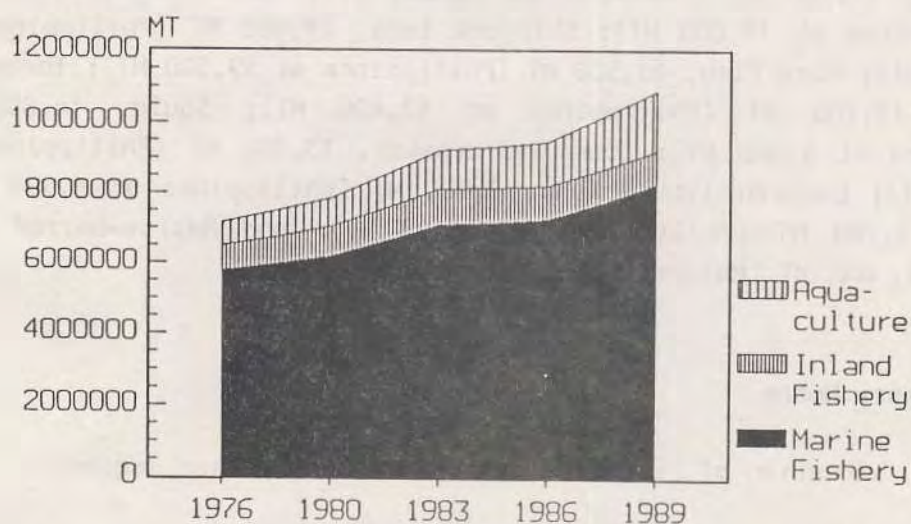


Fig. 1. Total regional fishery production in quantity.

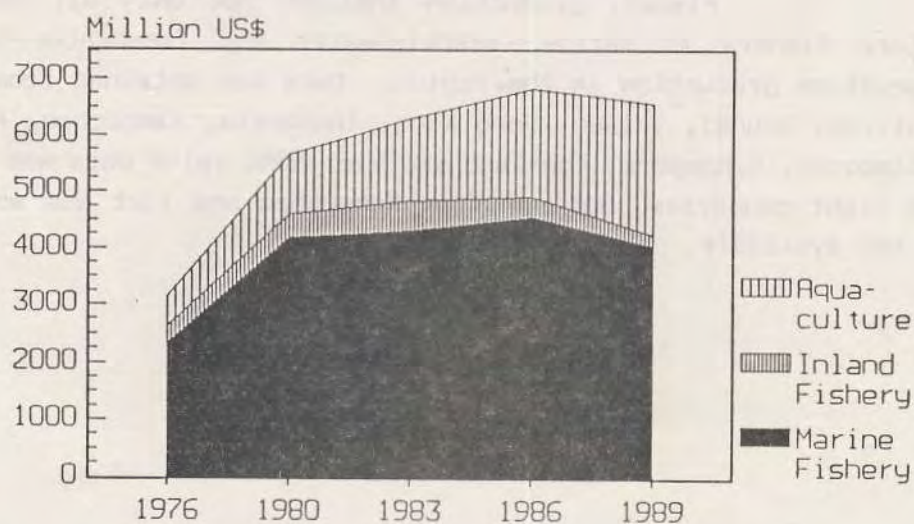


Fig. 2. Total regional fishery production in value.

3.1.2 Fishery production by country

Data was obtained from eight countries : Brunei, Taiwan, Hong Kong, Indonesia, Malaysia, the Philippines, Singapore and Thailand. In the following notes, numbers in parentheses show the minimum and the maximum during 1976 to 1989. Trends can be seen in the Figures that follow.

In terms of quantity, Indonesia and Thailand were the major regional producers from 1976 to 1989 with about 1.48 to 3.03 million MT from Indonesia and 1.69 to 2.74 million MT from Thailand. Following were the Philippines (1.39-2.37 million MT), Taiwan (810-637 thousand MT), Malaysia (517-934 thousand MT), Hong Kong (156-242 thousand MT), Singapore (16-12 thousand MT) and Brunei (2-1.9 thousand MT) as shown in Fig. 3.

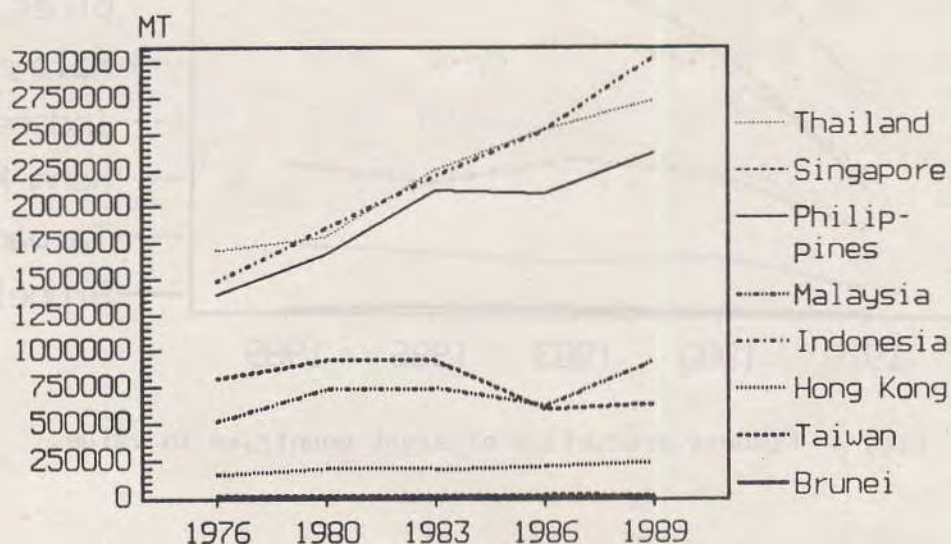


Fig. 3 Fishery production of eight countries in quantity.

In terms of value, the Philippines predominated making about US\$ 986 to 2,070 million followed by Indonesia (US\$ 656-1,102 million during 1976 to 1986, value data in 1989 was not available); Taiwan (US\$ 567-2,100 million); Thailand (US\$ 406-1,393 million); Malaysia (US\$ 380-673 million); Hong Kong (US\$ 125-305 million); Singapore (US\$ 14-16 million) and Brunei (US\$ 3-5 million) as shown in Fig. 4.

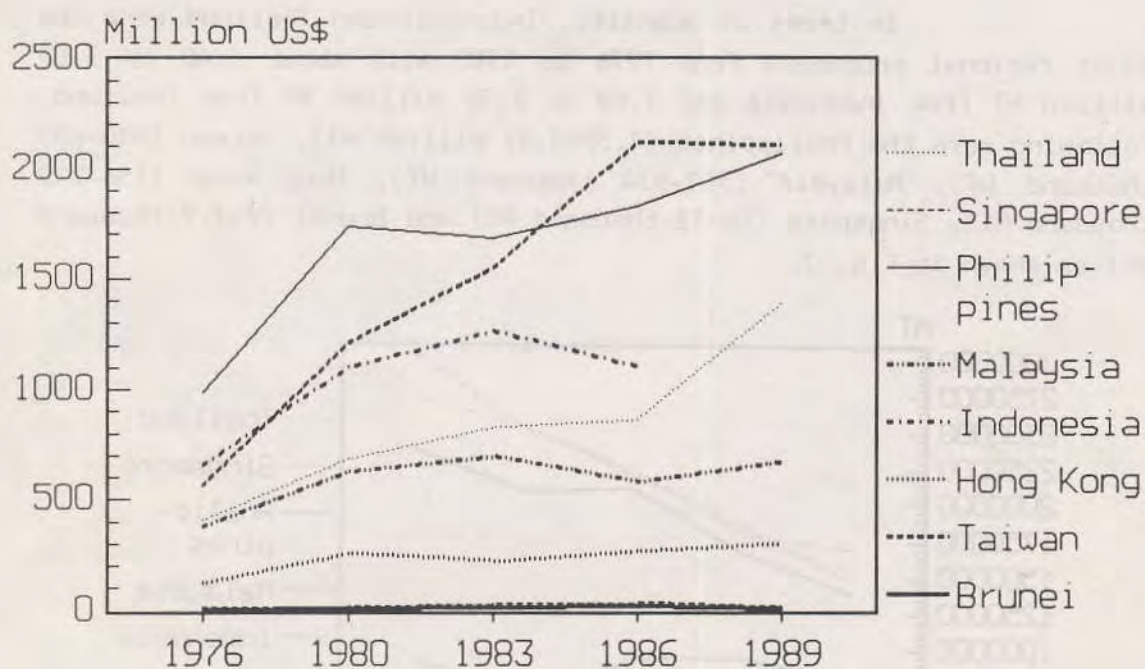


Fig. 4 Fishery production of eight countries in value.

3.1.3 Fishery production by sub-sector

Data was obtained from all ten countries : Brunei, Taiwan, Hong Kong, Indonesia, Kampuchea, Malaysia, Philippines, Singapore, Thailand and Viet Nam. Defined sub-sectors are marine capture fishery, inland capture fishery and aquaculture.

As shown in Fig. 5 (A), total marine capture fishery production in the region in quantity in 1976 was 5.76 million MT, increasing gradually to 6.1, 7.1, 7.2 and 8.2 million MT in 1980, 1983, 1986 and 1989 respectively. In terms of value, regional marine capture fishery production increased sharply from US\$ 2,324 - 4,178 million between 1976 and 1980, increased gradually to US\$ 4,315 and 4,555 million in 1983 and 1986 but decreased to US\$ 4,034 million in 1989. This fall in figures was caused by the lack of data from Indonesia in 1989 as shown in Fig. 5 (B).

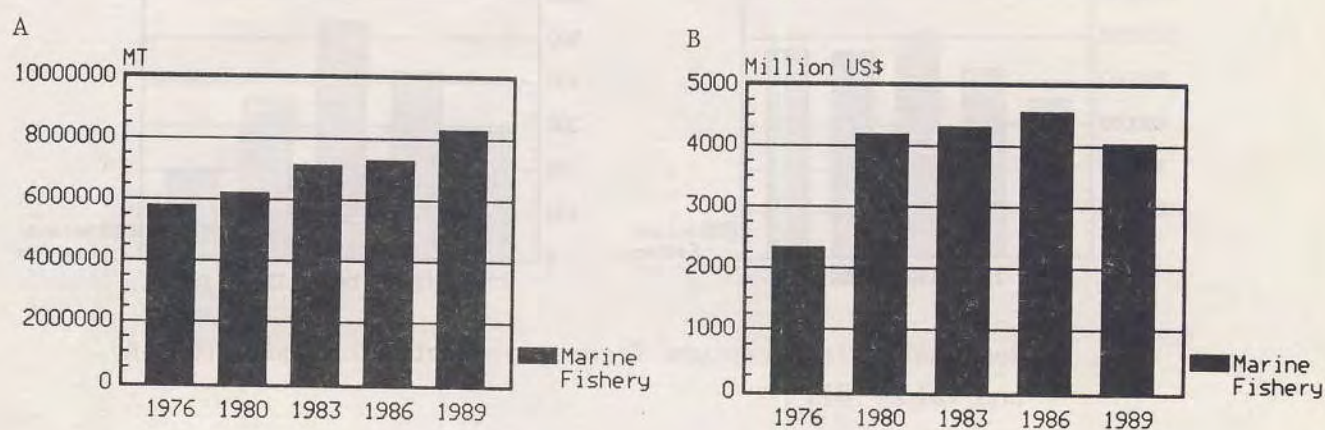


Fig. 5 Regional marine capture fishery production in quantity (A) and value (B).

Fig. 6 (A) shows regional inland capture fishery production in quantity. It increased gradually from 719 to 1,016 thousand MT from 1976 to 1983 but decreased to 934 and 947 thousand MT in 1986 and 1989. In terms of value, inland capture fishery production in the region also showed an increasing trend from US\$ 288-533 million from 1976 to 1983 but decreased to US\$ 367 and 196 million in 1986 and 1989. These figures were caused by the lack of data from Indonesia in 1989 as shown in Fig. 6 (B).

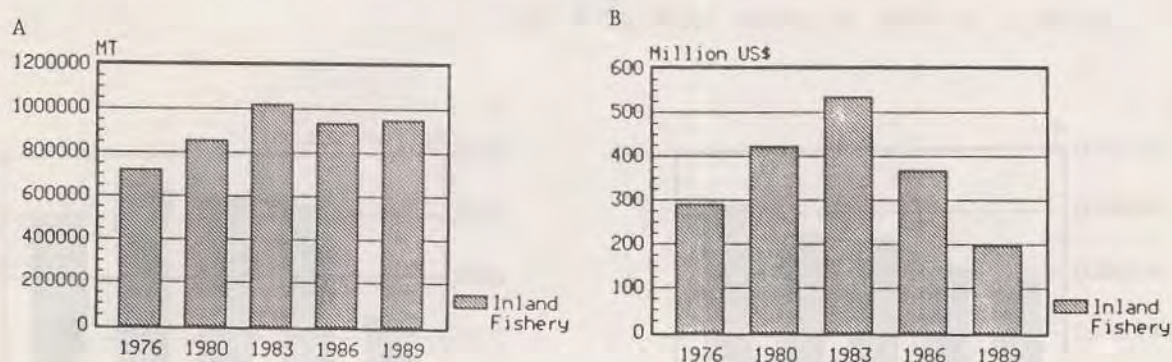


Fig. 6 Regional inland capture fishery production in quantity (A) and value (B).

Figs. 7 (A) and 7 (B), show aquaculture, which includes mariculture, brackishwater culture and freshwater culture, increasing gradually both in quantity and value from 687 thousand MT (US\$ 526 million) in 1976 to 1.6 million MT (US\$ 2,334 million) in 1989.

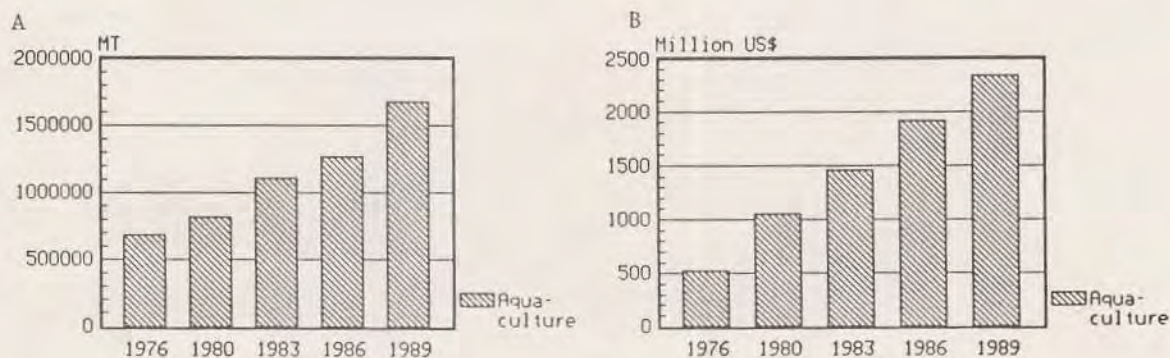


Fig. 7 Regional aquaculture production in quantity (A) and value (B).

Fig. 8 shows the percentage composition of the three fisheries sub-sectors in production quantity. Marine capture fishery showed a small decrease from 80.4% in 1976 to 76% in 1989. For inland fishery, the percentage composition did not change much, i.e., about 8-11% from 1976 to 1989, but for aquaculture the percentage increased gradually from 9.6% in 1976 to 15.4% in 1989.

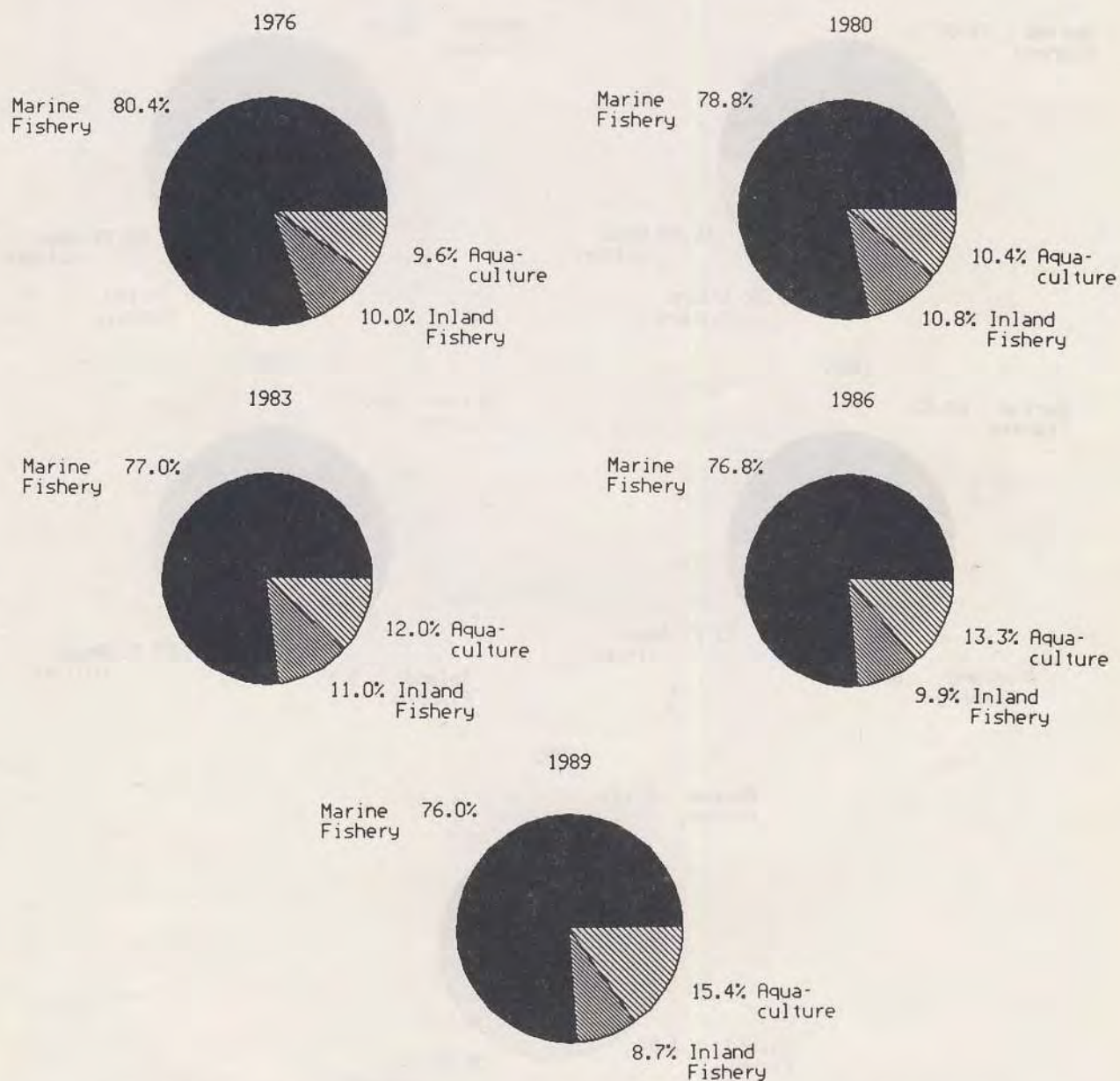


Fig. 8 Percentage of regional fishery production in quantity by sub-sector.

In terms of value, figures did not change much, although there was a decrease in marine capture, from 74% in 1976 to 61.4% in 1989, and inland capture, from 9.2% in 1976 to 3% in 1989. The reason for this decrease was the unavailability of value data from Indonesia in 1989. Aquaculture, however, showed an increasing trend, from 16.8% in 1976 to 35.6% in 1989 as shown in Fig. 9.

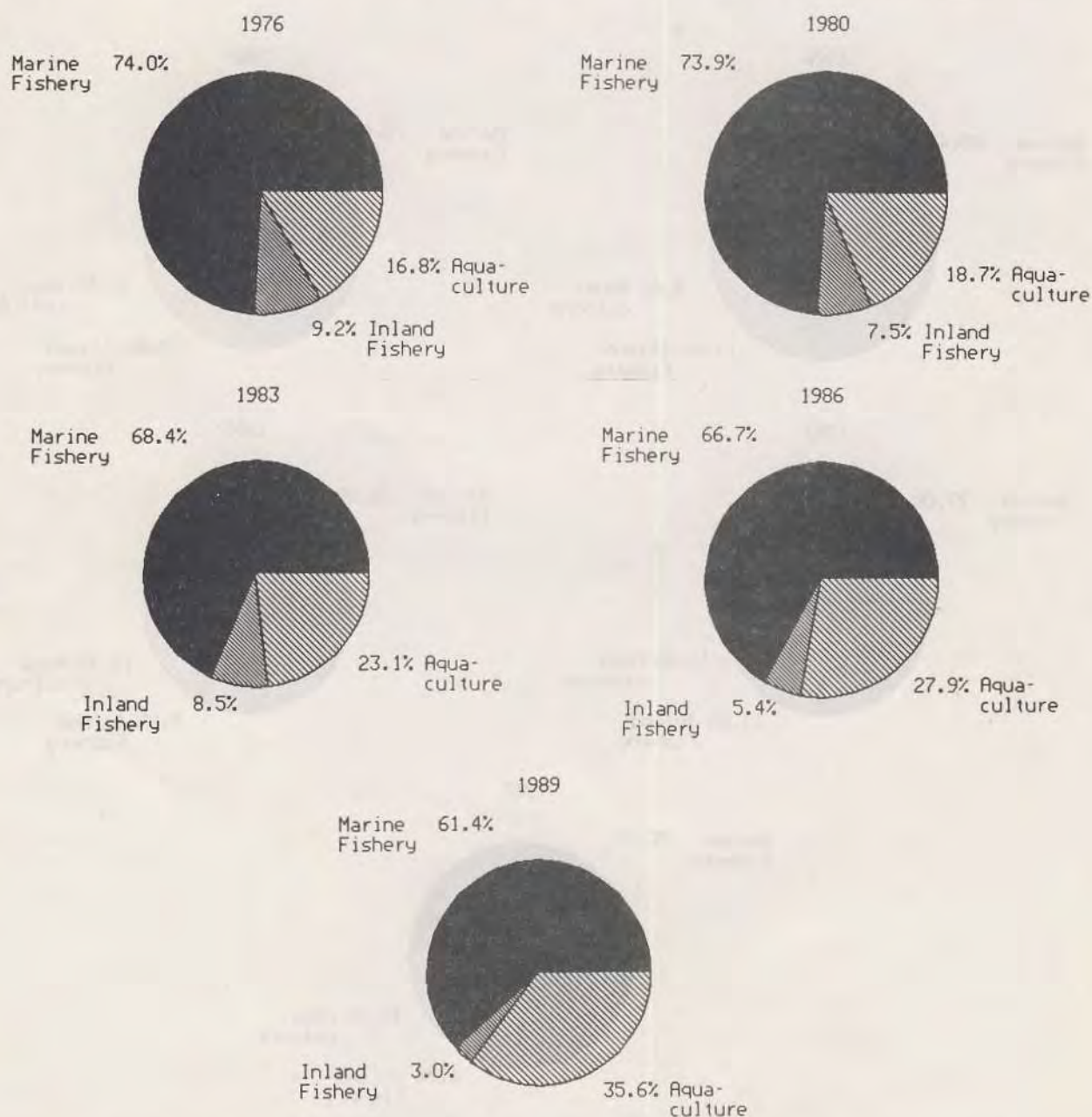


Fig. 9 Percentage of regional fishery production in value by sub-sector.

3.1.4 Fishery production by sub-sector by country

Data was obtained from eight countries : Brunei, Taiwan, Hong Kong, Indonesia, Malaysia, the Philippines, Singapore and Thailand.

Fishery production in quantity is shown in Fig. 10 and in value in Fig. 11. Marine capture fishery production is shown in Figs. 12 (in quantity) and 13 (in value); inland capture fishery production in Figs. 14 (in quantity) and 15 (in value); and aquaculture production in Figs. 16 (in quantity) and 17 (in value).

Indonesia, Thailand and the Philippines were the major producers in the region. Thailand headed the countries in marine capture fisheries as shown in Fig. 12. In terms of value the Philippines was the highest producer because its marine capture fisheries landed large volumes of high value pelagic fish as shown in Fig. 13.

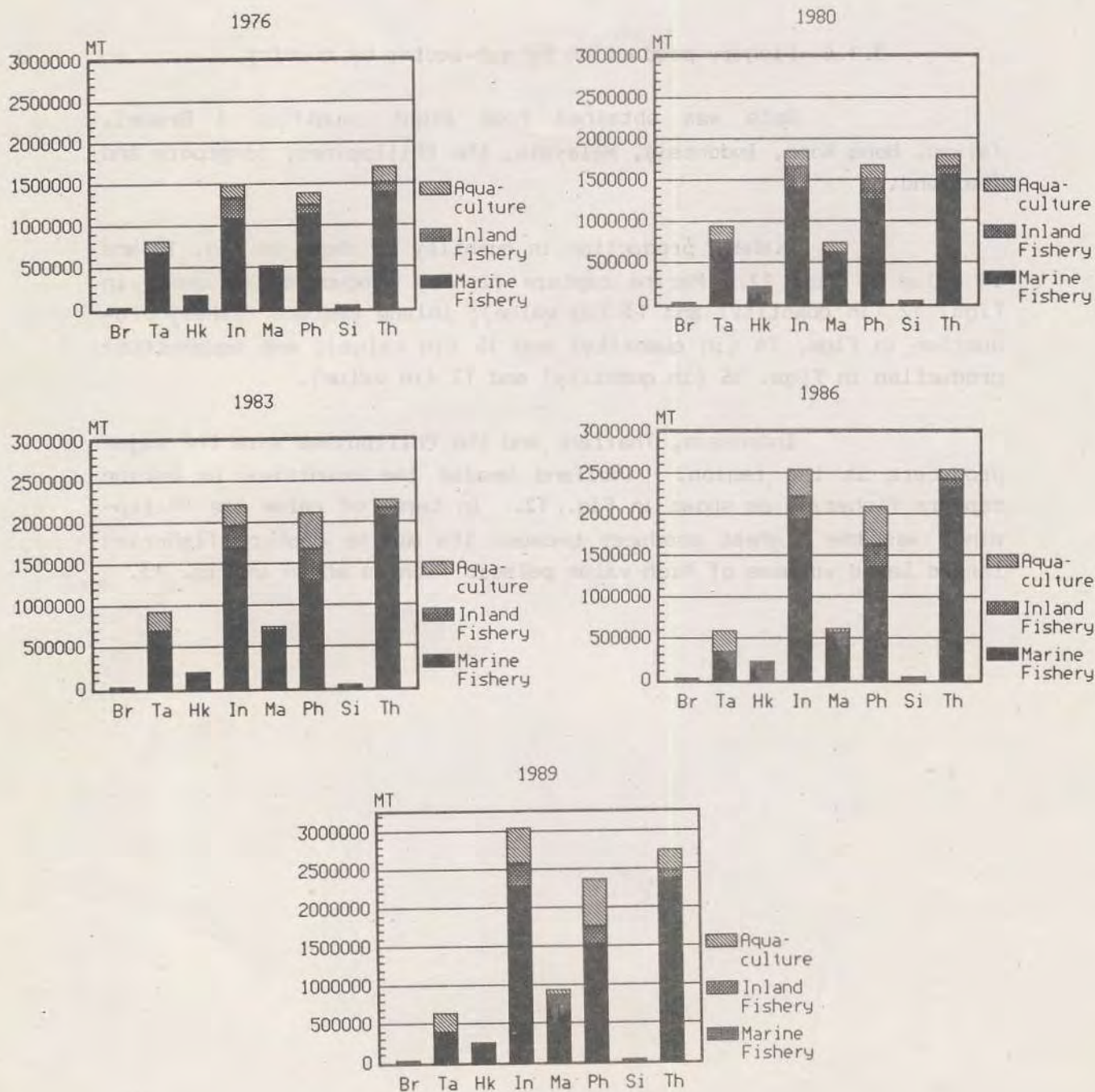


Fig. 10 Fishery production in quantity by sub-sector by country.
Data from eight countries.
Br. Brunei; Ta. Taiwan; Hk. Hong Kong;
In. Indonesia; Ma. Malaysia; Ph. Philippines;
Si. Singapore; Th. Thailand.

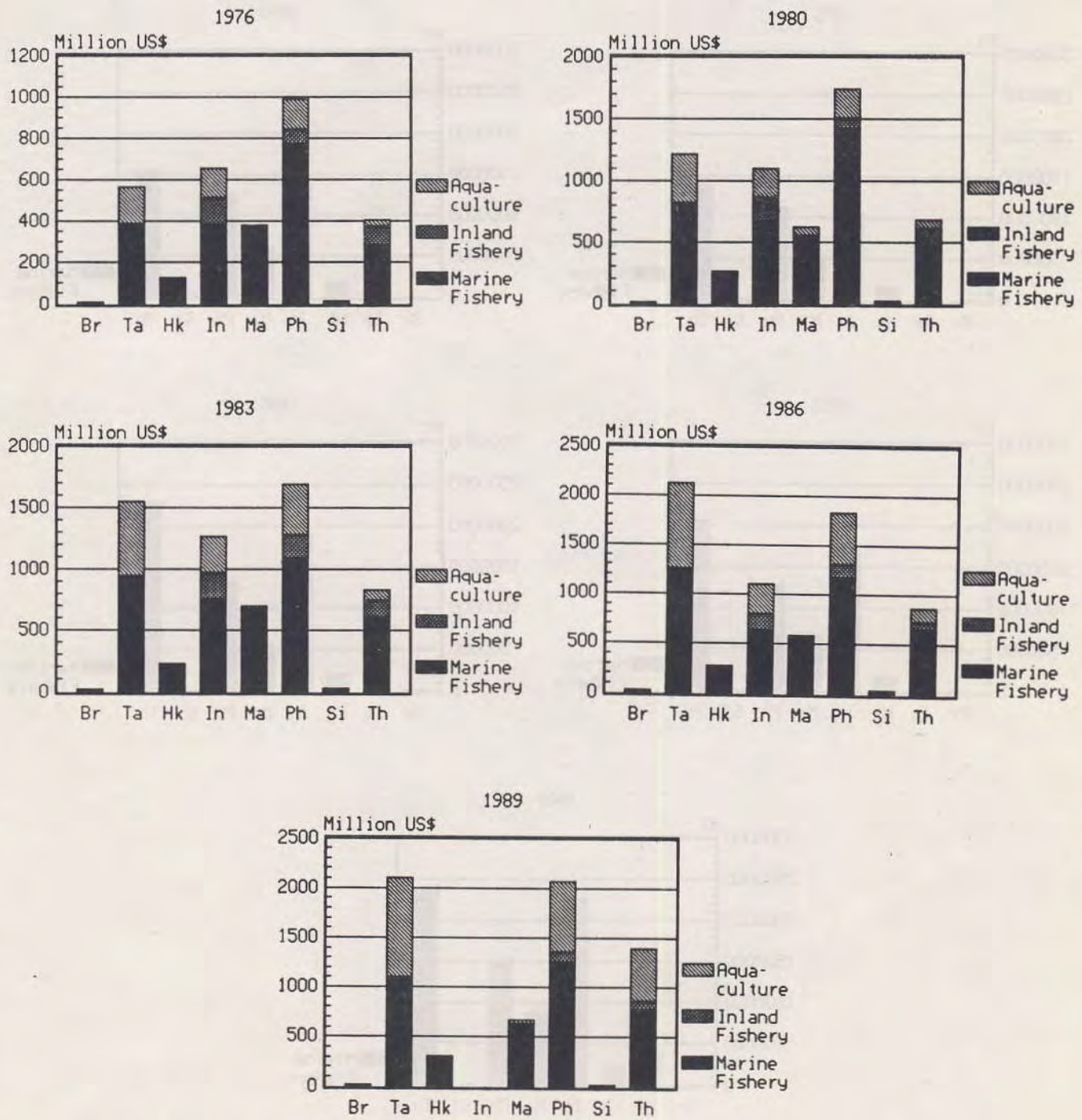


Fig. 11 Fishery production in value by sub-sector by country. Data from eight countries. Abbreviations are the same as those in Fig. 10.

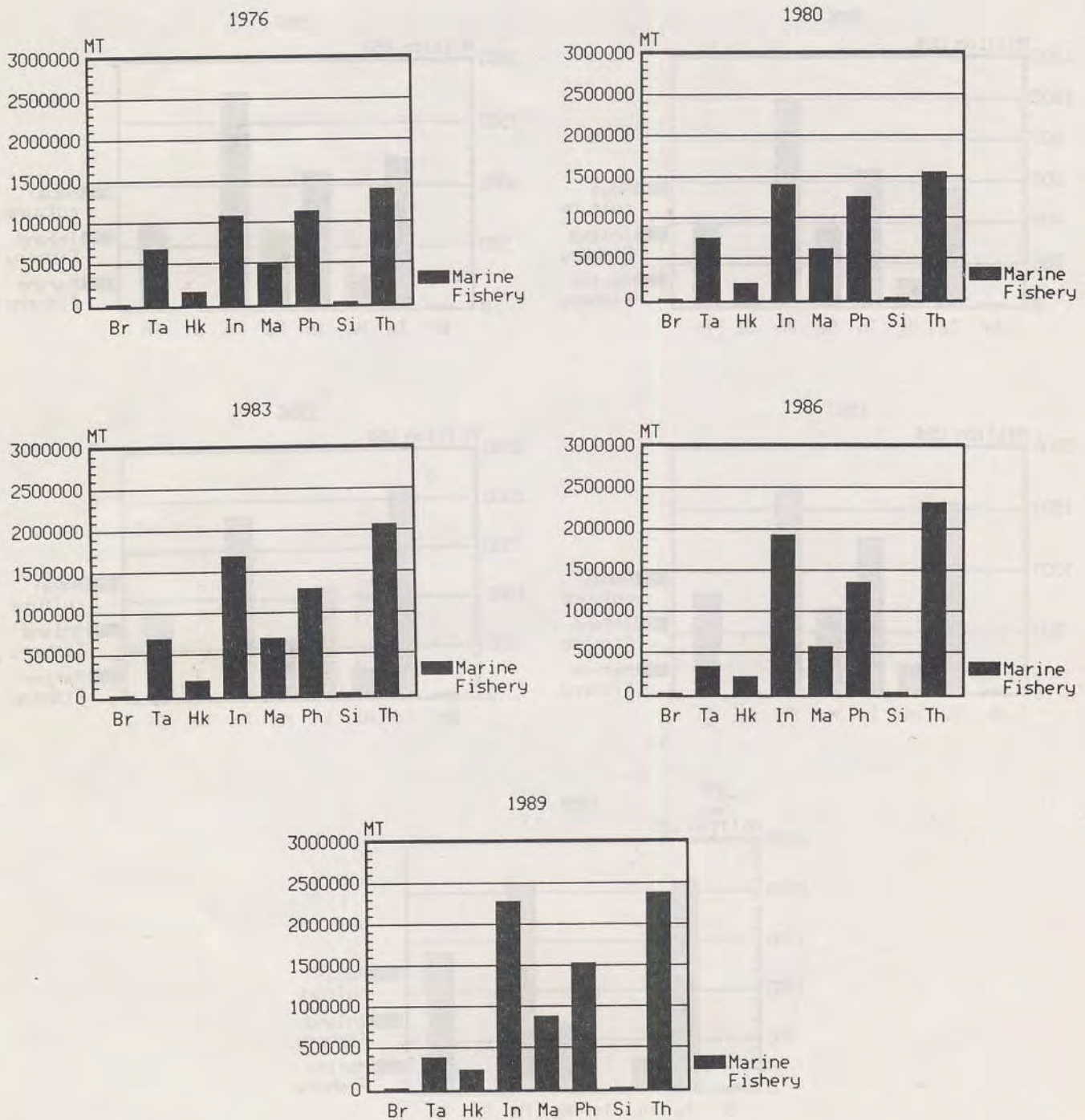


Fig. 12 Marine capture fishery production in quantity by country.
Data from eight countries.
Abbreviations are the same as those in Fig. 10.

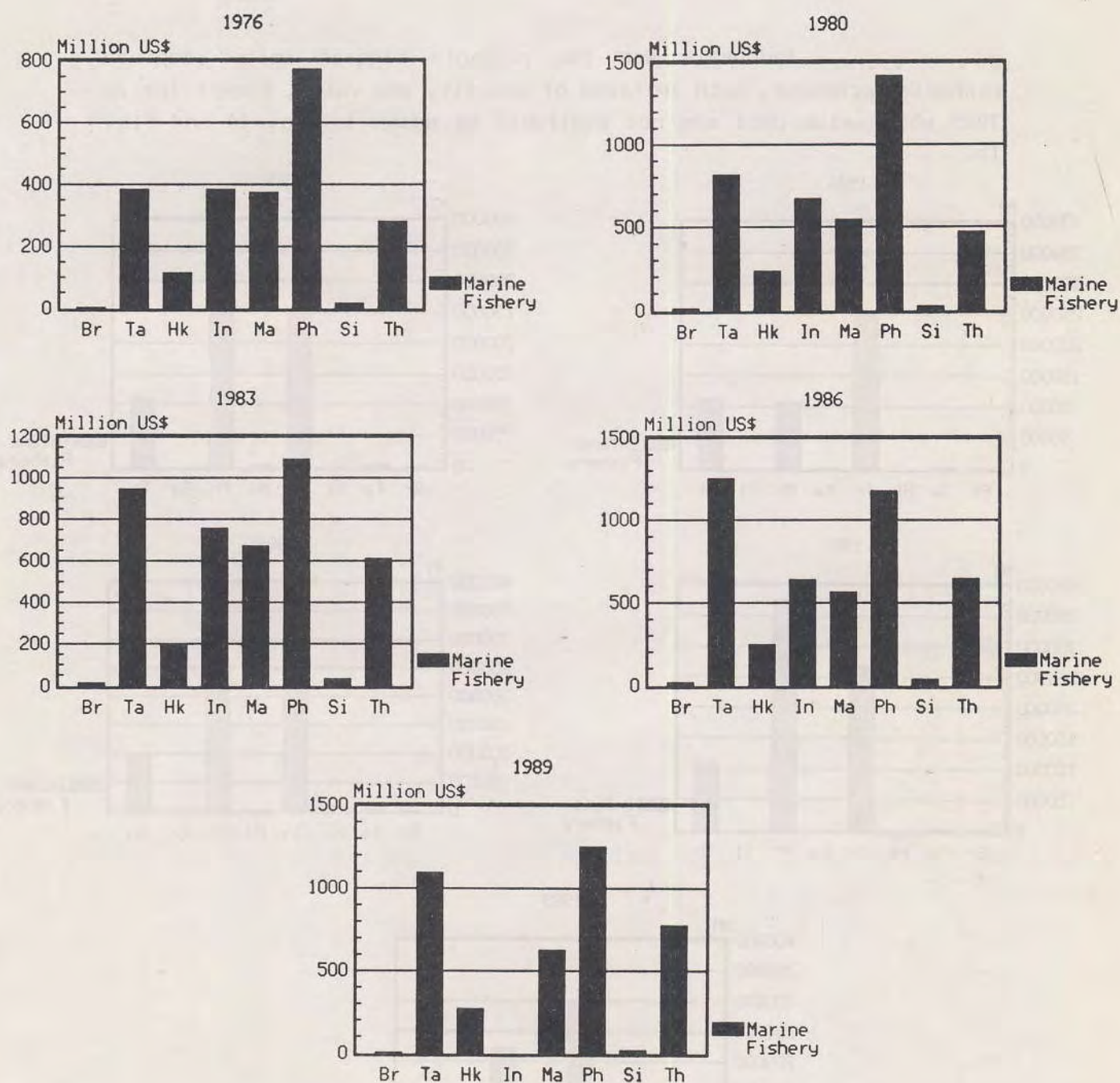


Fig. 13 Marine capture fishery production in value by country.
Data from eight countries.
Abbreviations are the same as those in Fig. 10.

Indonesia was the region's biggest inland capture fisheries producer, both in terms of quantity and value, except for in 1989 when value data was not available as shown in Fig. 14 and Fig. 15.

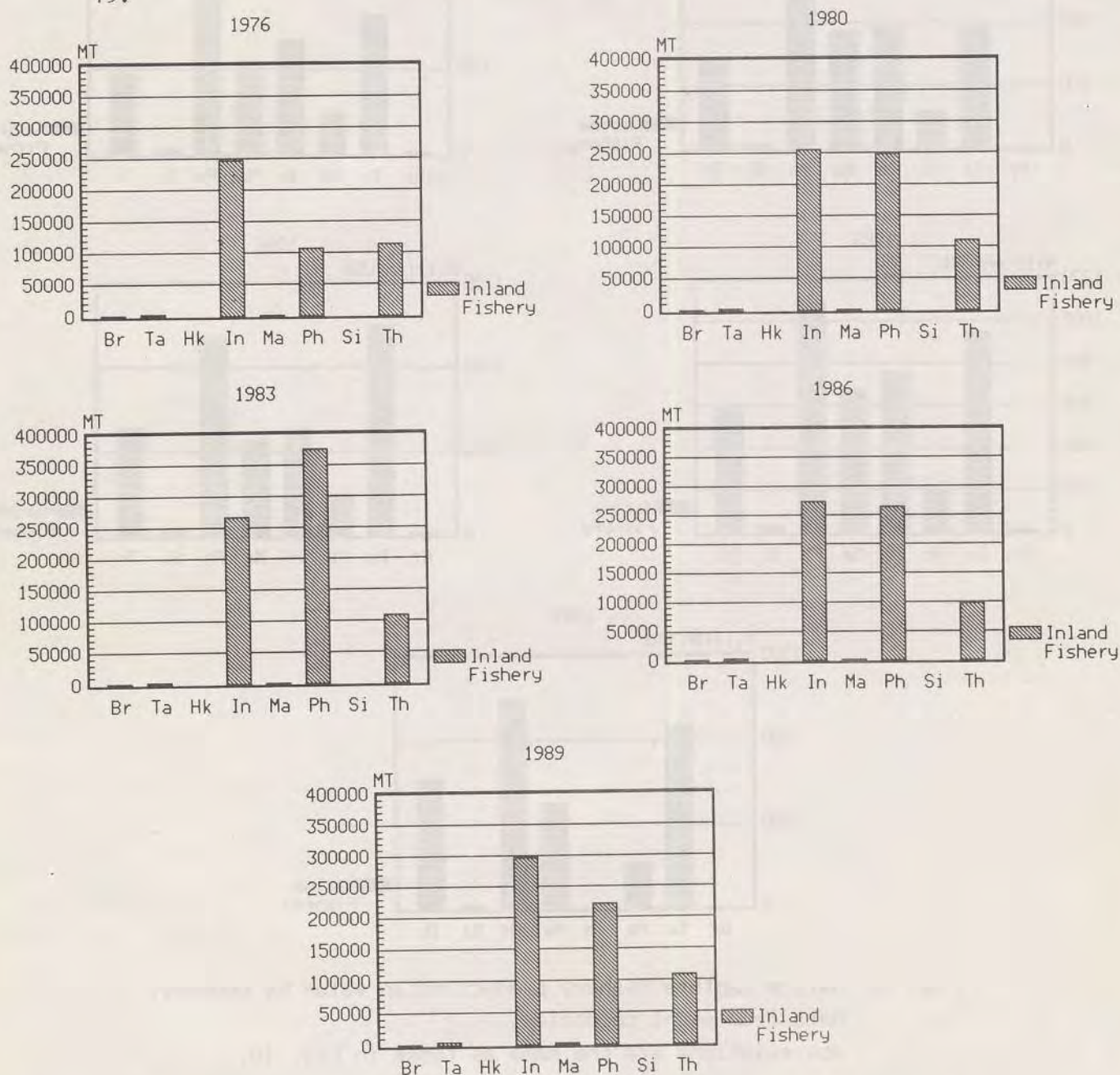


Fig. 14 Inland capture fishery production in quantity by country. Data from eight countries. Abbreviations are the same as those in Fig. 10.

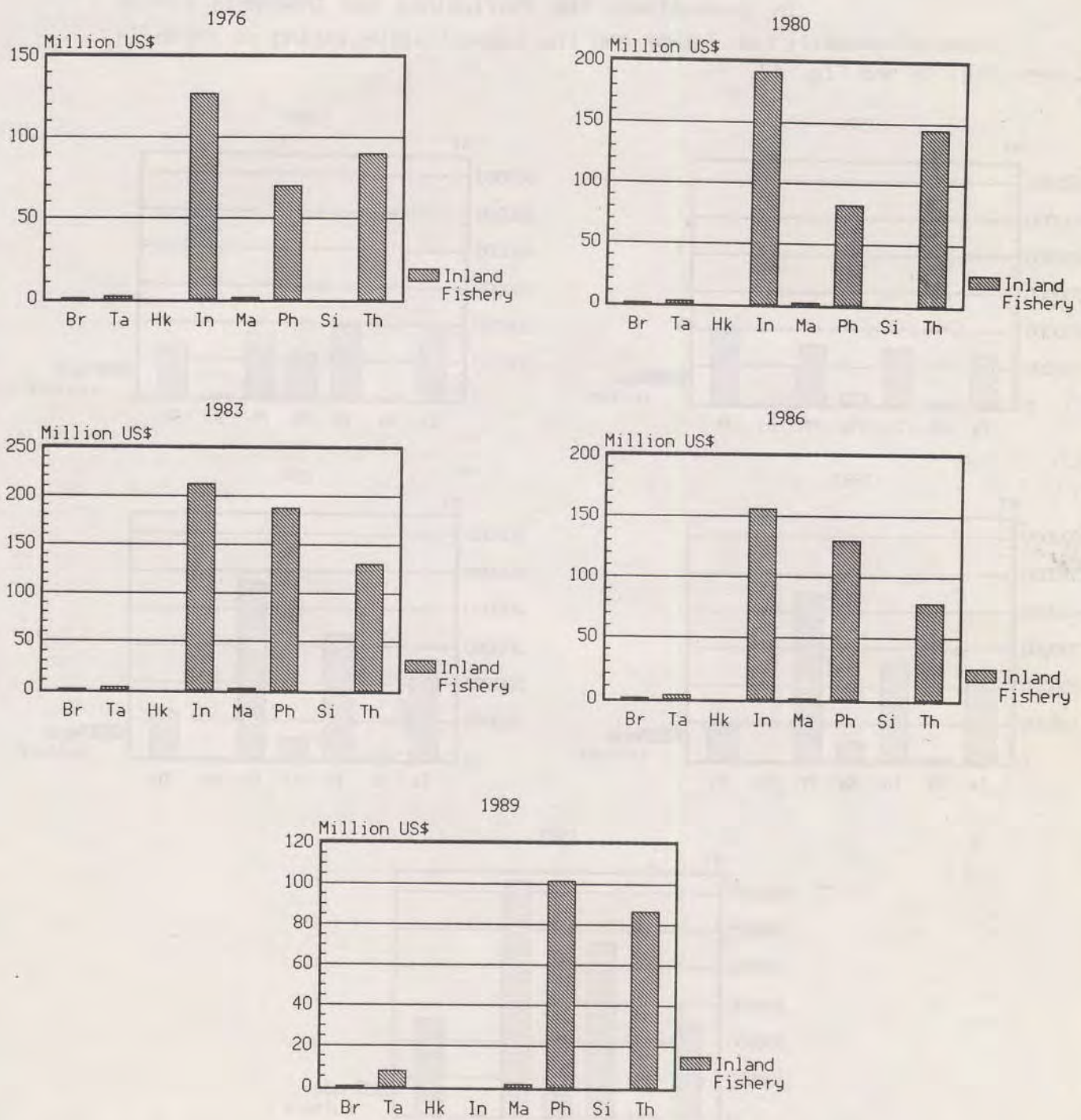


Fig. 15 Inland capture fishery production in value by country.
Data from eight countries.
Abbreviations are the same as those in Fig. 10.

In aquaculture, the Philippines and Indonesia led in terms of quantity but Taiwan had the highest value rating as shown in Fig. 16 and Fig. 17.

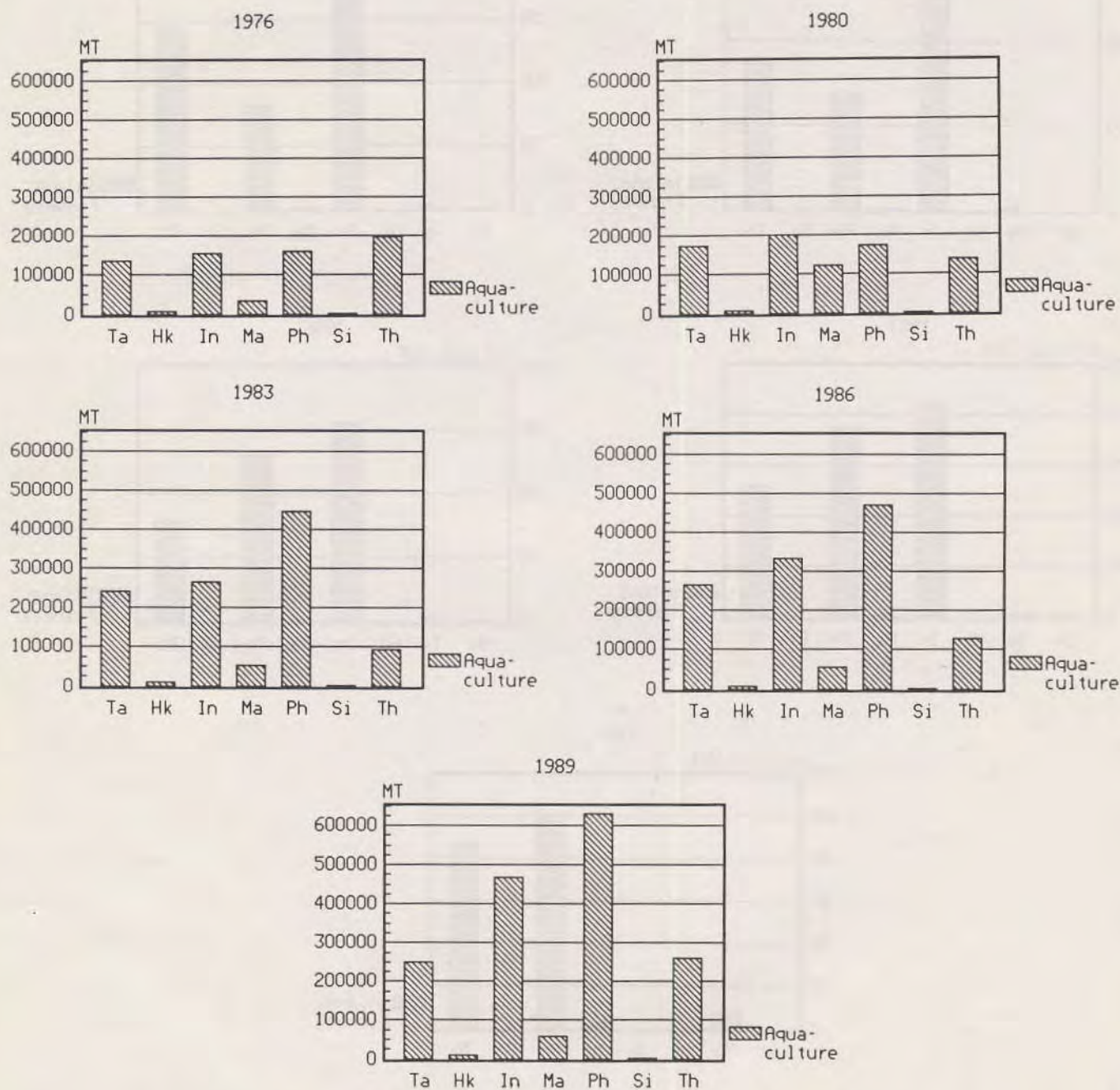


Fig. 16 Aquaculture production in quantity by country.
Data from seven countries.
Abbreviations are the same as those in Fig. 10.

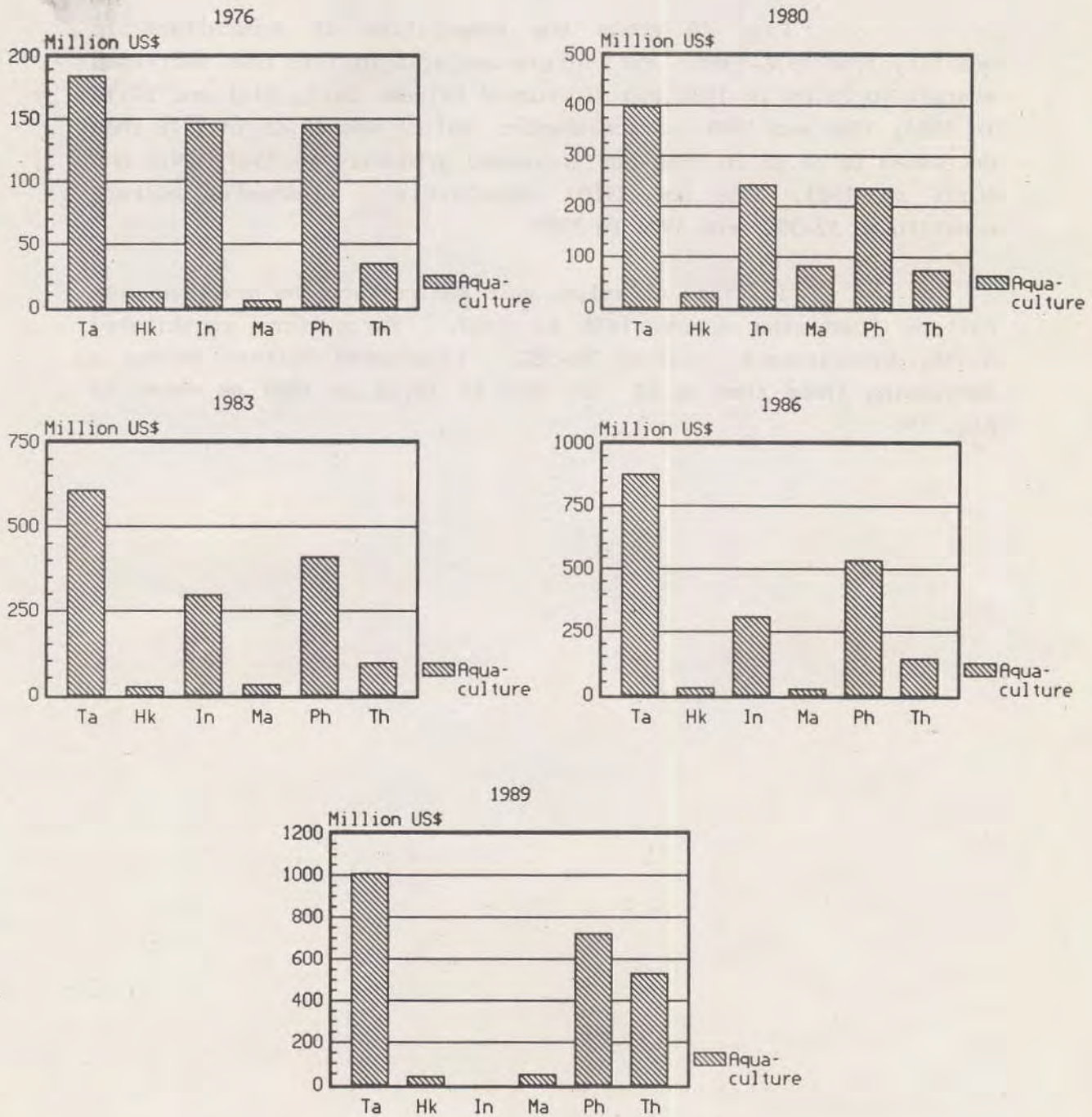


Fig. 17 Aquaculture production in value by country.
Data from six countries.
Abbreviations are the same as those in Fig. 10.

Fig. 18 shows the composition of aquaculture in quantity from 1976-1989. Mariculture was 4.6% in 1976 then increased sharply to 29.8% in 1980 and fluctuated between 24.5, 23.3 and 27.1% in 1983, 1986 and 1989. Brackishwater culture was 62.6% in 1976 then decreased to 34.6% in 1980 but increased gradually to 35.7, 39.2 and 40.3% in 1983, 1986 and 1989 respectively. Freshwater culture constituted 32-39% from 1976 to 1989.

In terms of value, both mariculture and brackishwater culture fluctuated during 1976 to 1989. Mariculture constituted 6-17%, brackishwater culture 38-58%. Freshwater culture showed a decreasing trend from 46.6% in 1976 to 34.2% in 1989 as shown in Fig. 19.



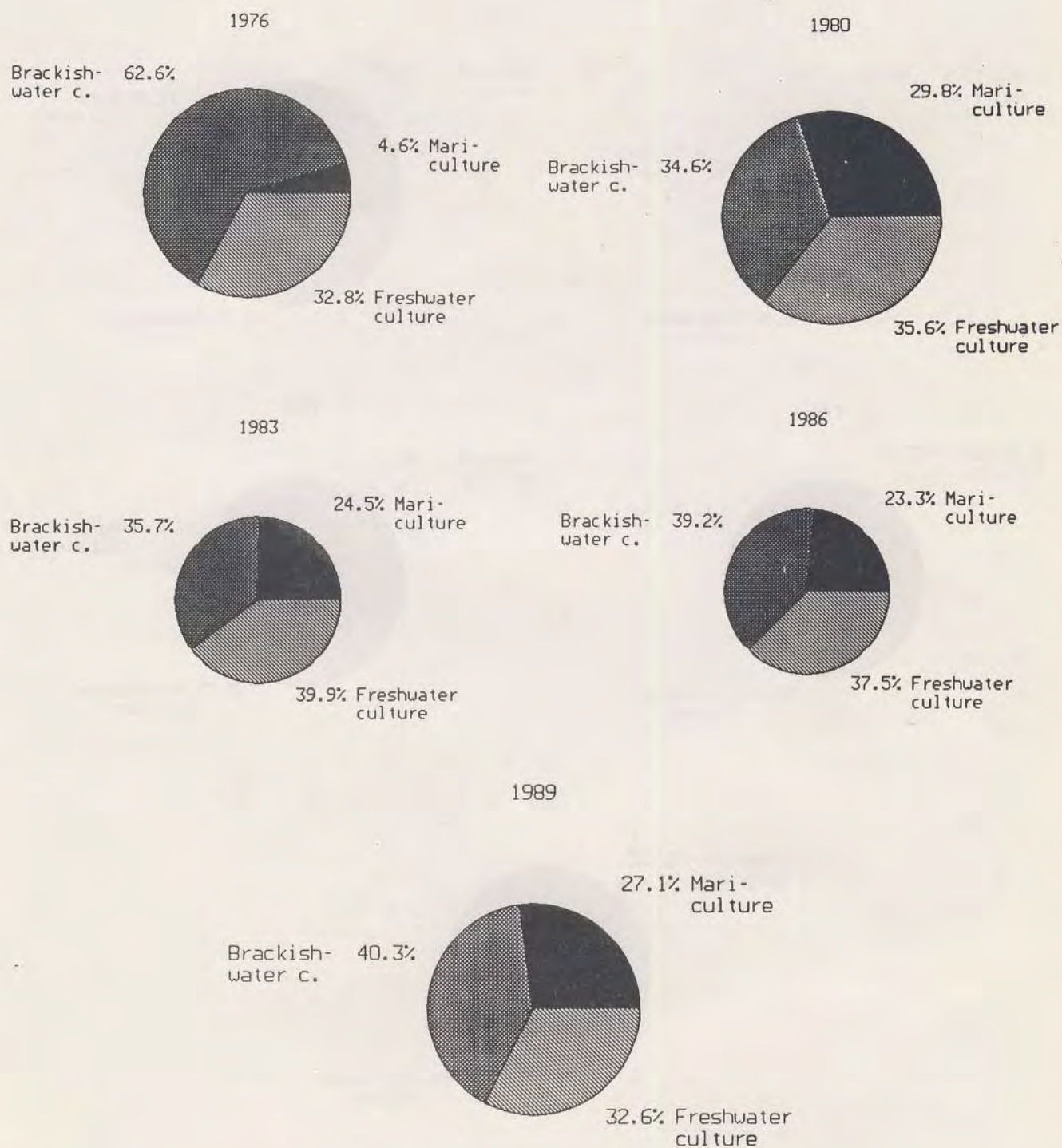


Fig. 18 Percentage of regional aquaculture production in quantity by sub-sector.

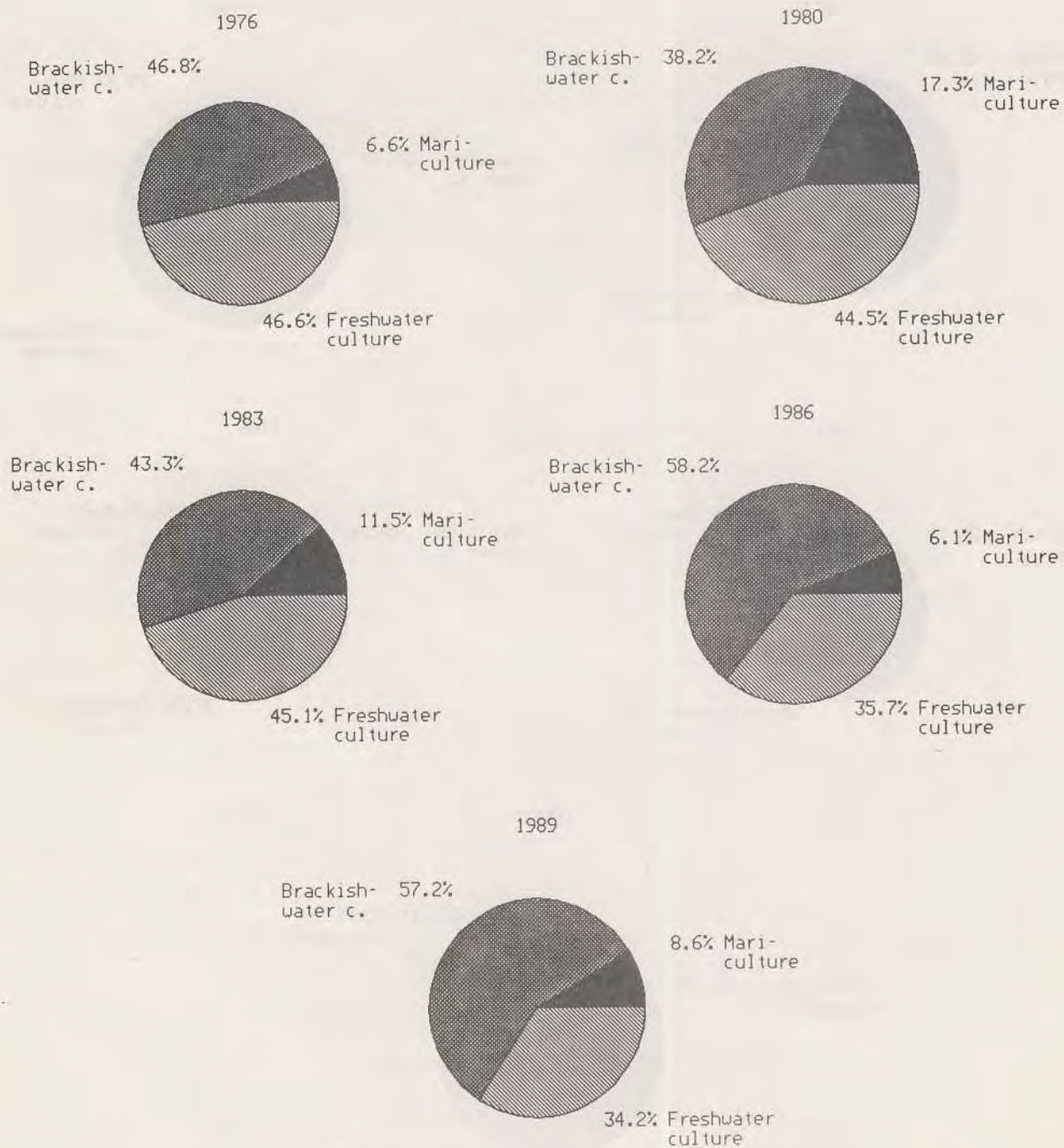


Fig. 19 Percentage of regional aquaculture production in value by sub-sector.

3.1.5 Number of fishing boats by type

Data was obtained from seven countries : Brunei, Hong Kong, Indonesia, Malaysia, Philippines, Singapore and Thailand. Boat classifications were non-powered, outboard powered and inboard powered.

As shown in Fig. 20 (A), the number of fishing boats in Brunei increased from 492 in 1976 to 1,361 in 1983 then decreased to 1,216 and 1,280 in 1986 and 1989, with the majority, 86-99%, being outboard powered boats. In Hong Kong, the number of fishing boats decreased from 5,474 in 1976 to 4,508 in 1989 with the majority, 82-92%, being inboard powered boat as shown in Fig. 20 (B).

The number of fishing boats in Indonesia increased from 245,725 in 1976 to 335,088 in 1989 with the majority, 65-92%, being non-powered boats. The analysis shows that the use of non-powered boats decreased while that of outboard and inboard powered boats increased between 1976 and 1989 as shown in Fig. 20 (C).

In Malaysia, the number of fishing boats increased from 32,091 in 1976 to 43,492 in 1980 then decreased apart from a small rise up to 39,824 in 1989. Inboard powered boats constituted 55-60%, outboard powered boats around 18-35%, and the rest were non-powered boats as shown in Fig. 20(D).

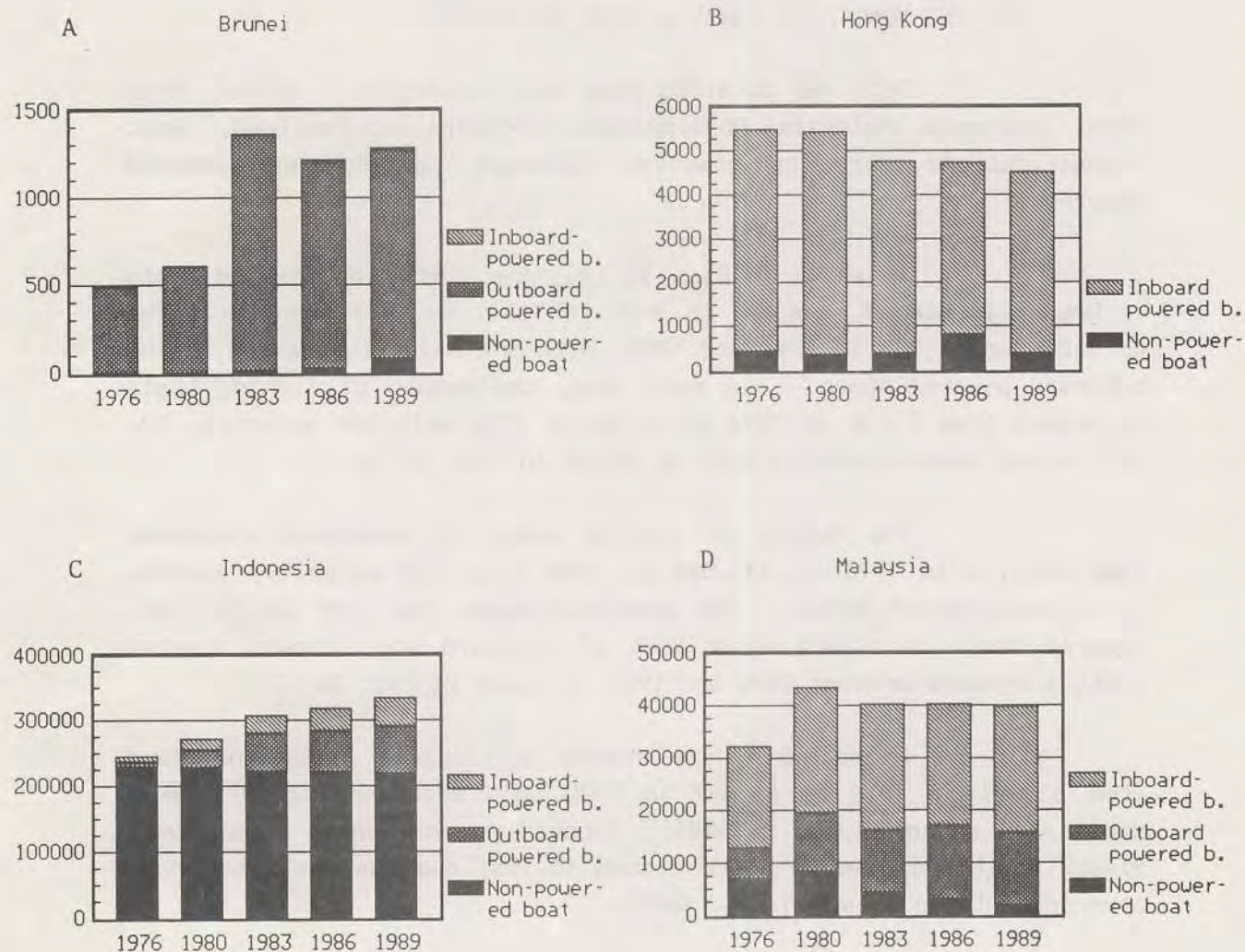


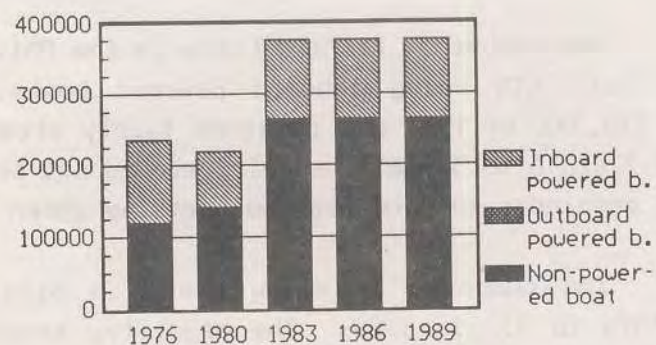
Fig. 20 Number of fishing boats by type (1). A. Brunei; B. Hong Kong; C. Indonesia; D. Malaysia.

The number of fishing boats in the Philippines in 1976 was 305,461, with 61% being inboard powered boats. This figure decreased to 219,352 in 1980 and remained fairly steady between 1983 and 1989 with 376,036 to 375,673 vessels, around 69% being non-powered boats and the remainder inboard powered boats as shown in Fig. 21 (A).

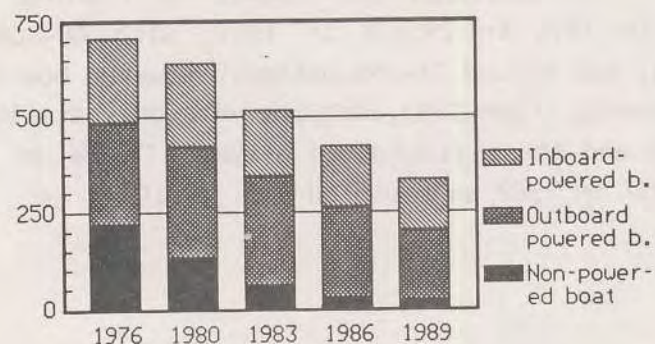
The number of fishing boats in Singapore decreased from 709 in 1976 to 335 in 1989. The majority, around 37-56%, were outboard powered boats, and 24-40% inboard powered boats, the rest were non-powered boats, decreasing in number as shown in Fig. 21 (B).

In Thailand, the number of fishing boats increased from 26,135 in 1976 to 29,479 in 1983, with 40-66% being inboard powered boats, and around 21-39% outboard powered boats; the rest were non-powered boats. From 1983, figures were only available for inboard powered boats and these fluctuated between 17,386 in 1983, 15,916 in 1986 and 21,037 in 1989 as shown in Fig. 21 (C).

A Philippines



B Singapore



C Thailand

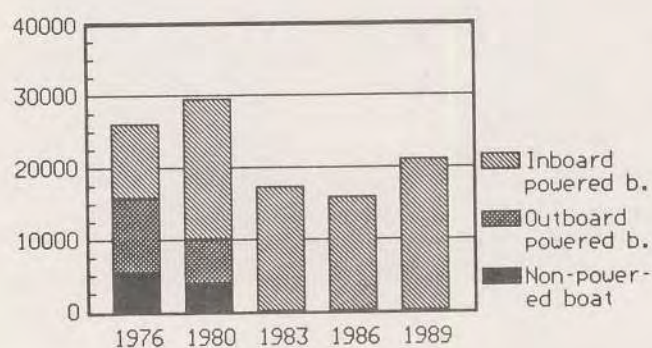


Fig. 21 Number of fishing boats by type (2).
A. Philippines; B. Singapore; C. Thailand.

3.1.6 Number of fishermen by working status

Data was obtained from seven countries : Brunei, Hong Kong, Indonesia, Malaysia, Philippines, Singapore and Thailand. Working status classification included full-time fishermen and two types of part-time fishermen-mainly engaged in fishing and partly engaged in fishing.

The numbers of fishermen thus classified during the period of 1976 to 1989 are shown by country in Figs. 22 and 23.

As shown in Fig. 22 (A), in Brunei the total number of fishermen increased from 520 persons in 1976 to 822 persons in 1980 (only figures for full-time fishermen were available). The number increased to 2,122 and 2,225 persons in 1983 and 1986 and decreased to 1,271 persons in 1989 with the majority, around 70-72% part-time fishermen (partly engaged in fishing). The remainder were full-time fishermen.

In Hong Kong, the number of fishermen decreased from 37,000 persons in 1976 to 23,605 persons in 1980. Figures then fluctuated between 1980 and 1989 with 28,000 persons in 1983, and 21,036 persons in 1989. All fishermen in Hong Kong were full-time as shown in Fig. 22 (B).

In Indonesia, figures for 1976 were not available. From 1980 onwards, the number of fishermen increased from 970,731 persons to 1.4 million persons by 1989, with the majority, about 49-53 percent, being full-time. Part-time fishermen (mainly engaged in fishing) accounted for about 37%, and part-time fishermen (partly engaged in fishing) the remainder, as shown in Fig. 22 (C).

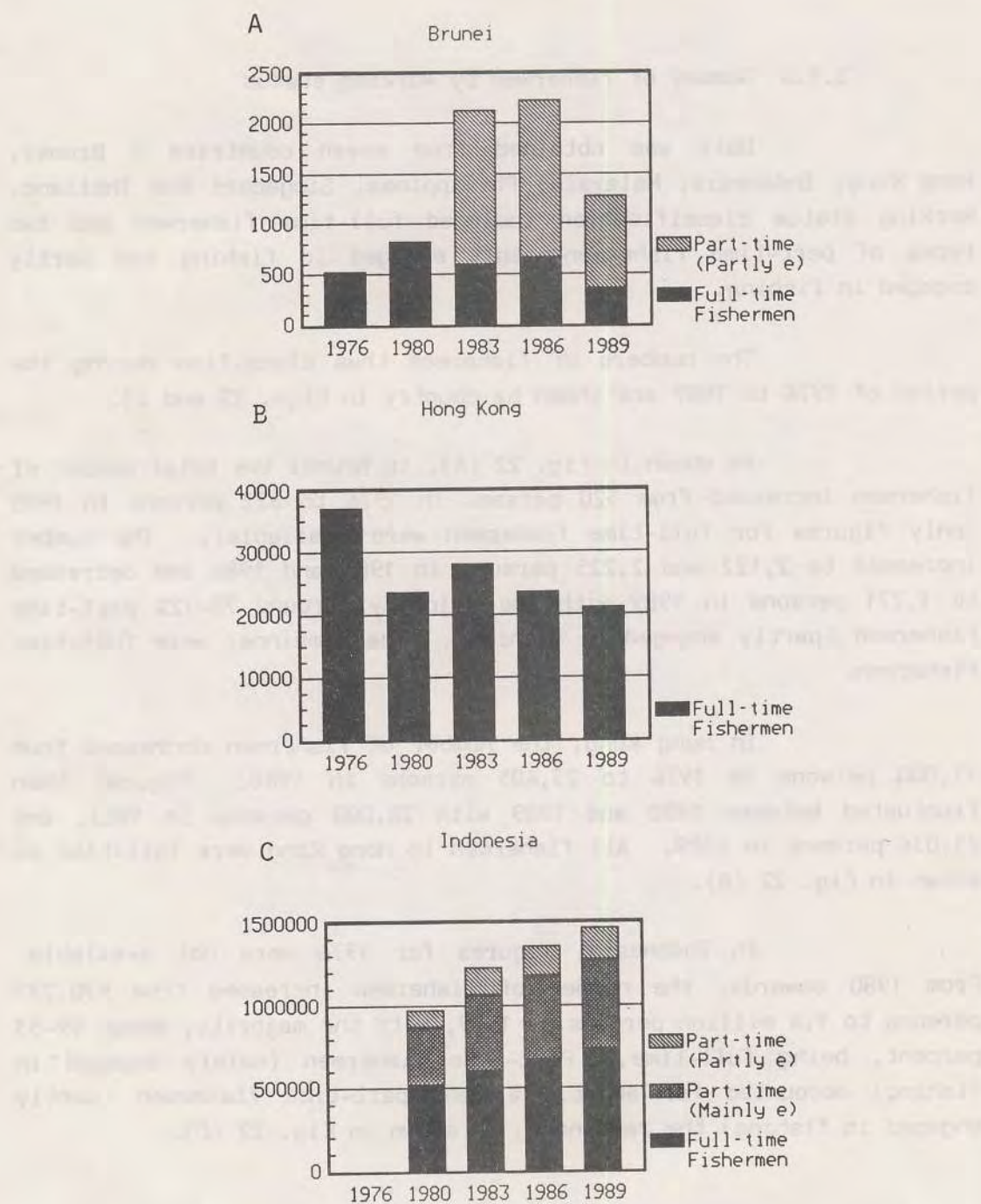


Fig. 22 Number of fishermen by working status (1). A. Brunei; B. Hong Kong; C. Indonesia. Partly. e. Partly engaged in fishing; Mainly e. Mainly engaged in fishing.

In Malaysia, the number of fishermen fluctuated between 95,765 persons in 1976 and 118,747, 108,472, 95,740 and 100,583 persons in 1980, 1983, 1986 and 1989 respectively. The majority, about 88-95%, were full-time fishermen, followed by about 3-8% part-time fishermen (mainly engaged in fishing), and the remainder part-time fishermen (partly engaged in fishing) as shown in Fig. 23 (A).

Numbers of fishermen for the Philippines, decreased from 787,872 persons in 1976 to 522,560 persons in 1980, then increased again to 772,780 persons in 1983, with small fluctuations of 769,715 and 784,877 persons in 1986 and 1989. The majority of these, about 55-65%, were full-time fishermen, followed by around 22-37% part-time fishermen (mainly engaged in fishing) and the rest part-time fishermen (partly engaged in fishing) as shown in Fig. 23 (B).

The number of fishermen for Singapore, increased from 1,988 persons in 1976 to 2,025 persons in 1980 but then decreased gradually to 1,641; 1,250 and 987 persons in 1983, 1986 and 1989 respectively. All fishermen in Singapore were full-time fishermen as shown in Fig. 23 (C).

In Thailand, the number of fishermen in 1976 was 69,927 persons, increasing to 89,777 persons between 1980 and 1983 (only 1981 figure available). The majority, about 73%, were full-time fishermen, followed by about 19 percent part-time fishermen (mainly engaged in fishing) and the remainder part-time fishermen (partly engaged in fishing). From 1986 to 1989, the total number of fishermen, for Thailand, 182,448 persons, was taken from the 1985 Fisheries Census of Thailand; all of them were full-time fishermen as shown in Fig. 23 (D).

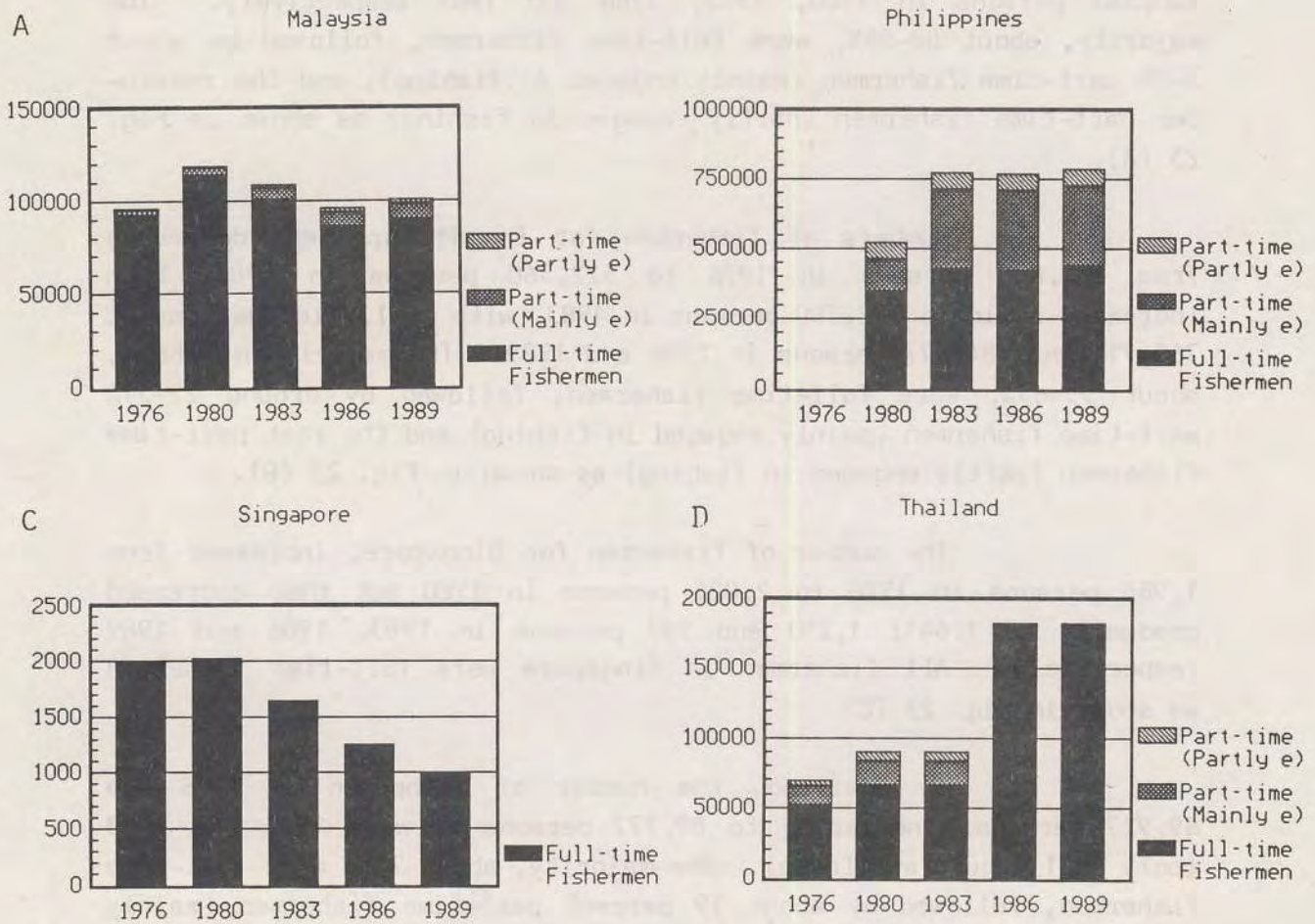


Fig. 23 Number of fishermen by working status (2). A. Malaysia; B. Philippines; C. Singapore; D. Thailand. Abbreviations are the same as those in Fig. 22.

3.1.7 Major twenty marine species caught in the region

Data was obtained from seven countries : Taiwan, Hong Kong, Indonesia, Malaysia, Philippines, Singapore and Thailand except for 1976 when data for Singapore was not available. The catch quantity and value figures were obtained from marine capture fishery.

Catch trends for the twenty major marine species caught in the region in quantity from 1976 to 1989 (1976, 1980, 1983, 1986, and 1989) are shown in Figs. 24 and 25. These were Trash fish, Miscellaneous fish, Round scad, Sardine, Anchovy, Indian mackerel, Other prawn (Non-penaeid prawn), Eastern little tuna, Penaeid prawn, Squid, Selar scad, Indo-Pacific mackerel, Skipjack tuna, Pony fish, Threadfin bream, Shark, Yellowfin tuna, Frigate and bullet tuna, Jack-cavalla-trevally and Narrow-barred king mackerel, respectively. The catch quantities showed some fluctuations with an increasing trend from 1976 to 1989 as shown in Figs. 24 and 25.

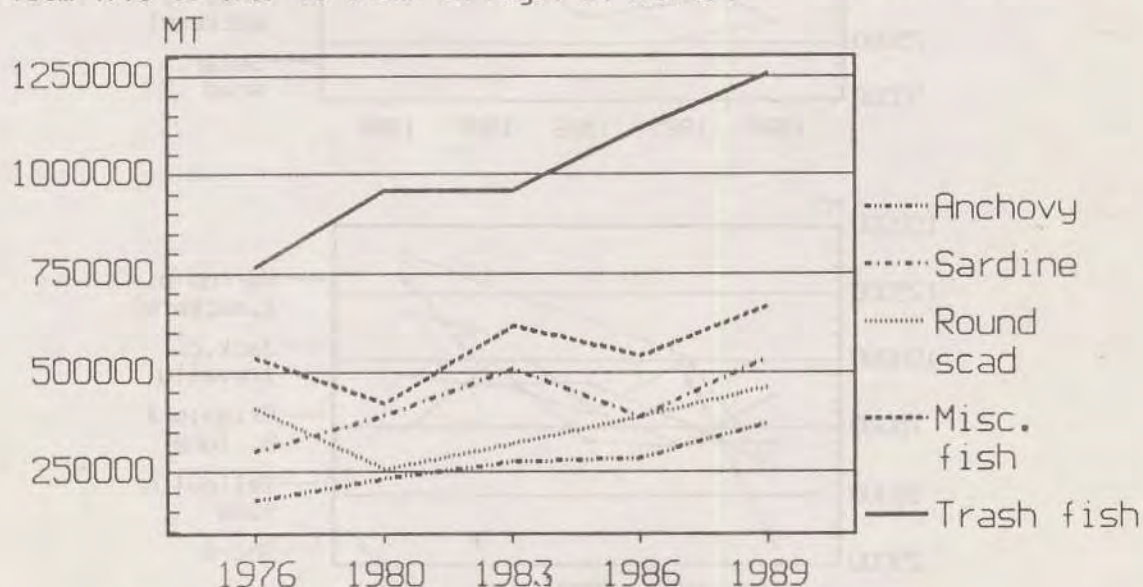


Fig. 24 Catch trends of major species by quantity from seven countries (1).

Misc. fish, Miscellaneous fish.

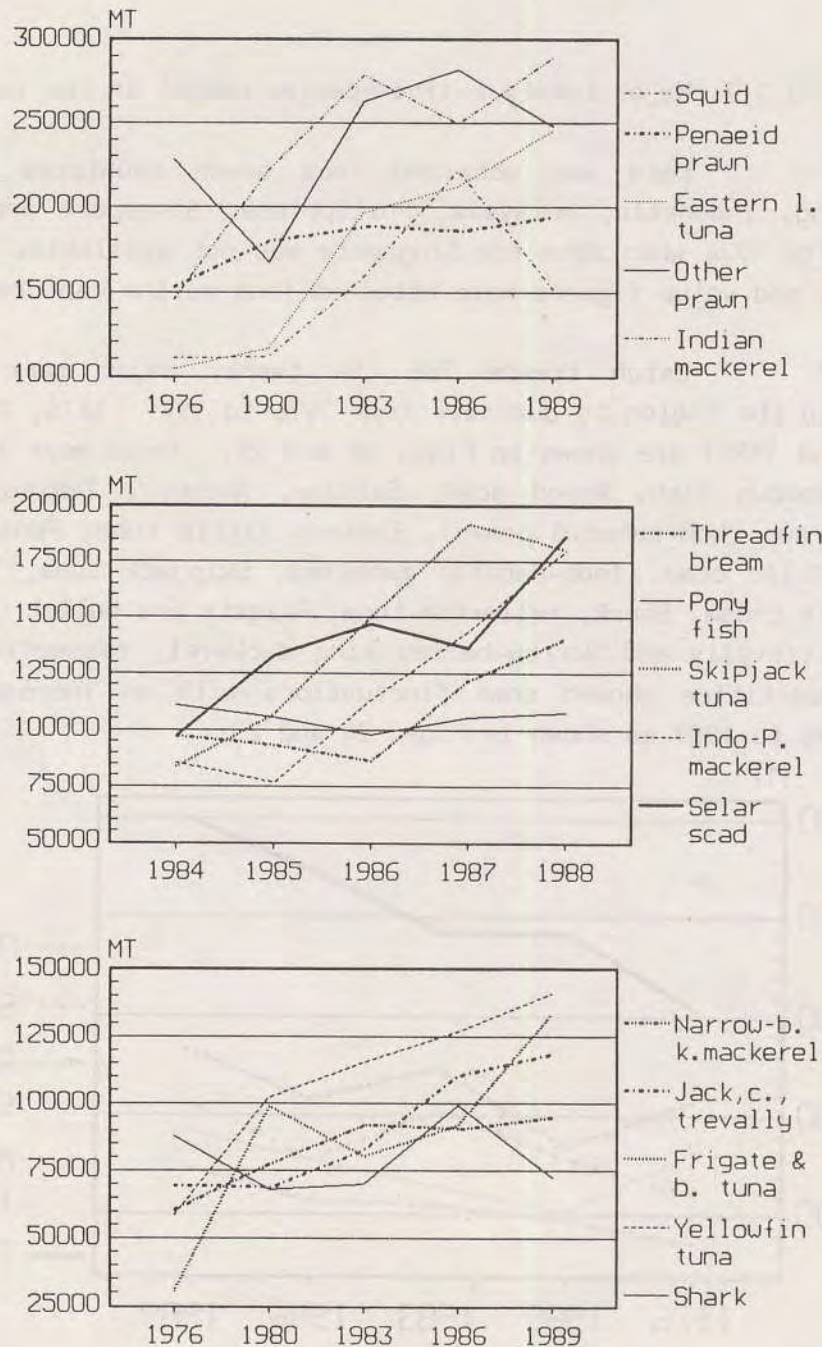


Fig. 25 Catch trends of major species by quantity from seven countries (2).
 Eastern l. tuna, Eastern little tuna; Indo-P. mackerel, Indo-Pacific mackerel; Frigate & b. tuna, Frigate and bullet tuna; Jack, c., trevally, Jack, cavalla, trevally; Narrow-b.k. mackerel, Narrow-barred king mackerel.

The percentage composition in quantity of the major twenty marine species also showed some fluctuations during 1976 to 1989 as shown in Figs. 26 to 29.

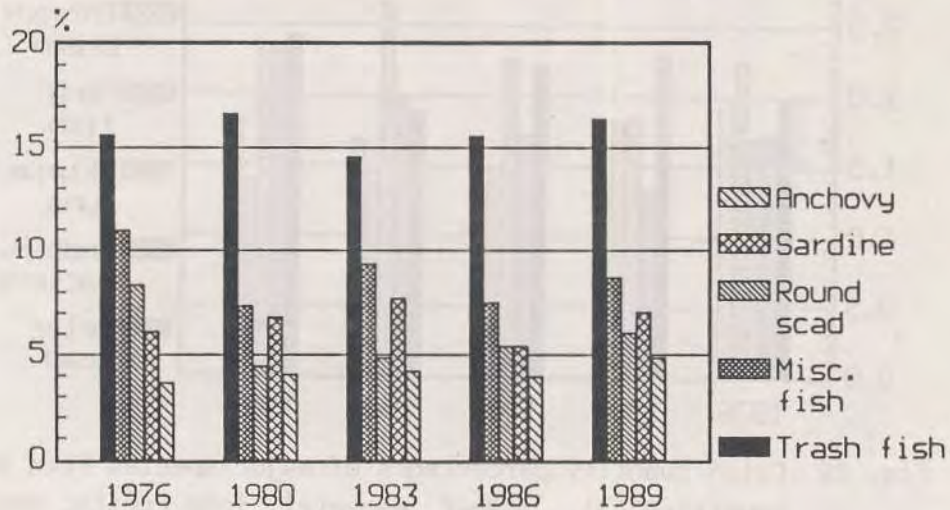


Fig. 26 Catch quantity percentages of major species from seven countries (1). Misc. fish, Miscellaneous fish.

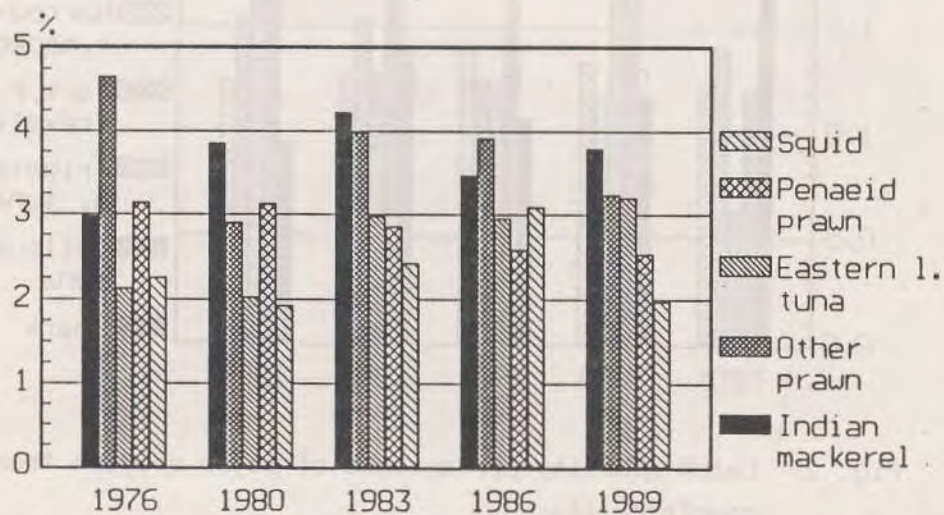


Fig. 27 Catch quantity percentages of major species from seven countries (2). Eastern l. tuna, Eastern little tuna.

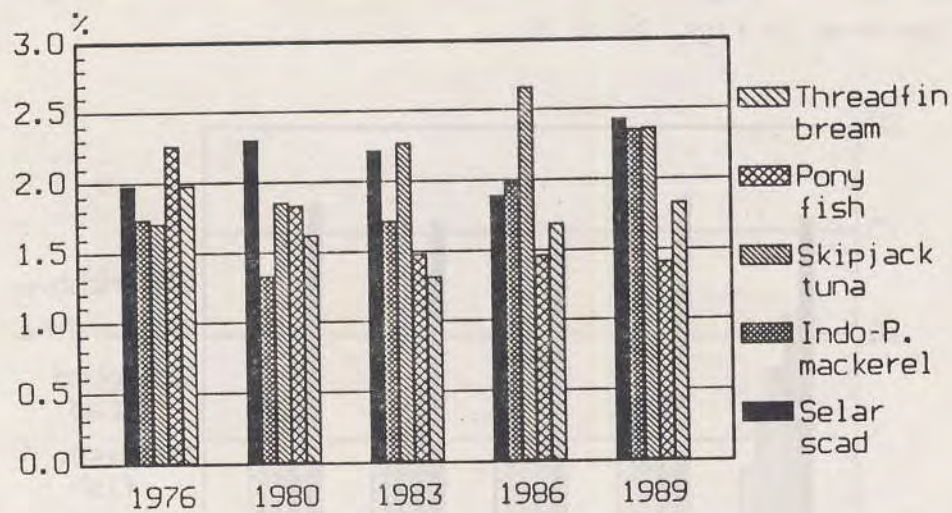


Fig. 28 Catch quantity percentages of major species from seven countries (3). Indo-P. mackerel, Indo-Pacific mackerel.

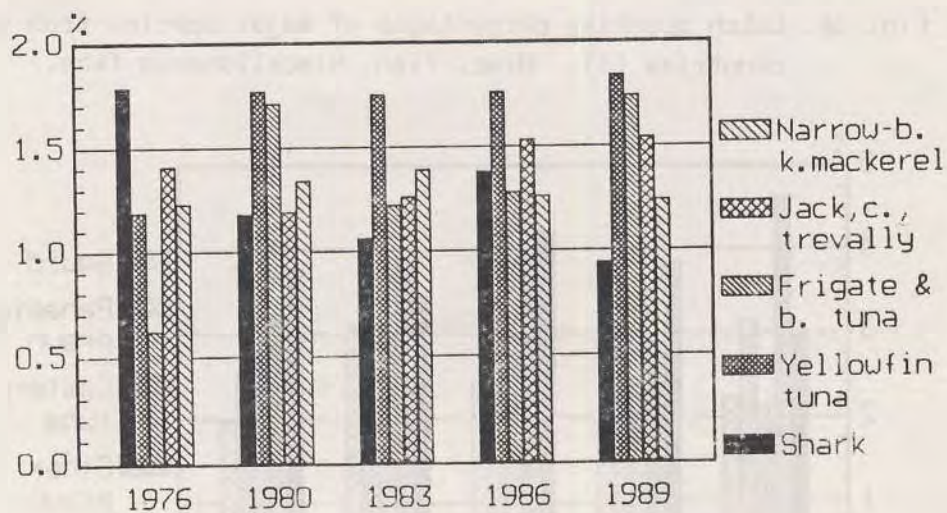


Fig. 29 Catch quantity percentages of major species from seven countries (4). Frigate & b. tuna, Frigate and bullet tuna; Jack, c., trevally, Jack, cavalla, trevally; Narrow-b.k. mackerel, Narrow-barred king mackerel.

Value trends of twenty species, Penaeid prawn, Miscellaneous fish, Round scad, Other prawn, Squid, Anchovy, Sardine, Indian mackerel, Threadfin bream, Yellowfin tuna, Eastern little tuna, Albacore, Indo-Pacific mackerel, Skipjack tuna, Cuttlefish, Narrow-barred king mackerel, Trash fish, Grouper, Frigate and bullet tuna and Selar scad, respectively are shown in Figs. 30 and 31.

The catch value and percentage composition fluctuated a little between 1976 to 1989 as shown in Figs. 30 and 31 and Figs. 32 to 35.

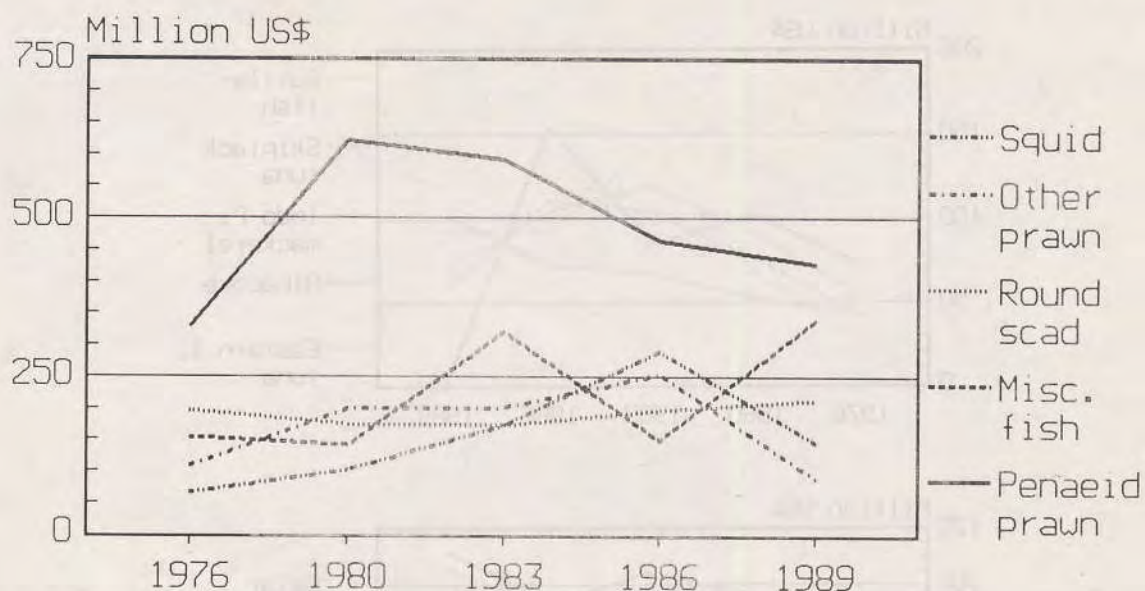


Fig. 30 Catch trends of major species by value from seven countries (1). Misc. fish, Miscellaneous fish.

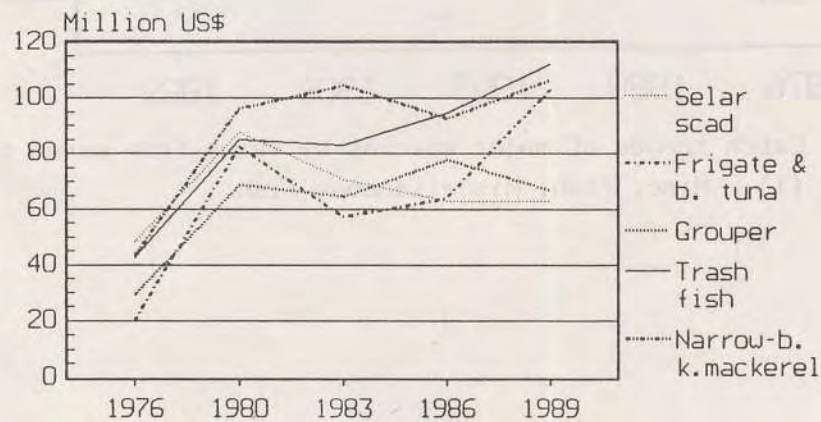
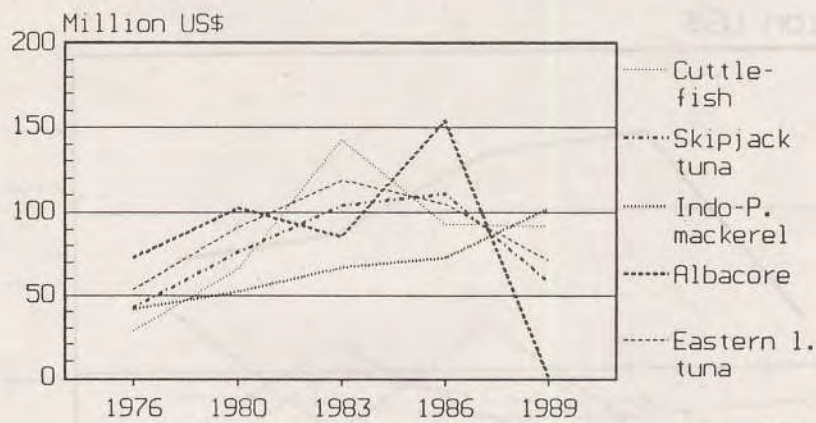
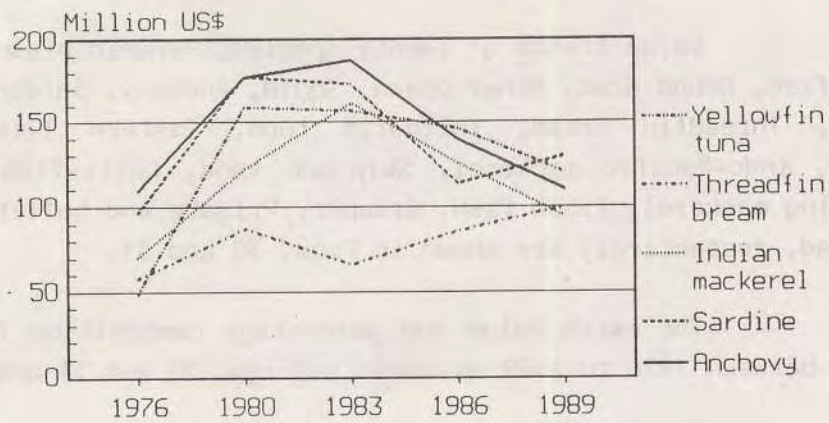


Fig. 31 Catch trends of major species by value from seven countries (2).
 Eastern l. tuna, Eastern little tuna; Indo-P. mackerel, Indo-Pacific mackerel; Narrow-b.k. mackerel, Narrow-barred king mackerel; Frigate & b. tuna, Frigate and bullet tuna.

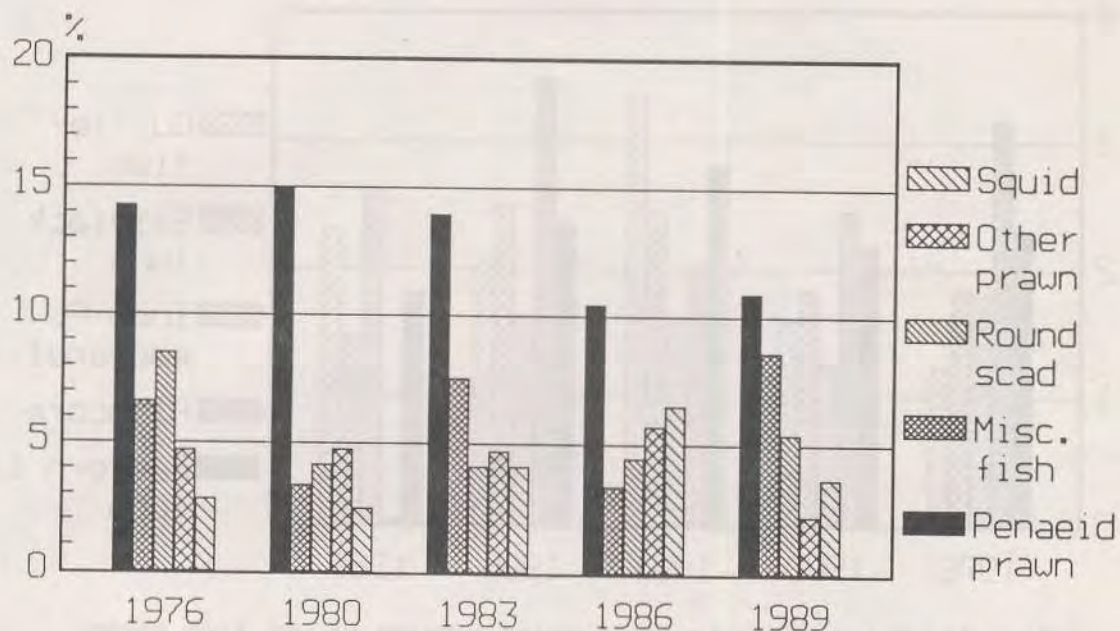


Fig. 32 Value percentages of major species caught from seven countries (1). Misc. fish, Miscellaneous fish.

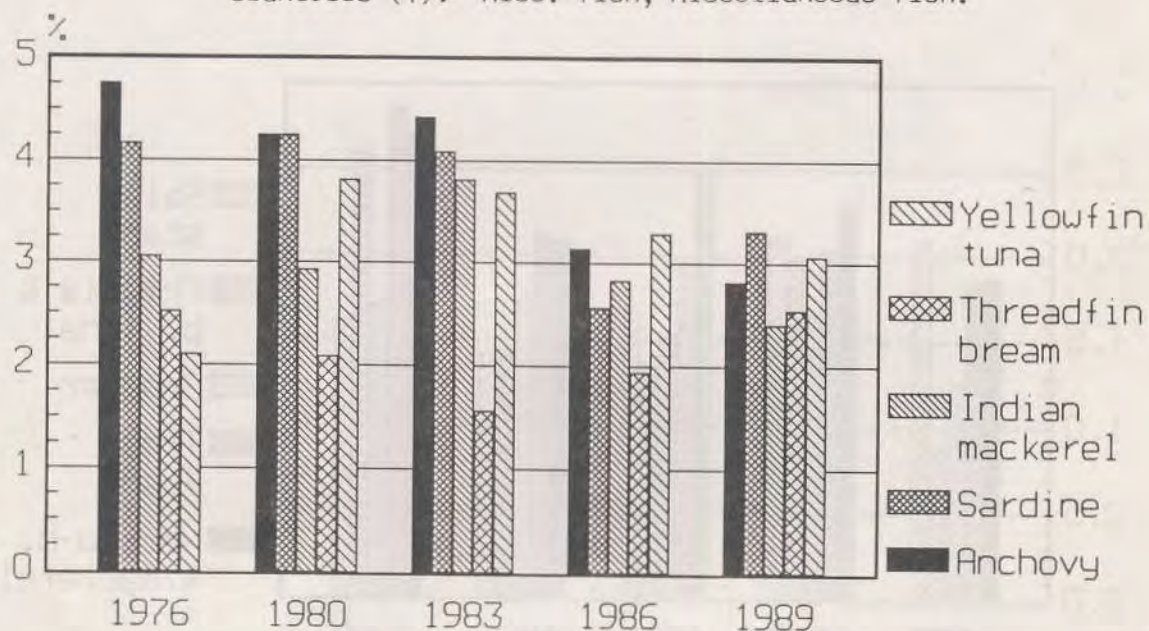


Fig. 33 Value percentages of major species caught from seven countries (2).

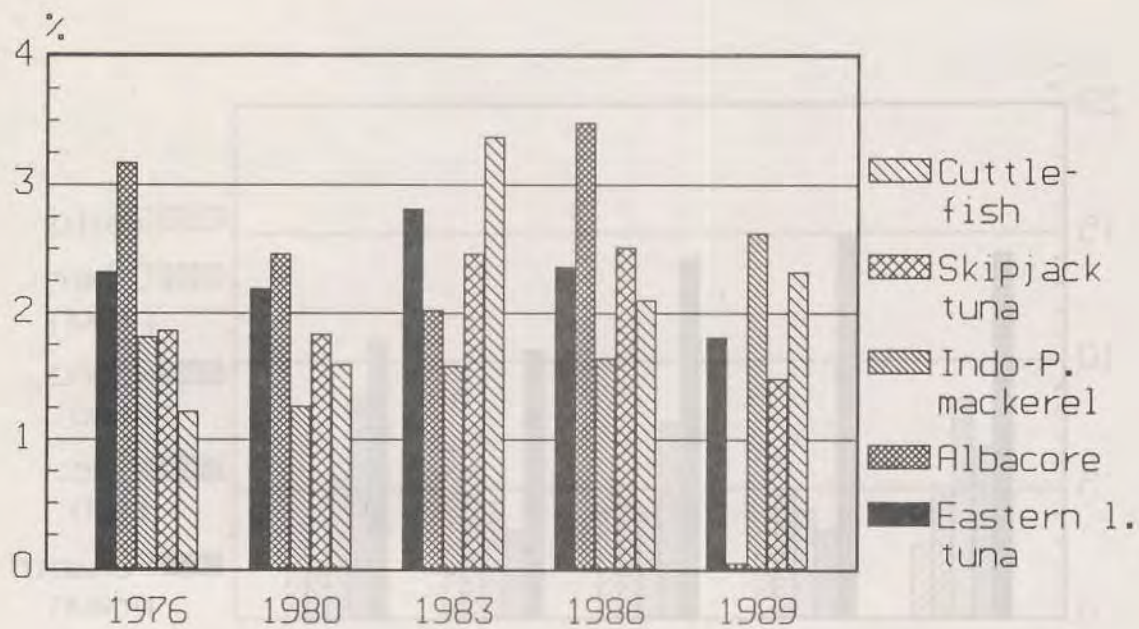


Fig. 34 Value percentages of major species caught from seven countries (3). Eastern l. tuna, Eastern little tuna; Indo-P. mackerel, Indo-Pacific mackerel.

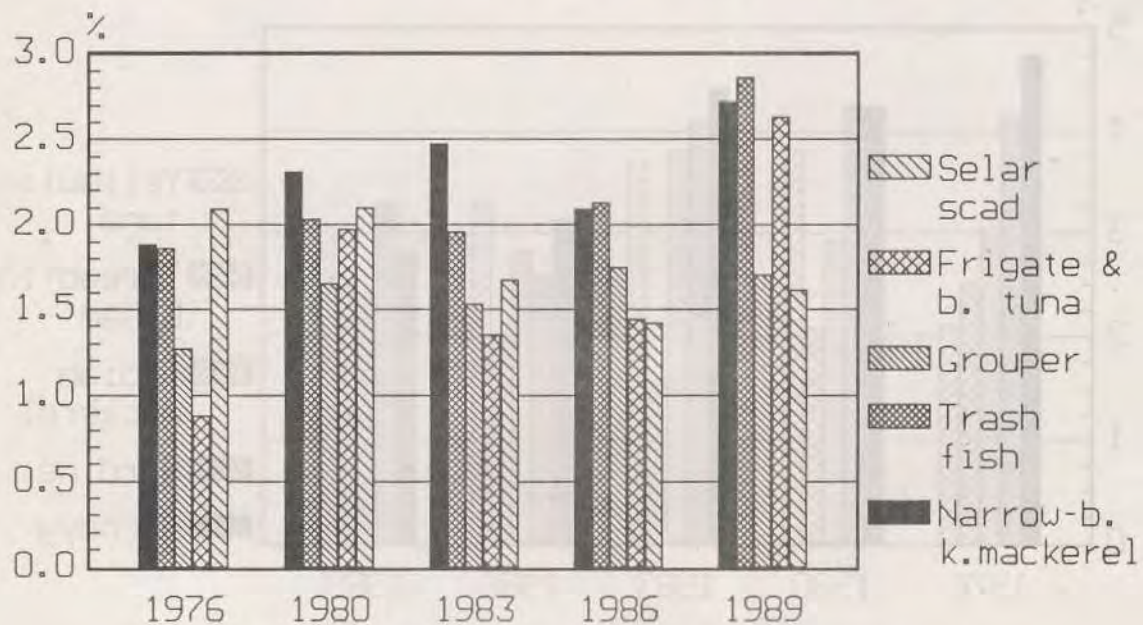


Fig. 35 Value percentages of major species caught from seven countries (4). Narrow-b.k. mackerel, Narrow-barred king mackerel; Frigate & b. tuna, Frigate and bullet tuna.

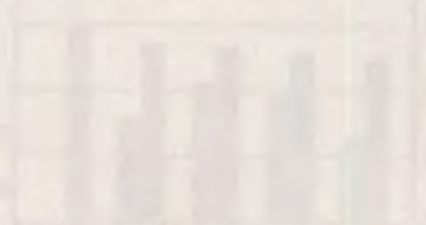
3.1.8 Quantity and value of inland fishery production by country

Data was obtained from six countries: Brunei, Taiwan, Indonesia, Malaysia, the Philippines and Thailand. Production is expressed in catches from inland capture fishery.

The inland fishery production of Brunei between 1976 and 1989 both in quantity and value, remained the same at about 83 MT in quantity and US\$ 115 thousand in value annually as shown in Fig. 36 (A).

Taiwan's inland fishery production fluctuated in quantity from 1976 to 1986 at 2,629; 2,701; 2,498 and 2,183 MT; it then increased to 3,877 MT in 1989. In terms of value, inland production also showed the same fluctuating pattern from US\$ 1.7 million in 1976 to US\$ 2.46, 3.09 and 2.72 million in 1980, 1983 and 1986 respectively, increasing to US\$ 7.63 million in 1989 as shown in Fig. 36 (B).

Indonesia's inland fishery production in quantity showed an increasing trend from 246,711 MT in 1976 to 296,385 MT in 1989. In terms of value, there was an increase from US\$ 126.8 million in 1976 to US\$ 191.6 and 211.7 million in 1980 and 1983 dropping to US\$ 155.4 million in 1986. The value data of inland production for Indonesia in 1989 was not available as shown in Fig. 36 (C).



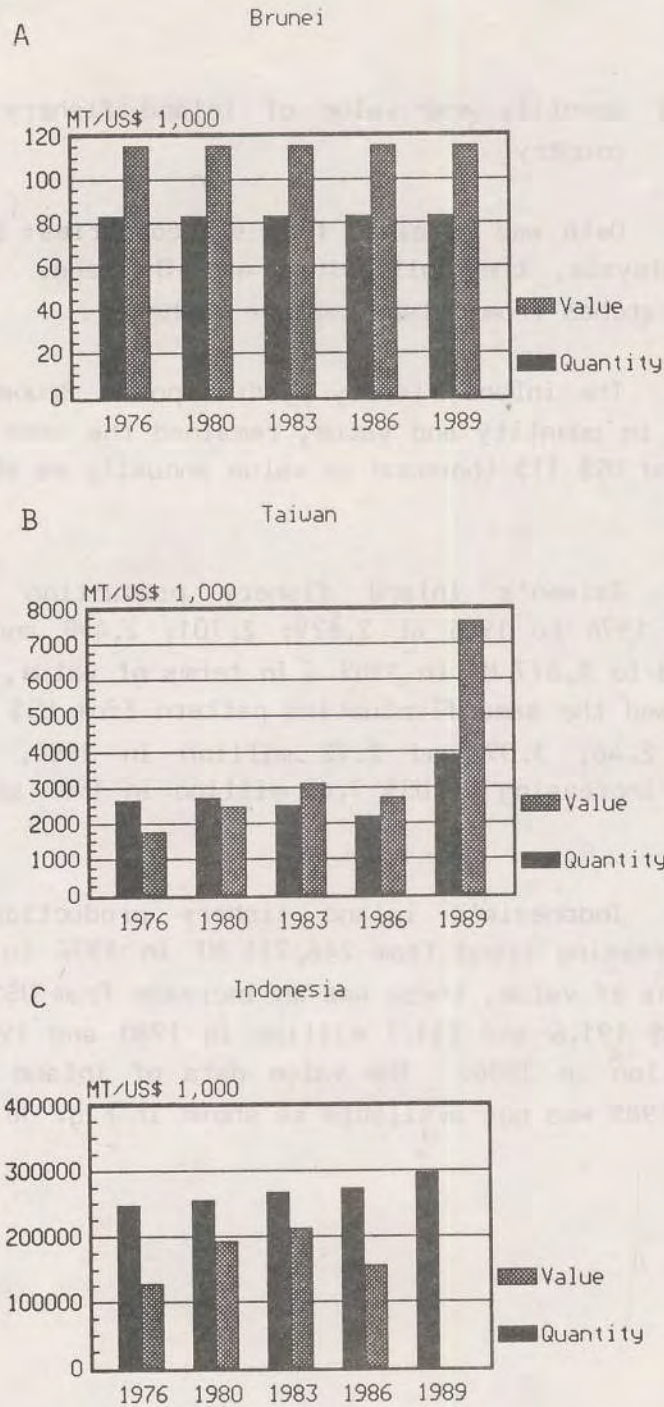


Fig. 36 Inland capture fishery production in quantity and value (1).
A. Brunei; B. Taiwan; C. Indonesia.

Malaysia's inland fishery production showed an increasing trend from 685 MT in 1976 to 2,080 MT in 1989. In terms of value, there was also an increasing trend from US\$ 666 thousand in 1976 to US\$ 1.8 million in 1983, decreasing to US\$ 800 thousand in 1986 but increasing again to US\$ 1.1 million in 1989 as shown in Fig. 37 (A).

In the Philippines, inland fishery production both in quantity and value showed an increasing trend from 106,360 MT (69.8 million US\$) in 1976 to 374,853 MT (US\$ 186.9 million) in 1983, then decreased gradually to 265,086 and 222,257 metric tons (US\$ 129.6 and 101.3 million) in 1986 and 1989 as shown in Fig. 37 (B).

Thailand's inland fishery production fluctuated a little between 1976 and 1989, with 113,263 MT production in 1976 and 109,120 MT in 1989. In terms of value, there were also fluctuations with US\$ 89.6, 144.6, 130, 78.5 and 86.5 million in 1976, 1980, 1983, 1986 and 1989 respectively as shown in Fig. 37 (C).



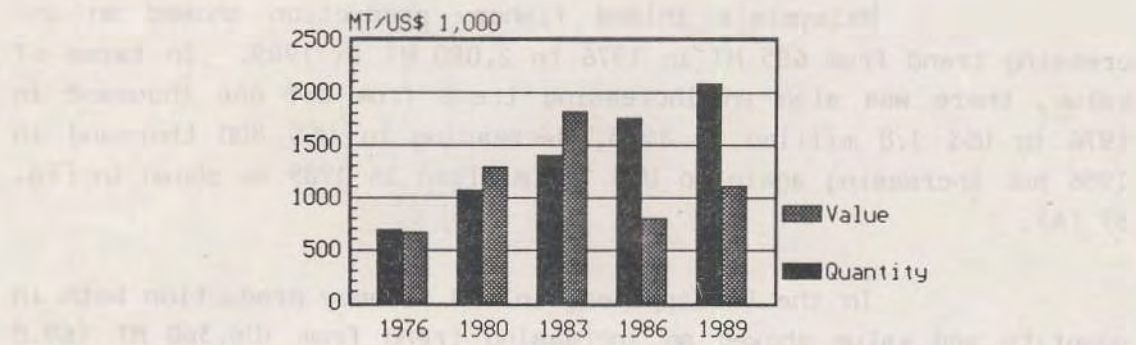
Fig. 37 (A) Malaysia's inland fishery production (quantity and value)

Fig. 37 (B) Philippines' inland fishery production (quantity and value)

Fig. 37 (C) Thailand's inland fishery production (quantity and value)

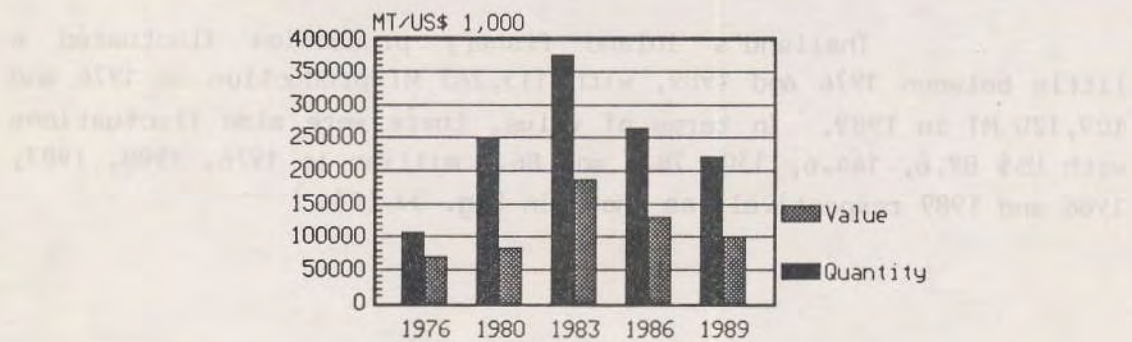
A

Malaysia



B

Philippines



C

Thailand

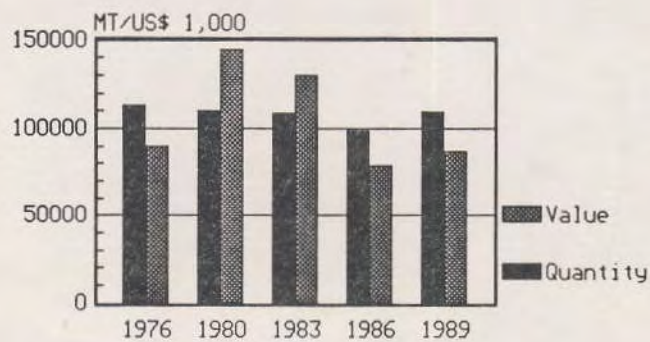


Fig. 37 Inland capture fishery production in quantity and value (2).
A. Malaysia, B. Philippines; C. Thailand.

3.1.9 Aquaculture

Aquaculture is divided into three sub-sectors, i.e., mariculture, brackishwater culture and freshwater culture.

(a) Mariculture production

Data was obtained from five countries: Taiwan, Hong Kong, Malaysia, the Philippines and Thailand except for in 1976 when data was only available for Taiwan and Hong Kong.

Mariculture production in the region in quantity by composition during 1976 to 1989 are shown in Fig. 38. Seaweeds were the major constituent from 1983 to 1989, 49-60%, but were only a small constituent in 1976 and 1980. Blood cockles were next, increasing from 0.1% in 1976 to 55.4% in 1980, decreasing to 16.9, 18 and 11.5% in 1983, 1986 and 1989. Oysters decreased from 42.8% in 1976 to 10.8% in 1980 and then fluctuated at 15.1, 12.5 and 9.5% in 1983, 1986 and 1989. Sea mussels fluctuated at 11.4, 14, 7.9 and 17% in 1980, 1983, 1986 and 1989. Figures for other animals showed a decreasing trend from 45.7% in 1976 to 22, 4.9, 3.2 and 1.7% in 1980, 1983, 1986 and 1989 respectively. Fish showed little change but a decreasing trend from 2.1% in 1976 to 0.7% in 1989.

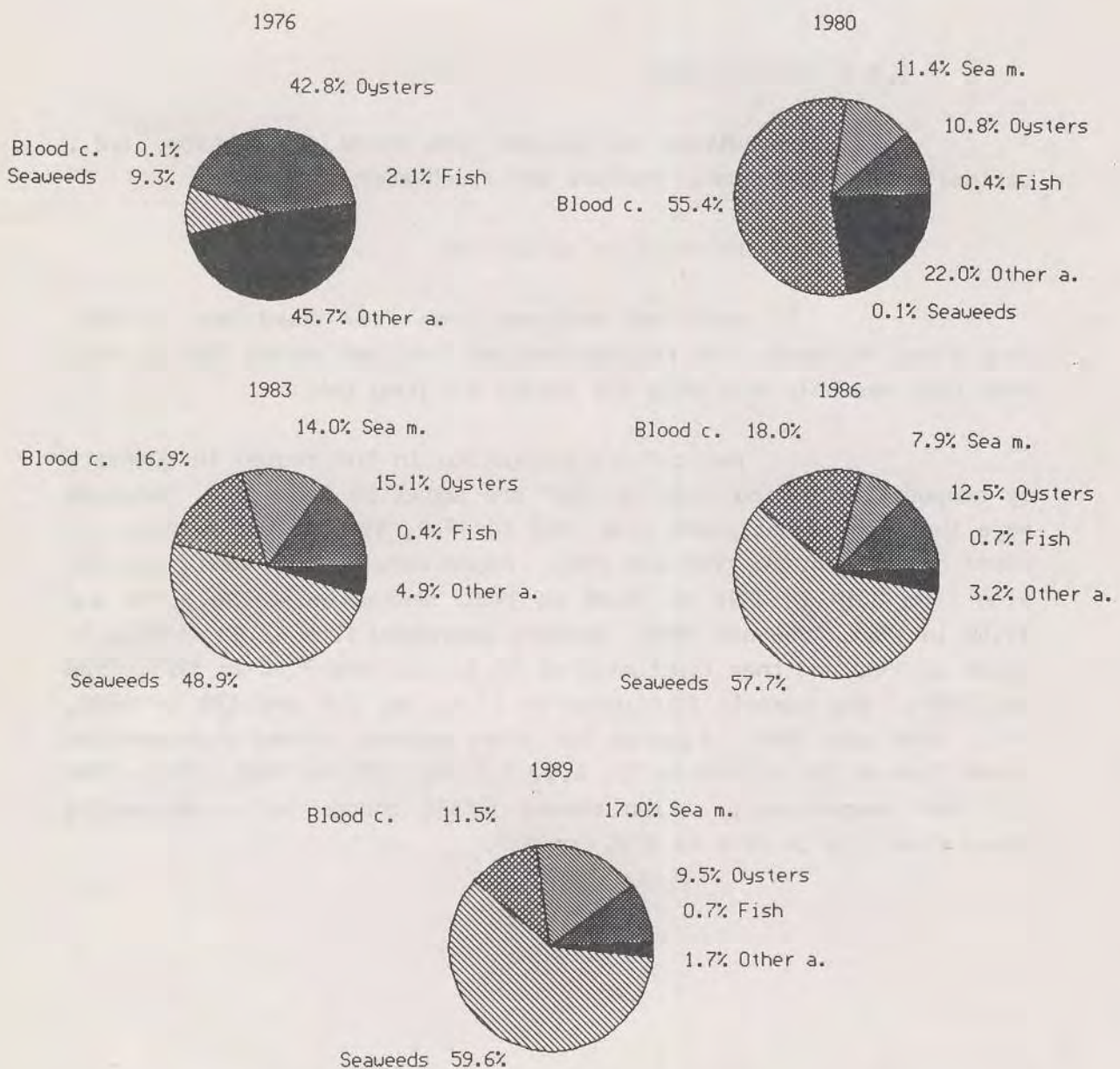


Fig. 38 Percentage of major species groups in mariculture production by quantity from six countries. Blood c., Blood cockles; Sea m., Sea mussels; Other a., Other animals.

In terms of value, mariculture production in the region during this period showed little change. The major constituent in value was Oysters, decreasing from 58% in 1976 to 31.2% in 1980 and then varying at 47.4, 40.7 and 49.9% in 1983, 1986 and 1989. They were followed by other animals at 26.4, 17, 20.7, 19.2 and 12.5% in 1976, 1980, 1983, 1986 and 1989 respectively. Fish, increased from 13% in 1976 to 31.7% in 1980 then decreased to 5.2% in 1983 and increased again to 15 and 12.4% in 1986 and 1989. Seaweeds decreased from 2.33% in 1976 to 0.1% in 1980 and then increased to 13.5, 14.5 and 14.2% in 1983, 1986 and 1989. Blood cockles increased sharply from 0.32% in 1976 to 16.9% in 1980, but then fluctuated, decreasing to 5.2% in 1983, increasing to 5.5% in 1986 but then decreasing again to 4.9% in 1989. Sea mussels, varied at 3.1, 8.0, 5.1 and 6.1% in 1980, 1983, 1986 and 1989 respectively, as shown in Fig. 39.

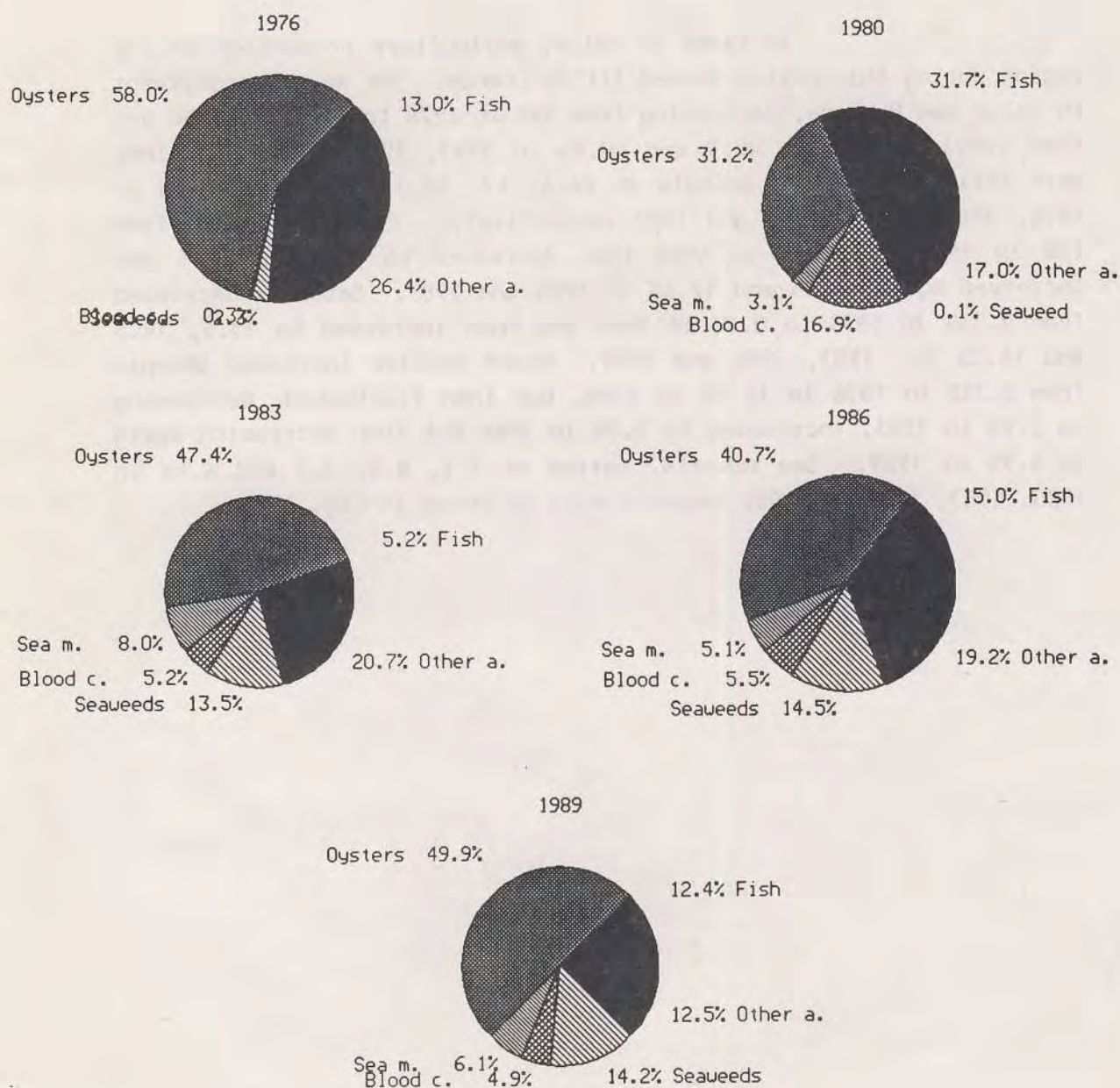


Fig. 39 Percentage of major species groups in mariculture production by value from six countries. Abbreviations are the same as those in Fig. 38.

(b) Brackishwater culture production

Data was obtained from six countries: Taiwan, Indonesia, Malaysia, the Philippines, Singapore and Thailand with the exception of value data from Singapore from 1976 to 1989 and Indonesia in 1989 which was not available.

As shown in Fig. 40, the composition of brackish-water culture production in quantity fluctuated between 1976 and 1989 (data from Singapore was not available between 1976 and 1989). The major component was Milkfish which increased from 42.7% in 1976 to 73.5% in 1980 and then decreased to 67.2, 57.3 and 46.3% in 1983, 1986 and 1989 respectively. Other fishes were next, increasing from 8.1% in 1976 to 9.1 and 11.1% in 1980 and 1983 then decreasing to 9.6% in 1986 and increasing again to 13.5% in 1989. Penaeid prawns, generally showed an increasing trend from 2.6% in 1976 to 8.2, 9.8 and 17.1% in 1980, 1983 and 1986 respectively, but in 1989 marine species classifications were revised, and so prawn data showed data Tiger prawn at 30.8%, Penaeid prawns and Other prawns at about 8.1 and 0.4%. Non-penaeid prawns also had an increasing trend from 1.43% in 1976 to 4.3, 8.0 and 11.2% in 1980, 1983 and 1986 respectively. The last were other crustaceans, at 0.2% in 1976, 4.9% in 1980, 3.9% in 1983, 4.7% in 1986 but only 0.9% in 1989.

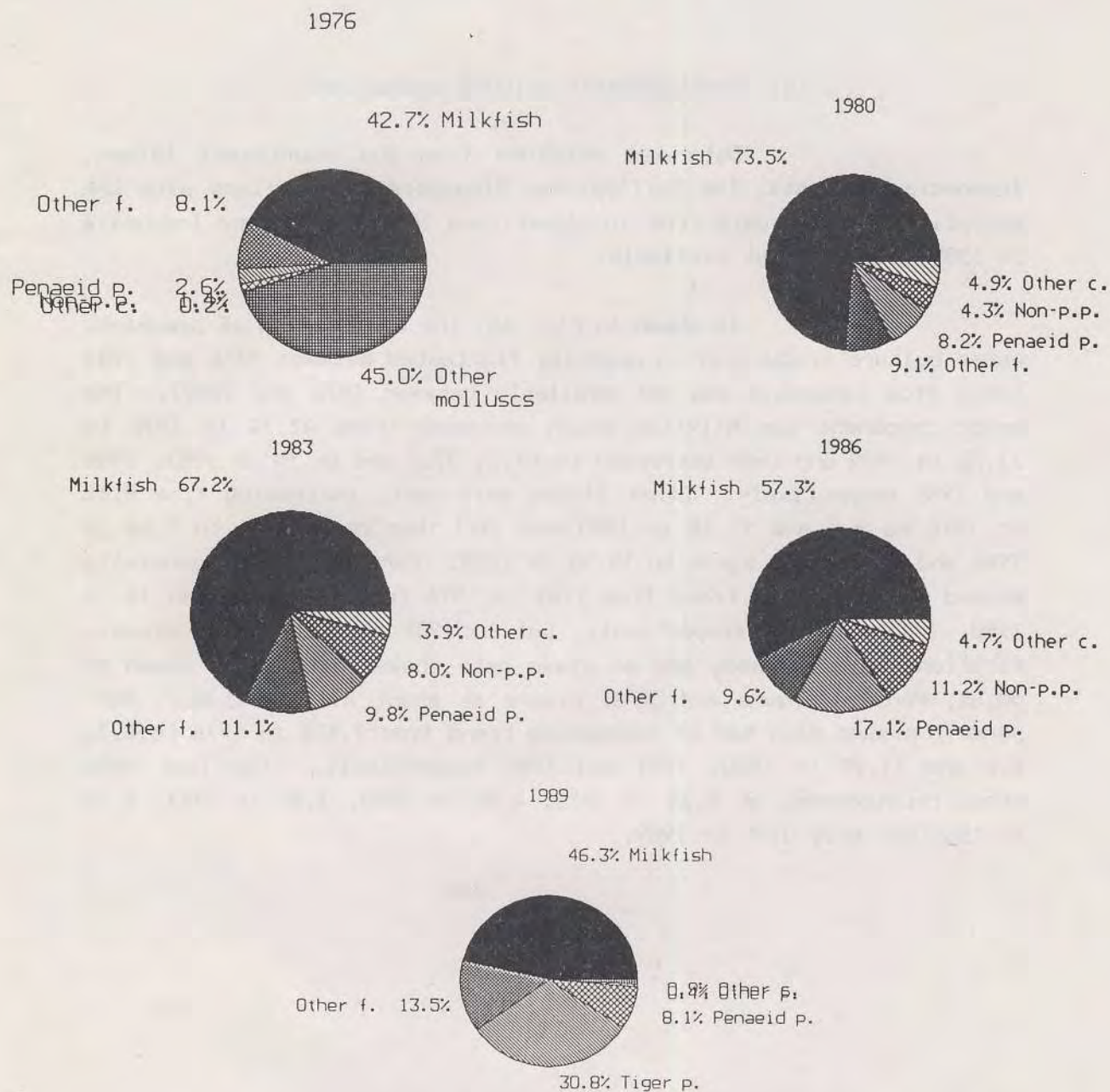


Fig. 40 Percentage of major species groups in brackishwater culture production by quantity from six countries, Penaeid p., Penaeid prawns; Other f., Other fishes; Non-p.p., Non-penaeid prawns; Tiger p., Tiger prawn; Other c., Other crustaceans.

In terms of value, the major species was Milkfish which showed a decreasing trend from 72.3% in 1976 to 69.5, 47.8, 27.5 and 18.8% in 1980, 1983, 1986 and 1989 respectively. Penaeid prawns were next, increasing from 11.9% in 1976 to 17.4, 25.6 and 34.5% in 1980, 1983 and 1986 respectively, but in 1989, prawn data showed data Tiger prawn, Penaeid prawns and Other prawns at about 62.7, 8.6 and 1.0%. Non-penaeid prawns also showed an increasing trend from 3.1% in 1976 to 6.9, 19.3 and 29.4% in 1980, 1983 and 1986 respectively. Other fishes were variable from 1976 to 1989 at 6.4, 3.1, 4.8, 3.8 and 8.0%. Other crustaceans, showed figures of 0.7, 3.1, 2.6, 4.7 in 1976, 1980, 1983 and 1986, decreasing to 0.9% in 1989 as shown in Fig. 41.

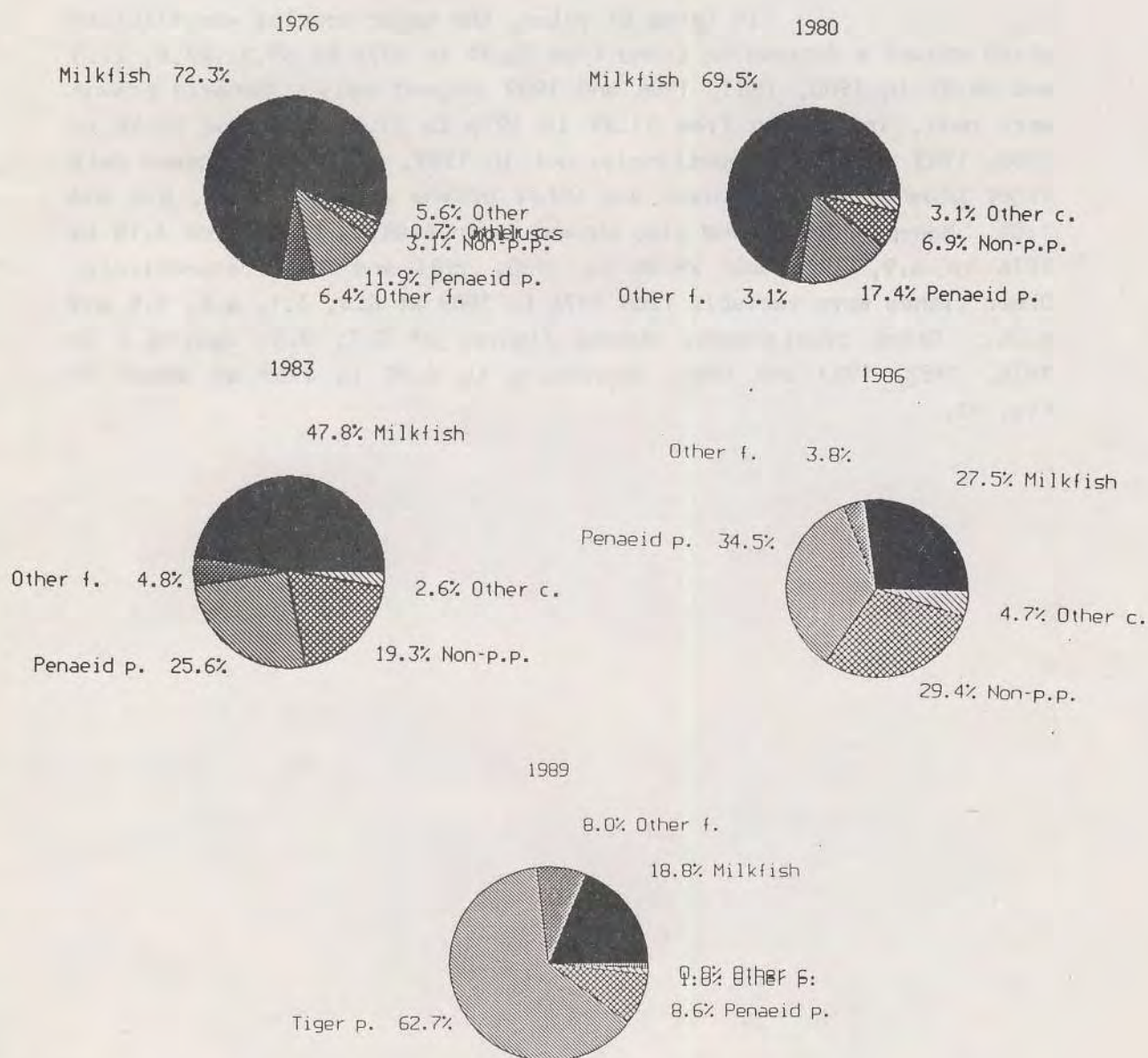


Fig. 41 Percentage of major species groups in brackishwater culture production by value from six countries. Abbreviations are the same as those in Fig. 40.

(c) Freshwater culture production

Data was obtained from six countries : Taiwan, Hong Kong, Indonesia, Malaysia, the Philippines and Thailand except in 1976 when value data for the Philippines was not available and in 1989 when it was not available for Indonesia.

The major species groups of freshwater culture production in quantity were Carp, barbel and other cyprinids which were 32.3, 33.6, 30.0, 35.5 and 34% in 1976, 1980, 1983, 1986 and 1989 respectively. Tilapia and other cichlids followed with an increasing trend from 11.6% in 1976 to 17.9, 22.8, 26.7 and 27.6% in 1980, 1983, 1986 and 1989 respectively. Miscellaneous freshwater fishes accounted for 45.9% of production in 1976 and then decreased to 17.8 and 14.6% in 1980 and 1983, increased to 21.1% in 1986 but decreased again to 19.9% in 1989. Figures for Milkfish were available from 1980 at 13.4% then varying at 21.3, 5.6 and 3.7% in 1983, 1986 and 1989. Eels, were 8.8, 11.4, 6.8, 7.6 and 8.7% in 1976, 1980, 1983, 1986 and 1989 respectively. Other freshwater animals, showed 1.4% in 1976, increasing to 5.9% in 1980 then 4.6, 3.4 and 6.1% in 1983, 1986 and 1989 respectively, as shown in Fig. 42.

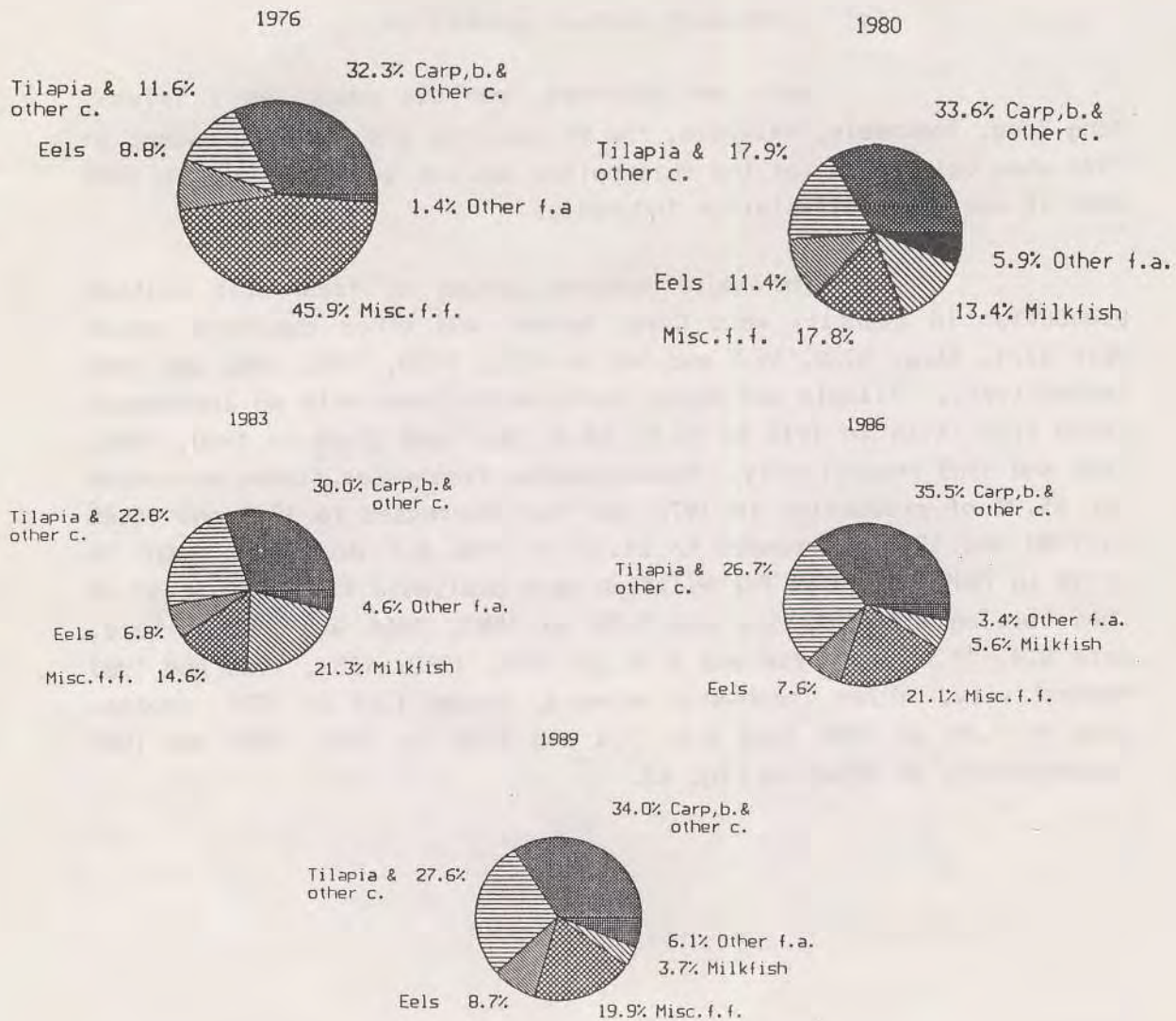


Fig. 42 Percentage of major species groups in freshwater culture production by quantity from six countries. Carp, b. & other c., Carp, barbel and other cyprinids. Tilapia & other c., Tilapia and other cichlids; Misc. f. f., Miscellaneous freshwater fishes; Other f. a., other freshwater animals.

In terms of value, Eels showed a decreasing trend from 42.5% in 1976 to 36.7 and 29% in 1980 and 1983 but then increased to 39.3 and 49.8% in 1986 and 1989. They were followed by Carp, barbel and other cyprinids with a decreasing trend from 35.3% in 1976 to 27.0, 25.5, 21.8 and 9.3% in 1980, 1983, 1986 and 1989 respectively. Tilapia and other cichlids showed increases from 5.4% in 1976 to 9.3, 12.5, 16.6 and 17.3% in 1980, 1983, 1986 and 1989 respectively. Figures for Milkfish were available from 1980 at 12.2% increasing to 17.9 percent in 1983 then decreasing to 5.4 and 4.0% in 1986 and 1989. Miscellaneous freshwater fishes, accounted for 15.6% of the whole in 1976, decreasing to 11.0 and 9.5% in 1980 and 1983, increasing to 12.0% in 1986 but decreasing again to 8.5% in 1989. Other freshwater animals varied at 1.2, 3.9, 5.6 and 4.9% in 1976, 1980, 1983 and 1986 respectively and then increased to 11.2% in 1989 as shown in Fig. 43.

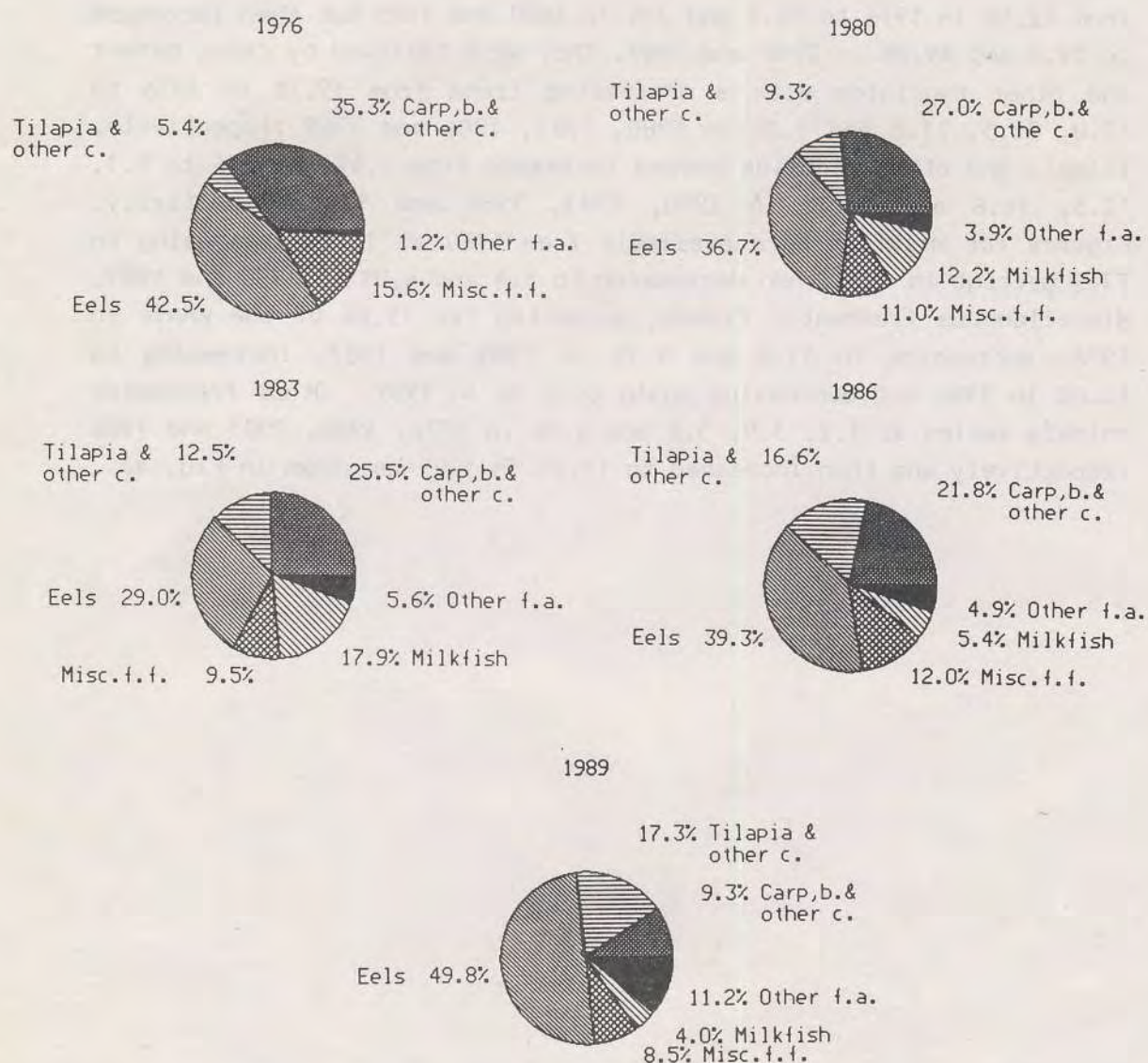


Fig. 43 Percentage of major species groups in freshwater culture production by value from six countries. Abbreviations are the same as those in Fig. 42.

3.1.10 Disposition of catch (percentage)

Data was obtained from six countries : Taiwan, Hong Kong, Indonesia, Malaysia, Singapore and Thailand. The five categorized dispositions were live fish, fresh fish, processed produce including frozen and canned, reduced produce and miscellaneous products.

Catch disposition by percentage by country from 1976 to 1989 is shown in Fig. 44. For Taiwan, data in 1976 and in 1989 was not available but in the remaining years showed little change. The majority, 40-51%, was processed followed by fresh fish, live fish, reduced and miscellaneous products.

For Hong Kong, catch disposition from 1976 to 1989 did not vary a great deal. The majority was fresh fish at about 78-92%, followed by miscellaneous products, processed, live fish and reduced.

The disposition of catch for Indonesia from 1976 to 1989 did not change much. The majority was fresh fish at about 47-55%, followed by processed at 43-52%, and reduced.

For Malaysia, catch disposition from 1976 to 1989 showed little change. The majority was fresh fish at about 58-71%, followed by processed, reduced, miscellaneous products and live fish.

Singapore's catch disposition from 1976 to 1989 showed little variation. The majority was fresh fish at about 83-97%, followed by live fish at about 2-16%.

For Thailand, figures between 1976 and 1989 were fairly constant. The majority was reduced at 32-45%, followed by processed at 17-38%, and the remainder was fresh fish and miscellaneous products.

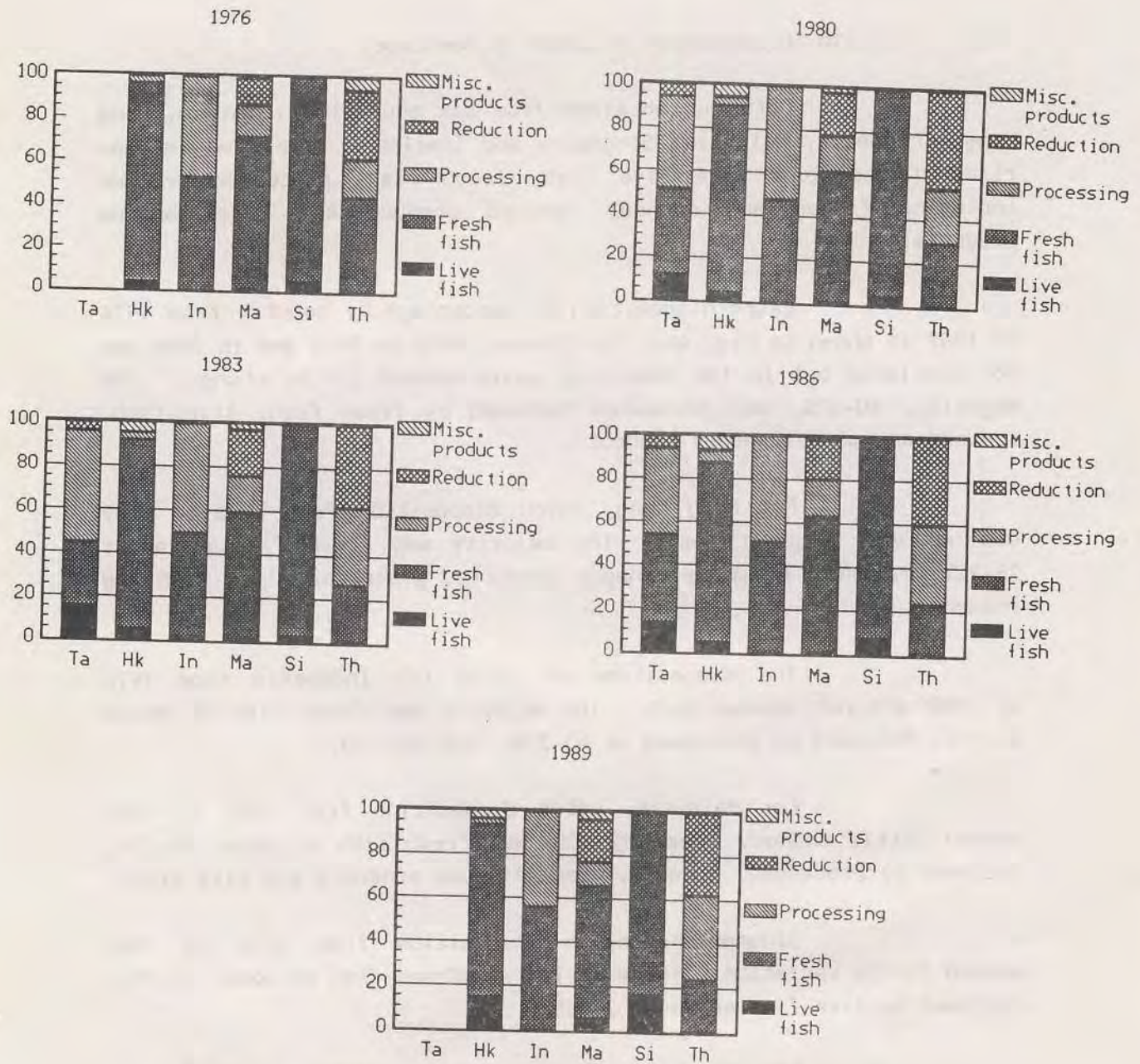


Fig. 44 The ratios of disposition of catch from six countries. Ta. Taiwan; Hk. Hong Kong; In. Indonesia; Ma. Malaysia; Si. Singapore; Th. Thailand; Misc. products, Miscellaneous products.

3.1.11 Export and import of fishery commodities

Data was obtained from eight countries : Brunei, Taiwan, Hong Kong, Indonesia, Malaysia, the Philippines, Singapore and Thailand. Values of annual exports and imports of all fishery commodities ranging from live fish to preserved and processed commodities are included.

Figs. 45 and 46 show the export and import of fishery commodities by country from 1976 to 1989.

For Brunei, data was only available from 1976 to 1983. During this time, the export and import of fishery commodities from Brunei increased from US\$ 108,000 million and US\$ 2.1 million in 1976 to US\$ 175,000 million and US\$ 8.8 million in 1980 but then decreased to US\$ 75,000 million and US\$ 6.6 million in 1983. The balance of trade therefore fluctuated from US\$ -1.9, -8.6 and -6.6 million in 1976, 1980 and 1983 respectively, as shown in Fig. 45 (A).

For Taiwan, data was only available in 1989 with the export, import and balance of trade at US\$ 2,199, 663 and 1,536, million, respectively as shown in Fig. 45 (B).

For Hong Kong, the value of both exported and imported fishery commodities increased from 1976 to 1989. The value of exports in 1976 was US\$ 121.4 million and US\$ 684.8 million in 1989 while imports in 1976 were US\$ 192.4 million increasing to US\$ 988.8 million in 1989. The balance of trade varied at US\$ -70.9, -230.3, -210.5, -167.2 and -304 million in 1976, 1980, 1983, 1986 and 1989 respectively as shown in Fig. 45 (C).

For Indonesia, the value of exported fishery commodities increased between 1976 and 1989 from US\$ 131.3 to 817.7 million; while the value of imports varied between 1976 and 1989 at US\$ 10.3 million, US\$ 902,000, US\$ 34.2, 2.1 and 31.9 million in 1976, 1980, 1983, 1986 and 1989 respectively. The balance of trade for Indonesia showed an increasing trend from US\$ 121 million in 1976 to US\$ 785.8 million in 1989 as shown in Fig. 45 (D).

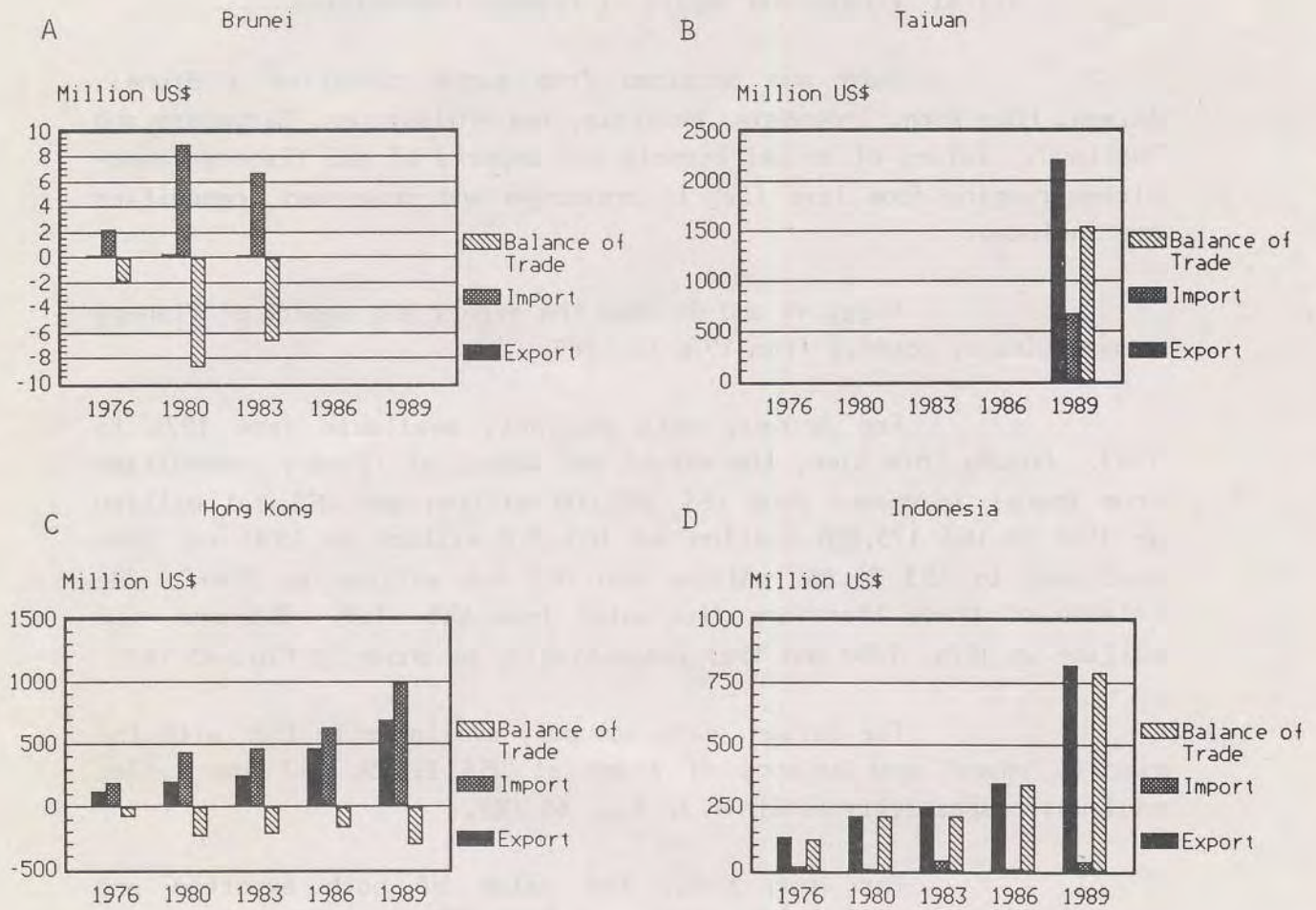


Fig. 45 Export and import of fishery commodities in value (1).

A. Brunei; B. Taiwan; C. Hong Kong; D. Indonesia.

For Malaysia, the value of both exported and imported fishery commodities increased from 1976 to 1989. Exports rose from US\$ 113.6 million to US\$ 266.2 million and imports from US\$ 46.1 million to US\$ 187.9 million. The balance of trade decreased from US\$ 67.4 million in 1976 to US\$ 10.7 million in 1986, then increased to US\$ 78.2 million in 1989 as shown in Fig. 46 (A).

For the Philippines, the value of exports showed an increasing trend from 1976 to 1989 except for in 1983. Figures were US\$ 9.7 million in 1976 and rose to US\$ 474.8 million in 1989. The value of imports fluctuated between 1976 and 1989 at US\$ 6.7, 40.1, 9.9, 18.9 and 65.9 million respectively. The balance of trade increased from US\$ 2.9 to 408.9 million from 1976 to 1989 as shown in Fig. 46 (B).

For Singapore, the value of both exported and imported fishery commodities increased between 1976 and 1989. Exported fishery commodities went up from US\$ 46.7 million in 1976 to US\$ 422.1 million in 1989, while imports increased from US\$ 75.2 million in 1976 to US\$ 403.3 million in 1989. The balance of trade varied at US\$ -28.5, -16.5, -44.7 and -93.2 million in 1976, 1980, 1983 and 1986 respectively increasing to US\$ 18.7 million in 1989 as shown in Fig. 46 (C).

For Thailand, the value of both exported and imported fishery commodities increased between 1976 and 1989. Exported fishery commodities increased from US\$ 155.6 million to US\$ 2,085.6 million, while imports went up from US\$ 7.4 million to US\$ 740.5 million. The balance of trade also increased between 1976 and 1989 from US\$ 148.2 million to US\$ 1,345.2 million in 1989 as shown in Fig. 46 (D).

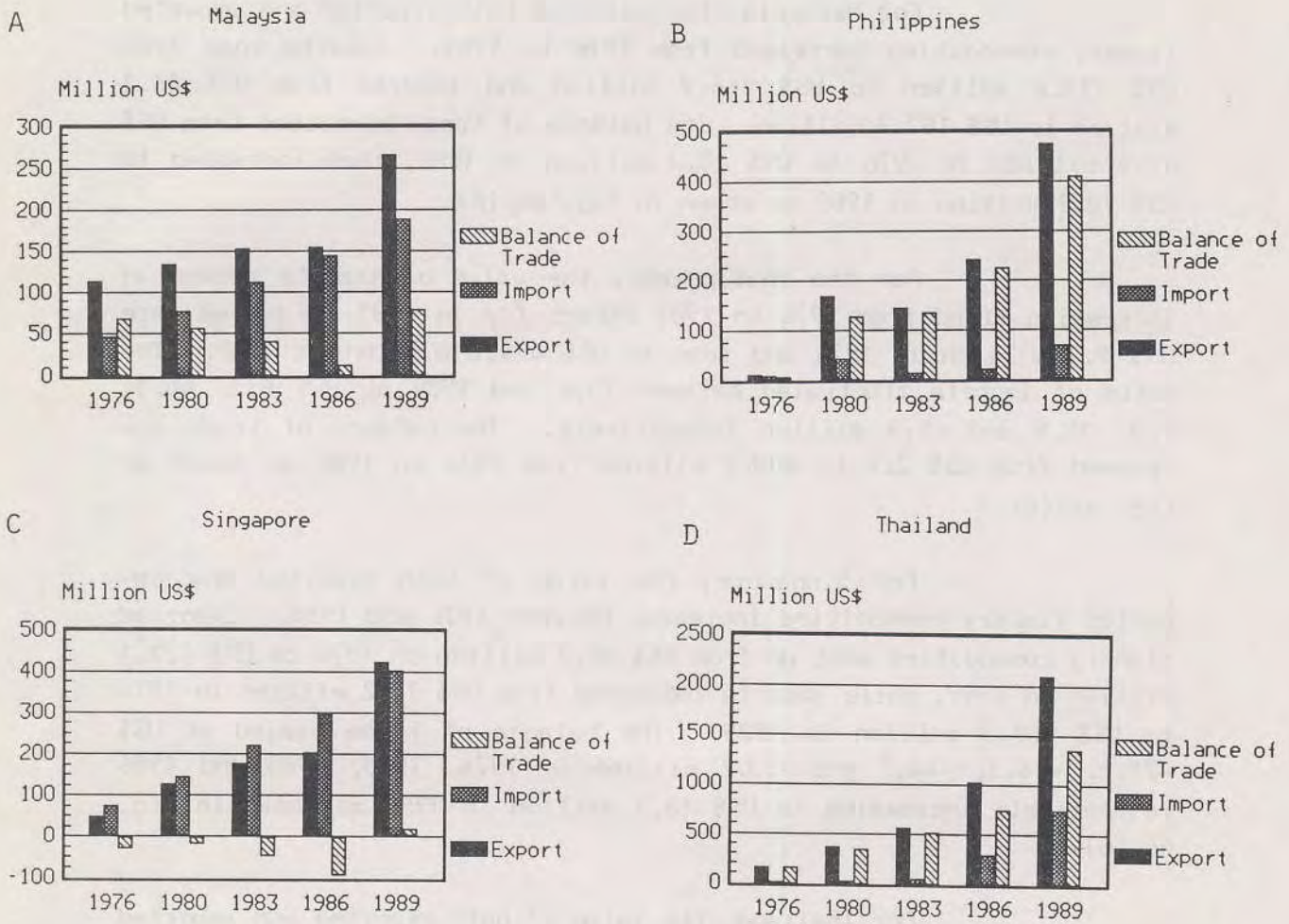


Fig. 46 Export and import of fishery commodities in value (2).
A. Malaysia; B. Philippines; C. Singapore; D. Thailand.

3.2 Catch and potential yield in each country

3.2.1 Brunei

Total catch

Marine capture fishery production in Brunei from 1976 to 1989 is shown in Table 7. Figures before 1987 include imported quantities.

The total catch in Brunei showed a steady increase from 2,000 MT in 1976 to 3,600 MT in 1980, then it remained constant at 3,500 MT until 1982. The catch increased again in 1983 to 5,000 MT, and remained at this level until 1985, after which it decreased to 4,300 MT in 1986, 2,100 MT in 1987, 1,500 MT in 1988, and 1,800 MT in 1989.

3.2.2 Taiwan

Total catch

Marine capture fishery production in Taiwan from 1976 to 1989 is shown in Table 8. The total catch figures before 1984 include those from outside the South China Sea Area.

The total catch in Taiwan increased from 672,500 MT in 1976 to 758,600 MT in 1980, but then it decreased slightly to 687,300 MT in 1983. Total catch from the South China Sea Area in Taiwan was 355,100 MT in 1984, decreasing slightly to 328,900 MT in 1986, but increasing again to 383,600 MT in 1989.

Catch by type of fishing gear

Marine catch by type of fishing gear from 1977 to 1989 in Taiwan is shown in Table 9. Catch figures before 1988 include those from outside the South China Sea Area. The Trawl catch, the most dominant over the 11 years from 1977 to 1987, was recorded at 392,500 MT in 1977, 99,400 MT in 1981, a drastic decrease, but up again to

202,500 MT in 1987. The mean value of the Trawl catch over the 11 years was 167,700 MT, ranging between 82,700 MT (1980) and 392,500 MT (1977). This was followed by Hook-and-line catch, averaging 163,400 MT, and ranging between 106,800 MT (1981) and 204,600 MT (1987).

The Trawl catch accounted for 38.3% (146,900 MT) of the total in 1989; followed by Surrounding net, 14.8% (56,800 MT); Hook-and-line, 12.8% (49,200 MT); Gill net, 11.6% (44,700 MT); Trap, 2.1% (8,100 MT); Seine net, 0.5% (1,900 MT); and others, 19.8% (76,000 MT).

Catch by species group

Marine catch for 19 major species groups in Taiwan from 1976 to 1989 is shown in Table 10. Catch figures before 1988 include catches from outside the South China Sea Area. An analysis of the mean value of the catch over the 12 years from 1976 to 1987 shows: Miscellaneous fish was the most dominant, ranging between 176,500 MT (1977) and 271,800 MT (1979), with a four year mean of 208,800 MT; followed by Non-penaeid prawn, ranging from 58,800 MT (1976) to 84,000 MT (1985), with an 11 year mean of 72,600 MT; Albacore, ranging between 50,000 MT (1981) and 93,900 MT (1986), with a 12 year mean of 64,700 MT; Squid, a mean of 41,000 MT; Shark, 35,400 MT; Yellowfin tuna, 28,100 MT; cuttlefish, 27,700 MT; Hardtail scad, 23,100 MT; Skipjack tuna, 20,600 MT; Hairtail, Drum and croaker, Lizard fish, King mackerel, Bigeye tuna, and Sardine, means at the 1,000 MT level; and Frigate tuna, Eastern little tuna, Penaeid prawn, and Anchovy, means of less than 1,000 MT.

In 1989, the catches from inside the South China Sea Area show: the catch of Miscellaneous fish accounting for 17.9% (68,600 MT) of the total; followed by Non-penaeid prawn, 11.6% (44,500 MT); Hairtail, 5.8% (22,400 MT); Drum and croaker, 4.4% (16,800 MT); Frigate tuna, 3.9% (15,100 MT); Sardine, 3.3% (12,800 MT); Yellowfin tuna, 3.2% (12,400 MT); and Shark, 2.0% (7,800 MT).

3.2.3 Hong Kong

Total catch

Marine capture fishery production in Hong Kong from 1976 to 1989 is shown in Table 11. The total catch in Hong Kong remained constant between 1976 and 1978 at the 150,000 MT level, then increased by 17.0% to 182,500 MT in 1979. During the years from 1979 to 1985, there was less variation, 172,000 MT to 191,800 MT, but in 1986 the catch was over 200,000 MT and increased further to 233,600 MT in 1989.

Catch by type of fishing gear

Marine catch by type of fishing gear from 1978 to 1989 in Hong Kong is shown in Table 12. The Trawl catch, the most dominant over the 12 years, was recorded at 110,500 MT in 1978, 128,000 MT in 1983 and 174,800 MT in 1989, showing a steady increase. The mean value of the Trawl catch over the 12 years was 139,800 MT, ranging between 110,500 MT (1978) and 174,800 MT (1989).

The Trawl catch accounted for 74.8% (174,800 MT) of the total in 1989, followed by Gill net, 7.3% (17,000 MT); Hook-and-line, 5.6% (13,000 MT); Surrounding net, 4.4% (10,400 MT); and others, 7.9% (18,400 MT).

Catch by species group

Marine catch for 16 major species groups in Hong Kong from 1976 to 1989 is shown in Table 13. An analysis of the mean value of the catch over the 14 years shows: Miscellaneous fish was the most dominant, ranging between 42,200 MT (1976) and 116,000 MT (1989), with a 14 year mean of 73,900 MT; followed by Threadfin bream, ranging between 12,400 MT (1983) and 23,000 MT (1987), with a mean of 16,500 MT; Penaeid prawn catch, ranging between 9,400 MT (1983) and 16,300 MT (1979), with a mean of 12,900 MT; Bigeye snapper, a mean of 11,600 MT;

Lizard fish, 8,900 MT; Round scad, 7,200 MT; Drum and croaker, 6,700 MT; Sharp-toothed pike and conger eels, Squid, and Miscellaneous marine molluscs, means at the 4,000 MT level; Hairtail, Narrow-barred king mackerel, and Black pomfret, the 3,000 MT level; Sardine, and Shark, the 1,000 MT level; and Jack-cavalla-trevally, 940 MT.

In 1989, the catch of Miscellaneous fish accounted for 49.7% (116,000 MT) of the total; followed by Threadfin bream, 7.9% (18,500 MT); Bigeye snapper, 6.7% (15,700 MT); Penaeid prawn, 5.5% (12,900 MT); Lizard fish, 5.3% (12,300 MT); Drum and croaker, 3.2% (7,600 MT); Sharp-toothed pike and conger eels, 2.1% (4,900 MT); Narrow-barred king mackerel, 2.1% (4,800 MT).

Provisional estimation of potential yield

This shows the maximum catch, estimated maximum potential, the latest three year mean of the catch and related figures in Hong Kong between 1976 and 1989 (Table 14).

Fishery resources in Hong Kong showed overexploitation by a total of 18,300 MT by 1989. Among the 16 major species groups, eight species groups showed overexploitation, but the other eight species groups; Round scad, Sardine, Squid, Hairtail, Jack-cavalla-trevally, Shark, Bigeye snapper and Miscellaneous marine molluscs; still have some potential for increased catch. The species groups overexploited the most were Miscellaneous fish estimated at 15,600 MT; followed by Threadfin bream, 4,900 MT; Lizard fish, 3,000 MT; Penaeid prawn, 2,200 MT; Narrow-barred king mackerel; Sharp-toothed pike and conger eels; Black pomfret; and Drum and croaker.

However, with good future management of resources urgently applied a potential increase of 33,800 MT, making a total catch of 260,500 MT, is possible for Hong Kong.

3.2.4 Indonesia

Total catch

Marine capture fishery production in Indonesia from 1976 to 1989 is shown in Table 15. During the 14 years, the total catch in Indonesia showed steady increases from 1,081,600 MT in 1976 to 1,682,000 MT in 1983. It increased further to 2,000,000 MT in 1987, and 2,272,200 MT in 1989.

Catch by type of fishing gear

Marine catch by type of fishing gear in 1983, and from 1987 to 1989, is shown in Table 16. The Gill net catch, the most dominant, ranged from 464,500 MT (1983) to 562,300 MT (1989), with a mean of 514,000 MT.

The Gill net catch accounted for 24.7% (562,300 MT) of the total in 1989; followed by Hook-and-line, 18.0% (409,100 MT); Surrounding net, 16.7% (378,500 MT); Seine net, 12.8% (290,700 MT); Lift net, 11.7% (266,600 MT); Trap, 8.4% (191,100 MT); Shellfish and seaweed collecting gear, 5.3% (120,900 MT); and others, 2.3% (53,200 MT).

Catch by species group

Marine catch for 27 major species groups from 1976 to 1989 in Indonesia is shown in Table 17. Data for 1979 was not available. An analysis of the mean value of the catch over 13 years shows: Miscellaneous fish was the most dominant, ranging between 142,200 MT (1977) and 492,700 MT (1984), with a 13 year mean of 283,900 MT; followed by Sardine, ranging between 97,000 MT (1977) and 241,300 MT (1989), with an 11 year mean of 164,700 MT; Round scad, ranging between 65,600 MT (1981) and 190,000 MT (1986), with an 11 year mean of 118,200 MT; Indian mackerel, a mean of 115,600 MT; Anchovy, 102,300 MT; Eastern little tuna, 92,200 MT; Non-penaeid prawn, 70,900 MT; Skipjack tuna, 67,100 MT; Selar scad, 64,000 MT; Penaeid prawn, 53,500 MT; Narrow-barred king mackerel, Indo-Pacific mackerel, Pony fish,

Yellowfin tuna, Blood cockle, and Shark, means at the 30,000 MT level; Marine catch fish, Red snapper, and Drum and croaker, the 20,000 MT level; Jack-cavalla-trevally, Mullet, Threadfin, Wolf herring, Squid, Grouper, and Threadfin bream, the 10,000 MT level; and Jellyfish, 6,900 MT.

In 1989, the catch of Miscellaneous fish accounted for 14.6% (331,600 MT) of the total; followed by Sardine, 10.6% (241,300 MT); Round scad, 6.4% (145,800 MT); Indian mackerel, 6.4% (145,700 MT); Eastern little tuna, 6.0% (135,300 MT); Anchovy, 5.3% (119,700 MT); Skipjack tuna, 5.0% (113,800 MT); Selar scad, 3.9% (88,800 MT); Non-penaeid prawn, 3.2% (72,300 MT); Penaeid prawn, 3.1% (70,000 MT); Yellowfin tuna, 2.9% (66,300 MT); and Shark, 2.1% (48,000 MT).

Provisional estimation of potential yield

This shows the maximum catch, estimated maximum potential, and the latest three year mean of the catch and their related figures in Indonesia between 1976 and 1989 (Table 18).

Fishery resources in Indonesia showed overexploitation by a total of 139,300 MT by 1989. Among the 27 major species groups, 17 species groups showed overexploitation, but the other 10 species groups; Miscellaneous fish, Indo-Pacific mackerel, Non-penaeid prawn, Jack-cavalla-trevally, Round scad, Jellyfish, Blood cockle, Yellowfin tuna, Threadfin bream, and Grouper; still have some potential for increased catch. The species groups which showed the greatest over-exploitation were Sardine, estimated at 58,200 MT; Anchovy, 33,900 MT; Eastern little tuna, 31,300 MT; Indian mackerel, 30,000 MT; Selar scad, 20,800 MT; Skipjack tuna, 17,900 MT; Narrow-barred king mackerel, 13,700 MT; Penaeid prawn, 10,500 MT; Marine catfish, 10,000 MT; Pony fish; Shark; Red snapper; Mullet; Squid; Drum and croaker; Threadfin bream; and Wolf herring.

On the other hand, with good management of resources applied urgently, a potential increase in catch of 365,300 MT is possible, giving a potential total catch of 2,523,400 MT for Indonesia.

3.2.5 Kampuchea

Total catch

Marine capture fishery production in Kampuchea from 1976 to 1989 is shown in Table 19. The total catch in Kampuchea was 10,800 MT from 1976 to 1978, but it decreased to 5,100 MT in 1983. After this, the total increased from 5,500 MT in 1984 to 6,500 MT in 1986, and then remained constant until 1989.

3.2.6 Malaysia

Total catch

Marine capture fishery production in Malaysia from 1976 to 1989 is shown in Table 20. The total catch in Malaysia gradually increased from 483,200 MT in 1976 to 630,000 MT in 1979, reaching 686,400 MT in 1981 and 1983. In 1986, the total decreased to 563,500 MT, but thereafter, increased again to 858,800 MT in 1987, then remaining constant until 1988.

Catch by type of fishing gear

Marine catch by type of fishing gear from 1977 to 1989 in Malaysia is shown in Table 21. The Trawl catch, the most dominant over the 13 years, was recorded at 355,900 MT in 1978, and 229,600 MT in 1985, but it increased to 502,100 MT in 1989. The mean value of the Trawl catch over the 13 years was 329,700 MT, ranging between 229,600 MT (1985) and 502,100 MT (1989).

The Trawl catch accounted for 57.4% (502,100 MT) of the total in 1989; followed by Surrounding net, 17.1% (149,900 MT); Gill net, 8.3% (72,700 MT); Hook-and-line, 3.1% (27,100 MT); Seine net, 2.6% (22,500 MT); Lift net, 2.1% (18,000 MT); Trap, 2.0% (17,800 MT); Push net, 0.2% (2,000 MT); Shellfish and seaweed collecting gear, 0.1% (780 MT); and others, 7.0% (61,600 MT).

Catch by species group

Marine catch in Malaysia for 21 major species groups from 1976 to 1989 is shown in Table 22. An analysis of the mean value of the catch over the 14 years shows: Trash fish was the most dominant, ranging between 112,000 MT (1984) and 266,300 MT (1989) with a 14 year mean of 164,500 MT; followed by Penaeid prawn, ranging between 45,400 MT (1987) and 93,000 MT (1989) with a mean of 70,800 MT; Indian mackerel, between 19,100 MT (1976) and 91,500 MT (1983) with a mean of 60,100 MT; Miscellaneous fish, a mean of 31,300 MT; Selar scad, 27,300 MT; Anchovy, 26,600 MT; Round scad, 26,400 MT; Sardine, 18,800 MT; Longtail tuna, and Squid, means at the 14,000 MT level; Threadfin bream, 13,000 MT level; Drum and croaker, and Narrow-barred king mackerel, 12,000 MT level; Jellyfish, and Non-penaeid prawn, 11,000 MT level; and Hardtail scad, Miscellaneous marine crustacea, Jack-cavalla-trevally, Shark, Eastern little tuna, and Indo-Pacific mackerel, less than 1,000 MT.

In 1989, the catch of Trash fish accounted for 30.5% (266,300 MT) of the total; followed by Penaeid prawn, 10.6% (93,000 MT); Indian mackerel, 6.5% (57,100 MT); Miscellaneous fish, 4.8% (42,400 MT); Jellyfish, 4.8% (42,000 MT); Round scad, 4.8% (42,000 MT); Selar scad, 4.3% (37,300 MT); Squid, 3.6% (31,100 MT); Anchovy, 3.5% (30,500 MT); and Threadfin bream, 2.7% (23,600 MT).

Provisional estimation of potential yield

This shows the maximum catch, estimated maximum potential, the latest three year mean of the catch and their related figures in Malaysia between 1976 and 1989 (Table 23).

Fishery resources in Malaysia, as summarized, showed overexploitation by a total of 64,700 MT by 1989. Among the 21 major species groups, nine species groups showed overexploitation, but the other twelve; Indian mackerel, Non-penaeid prawn, Miscellaneous marine crustacea, Selar scad, Hardtail scad, Eastern little tuna, Narrow-barred king mackerel, Jack-cavalla-trevally, Anchovy, Shark, Indo-

Pacific mackerel, and Threadfin bream; still have some potential for increased catch. The species groups which showed the greatest over-exploitation were Trash fish estimated at 64,200 MT; followed by Penaeid prawn, 3,900 MT; Squid, 3,400 MT; Longtail tuna, 2,600 MT; Miscellaneous fish, 2,000 MT; Round scad, 1,900 MT; Drum and croaker, 1,100 MT; Sardine; and Jellyfish.

However, with good management of fisheries resources, there is a potential for an increased catch of 132,100 MT giving a total future catch of 984,300 MT for Malaysia.

3.2.7 Philippines

Total catch

Marine capture fishery production in the Philippines from 1976 to 1989 is shown in Table 24. The total catch in the Philippines was recorded at 1,127,300 MT in 1976, with a slight increase to 1,230,700 MT in 1977; it then remained constant until 1985. After this the total showed a steady increase to 1,519,500 MT in 1989.

Catch by type of fishing gear

Marine catch by type of fishing gear from 1977 to 1988 is shown in Table 25. The Surrounding net catch, the most dominant over the 12 years, was 32,800 MT in 1977, increasing dramatically to 260,700 MT in 1979, then remaining constant until 1983. The catch increased again from 1984, when it was 307,800 MT, reaching 407,200 MT in 1988. The mean value of the Surrounding net catch over the 12 years was 254,800 MT, ranging between 8,700 MT (1978) and 407,200 MT (1988).

The Surrounding net catch accounted for 28.3% (407,200 MT) of the total in 1988; followed by Hook-and-line, 18.4% (264,100 MT); Gill net, 16.3% (234,000 MT); Trawl, 10.0% (144,000 MT); Lift net, 9.7% (138,900 MT); Seine net, 8.6% (124,300 MT); Trap, 3.7% (53,300 MT); Push net, 1.0% (14,000 MT); Shellfish and seaweed collecting gear, 1.0% (13,900 MT); and others, 3.1% (44,700 MT).

Catch by species group

Marine catch for 27 major species groups from 1976 to 1989 in the Philippines is shown in Table 26. An analysis of the mean value of the catch over the 14 years shows: Round scad was the most dominant, ranging between 131,600 MT (1984) and 224,700 MT (1976) with a 14 year mean of 166,900 MT; followed by Sardine, ranging between 61,700 MT (1976) and 154,000 MT (1978) with a mean of 113,200 MT; Anchovy, between 50,200 MT (1977) and 126,400 MT (1988) with a mean of 90,800 MT; Frigate tuna, a mean of 78,700 MT; Pony fish, 65,200 MT; Yellowfin tuna, 59,200 MT; Skipjack tuna, 51,300 MT; Threadfin bream, 41,300 MT; Eastern little tuna, 40,300 MT; Selar scad, Jack-cavalla-trevally, Indian mackerel, and Round herring, means at the 30,000 MT level; Squid, Indo-Pacific mackerel, Grouper, and Goatfish, 20,000 MT level; Penaeid prawn, Fusilier, Blue swimming crab, Narrow-barred king mackerel, Non-penaeid prawn, and Lizard fish, 10,000 MT level; and Drum and croaker, Trash fish, Shark, and Miscellaneous fish, less than 1,000 MT.

In 1989, the catch of Round scad accounted for 13.8% (209,800 MT) of the total; followed by Sardine, 8.1% (122,500 MT); Anchovy, 8.0% (122,300 MT); Frigate tuna, 7.7% (117,500 MT); Skipjack tuna, 4.3% (64,700 MT); Pony fish, 4.2% (63,500 MT); Yellowfin tuna, 4.1% (62,100 MT); Eastern little tuna, 3.8% (57,900 MT); Indian mackerel, 3.4% (51,700 MT); Threadfin bream, 2.8% (43,100 MT); Selar scad, 2.5% (38,600 MT); Jack-cavalla-trevally, 2.5% (37,300 MT); and Round herring, 2.1% (32,100 MT).

Provisional estimation of potential yield

This part shows the maximum catch, estimated maximum potential, the latest three year mean of the catch and their related figures in the Philippines between 1976 and 1989 (Table 27).

Fishery resources in the Philippines, showed under-exploitation by a total of 27,700 MT by 1989. Among the 27 major species groups, 10 species groups showed overexploitation, but the other 17 major species groups; Yellowfin tuna, Sardine, Round herring,

Miscellaneous fish, Penaeid prawn, Lizard fish, Selar scad, Trash fish, Blue swimming crab, Non-penaeid prawn, Drum and croaker, Pony fish, Fusilier, Indo-Pacific mackerel, Threadfin bream, Shark, and Round scad; still have some potential for increased catch. The species groups which showed the strongest overexploitation were Frigate tuna estimated at 23,200 MT; Anchovy, 21,200 MT; Indian mackerel, 10,100 MT; Jack-cavalla-trevally, 6,200 MT; Eastern little tuna, 5,500 MT; Squid, 2,900 MT; Skipjack tuna, 2,500 MT; Narrow-barred king mackerel, 2,000 MT; Grouper; and Goatfish.

With better fisheries resources management than in the past, there is the potential for an increased catch of 398,400 MT bringing the total future catch for the Philippines to 1,853,500 MT.

3.2.8 Singapore

Total catch

Marine capture fishery production in Singapore from 1976 to 1989 is shown in Table 28. The total catch in Singapore was 15,800 MT in 1976 and remained constant until 1981, then it increased to 18,800 MT in 1982 and peaked at 25,000 MT in 1984. After 1984, the total catch in Singapore showed a decreasing trend to 10,600 MT in 1989.

Catch by species group

Marine catch for 15 major species groups from 1976 to 1989 in Singapore is shown in Table 29. An analysis of the mean value of the catch over the 14 years shows: Trash fish was the most dominant, ranging between 1,130 MT (1989) and 3,430 MT (1976) with a 14 year mean of 2,520 MT; followed by Fusilier, ranging between 340 MT (1989) and 3,340 MT (1977) with a mean of 1,960 MT; Miscellaneous fish, between 850 MT (1983) and 3,200 MT (1976) with a mean of 1,420 MT; Penaeid prawn, a mean of 1,290 MT; Threadfin bream, 600 MT; Yellowfin tuna, 560 MT; Ray, 480 MT; Selar scad, and Drum and croaker, 470 MT; Goatfish, 420 MT; Squid, Shark, Anchovy, and Sardine, means at the 300 MT level; and Indian mackerel, 210 MT.

In 1989, the catch of Trash fish accounted for 10.7% (1,130 MT) of the total; followed by Miscellaneous fish, 9.2% (970 MT); Penaeid prawn, 7.0% (740 MT); Anchovy, 4.3% (460 MT); Drum and croaker, 4.1% (440 MT); Ray, 4.1% (430 MT); Threadfin bream, 3.9% (410 MT); Selar scad, 3.4% (360 MT); Fusilier, 3.2% (340 MT); and Sardine, 3.1% (320 MT).

Provisional estimation of potential yield

This part shows the maximum catch, estimated maximum potential, the latest three year mean of the catch and their related figures in Singapore between 1976 and 1989 (Table 30).

Fishery resources in Singapore, as summarized, showed underexploitation by a total of 7,900 MT by 1989. Among the 15 major species group, only one species group showed overexploitation, and the other 14 major species groups; Fusilier, Trash fish, Miscellaneous fish, Yellowfin tuna, Penaeid prawn, squid, Goat fish, Threadfin bream, Indian mackerel, Selar scad, Ray, Sardine, Shark, and Anchovy; still have potential for increased catch. The species group which showed overexploitation was Drum and croaker; this was estimated at 76 MT.

However, with better management than before an increased catch of 13,200 MT is possible, giving Singapore a potential total catch of 26,100 MT.

3.2.9 Thailand

Total catch

Marine capture fishery production in Thailand from 1976 to 1989 is shown in Table 31. The total catch in Thailand was recorded at 1,388,200 MT in 1976, and showed a dramatic increase to 1,916,000 MT in 1977, but decreased slightly to 1,544,400 MT in 1980. The total catch increased again from 1981, when it was 1,756,900 MT, reaching 1,949,700 MT in 1982, then remaining constant until 1985. After that the annual total catch was over 2,000,000 MT until 1989 with a peak of 2,540,100 MT in 1987.

Catch by type of fishing gear

Marine catch by type of fishing gear from 1977 to 1989 in Thailand is shown in Table 32. The Trawl catch, the most dominant over the 13 years, was 1,247,000 MT in 1977, but then decreased slightly to 1,055,200 MT in 1980 where it remained constant until 1985. The catch increased again to 1,308,400 MT in 1989 with a peak of 1,399,800 MT in 1987. The mean value of the Trawl catch over the 13 years was 1,165,100 MT, ranging between 1,002,400 MT (1985) and 1,399,800 MT (1987).

The Trawl catch accounted for 55.2% (1,308,400 MT) of the total in 1989; followed by Surrounding net, 28.4% (674,100 MT); Gill net, 5.7% (134,500 MT); Trap, 1.2% (27,300 MT); Push net, 0.6% (13,600 MT); Hook-and-line, 0.3% (7,100 MT); and others, 8.7% (205,800 MT).

Catch by species group

Marine catch for 24 major species groups from 1976 to 1989 in Thailand is shown in Table 33. An analysis of the mean value of the catch over the 14 years showed: Trash fish was the most dominant, ranging between 620,600 MT (1976) and 1,105,700 MT (1987) with a 14 year mean of 845,800 MT; followed by Sardine, ranging between 97,700 MT (1985) and 214,100 MT (1977) with a mean of 131,900 MT; Non-penaeid prawn, ranging between 69,300 MT (1979) and 151,600 MT (1982) with a mean of 101,700 MT; Miscellaneous fish, a mean of 95,700 MT; Indo-Pacific mackerel, 87,500 MT; Squid, 59,400 MT; Jellyfish, 51,900 MT; Round scad, 51,500 MT; Miscellaneous marine molluscs, 48,600 MT; Anchovy, 45,500 MT; Longtail tuna, 44,700 MT; Cuttlefish, 40,200 MT; Indian mackerel, Jack-cavalla-trevally, and Sea mussel, means of 30,000 MT level; Blue swimming crab, Eastern little tuna, Threadfin bream, Penaeid prawn, and Selar scad, 20,000 MT level; and Bigeye snapper, Hardtail scad, Drum and croaker, and Narrow-barred king mackerel, 10,000 MT level.

In 1989, the catch of Trash fish accounted for 41.4% (980,300 MT) of the total; followed by Sardine, 6.1% (145,000 MT); Indo-Pacific mackerel, 5.1% (121,000 MT); Miscellaneous fish, 4.4% (103,900 MT); Non-penaeid prawn, 4.1% (97,900 MT); Anchovy, 4.1% (97,100 MT); Longtail tuna, 3.5% (82,100 MT); Squid, 2.9% (69,800 MT); Cuttlefish, 2.4% (57,000 MT); Jack-cavalla-trevally, 2.3% (53,800 MT); and Eastern little tuna, 2.0% (47,500 MT).

Provisional estimation of potential yield

This part shows the maximum catch, estimated maximum potential, the latest three year mean of the catch and their related figures in Thailand between 1976 and 1989 (Table 34).

Fishery resources in Thailand, as summarized, showed overexploitation by a total of 185,300 MT by 1989. Among the 24 major species groups, 13 major species groups showed overexploitation, but the other 11 major species groups; Jellyfish, Round scad, Sea mussel, Penaeid prawn, Sardine, Anchovy, Non-penaeid prawn, Indian mackerel, Bigeye snapper, Cuttlefish, and Selar scad; still have some potential for increased catch. The species groups which showed the strongest overexploitation were Trash fish, estimated at 318,700 MT; followed by Miscellaneous fish, 32,800 MT; Miscellaneous marine molluscs, 28,900 MT; Blue swimming crab, 8,900 MT; Threadfin bream, 8,800 MT; Squid, 7,000 MT; Longtail tuna, 6,600 MT; Indo-Pacific mackerel, 5,500 MT; Eastern little tuna, 4,800 MT; Jack-cavalla-trevally, 4,100 MT; Narrow-barred king mackerel; 3,500 MT; Drum and croaker, 2,500 MT; and Hardtail scad, 2,400 MT.

On the other hand, with good management of fisheries resources, there is the potential for increased catch of 383,300 MT giving Thailand a total possible catch of 2,842,700 MT.

3.2.10 Viet Nam

Total catch

Marine capture fishery production in Viet Nam from 1976 to 1989 is shown in Table 35. The total catch in Viet Nam was 837,200 MT from 1976 to 1978, then it decreased drastically to 415,000 MT in 1979 and remained constant until 1982. The total catch increased again to 552,600 MT in 1983, was recorded at 582,100 MT in 1986, and reached 618,000 MT in 1989.

4. References of Data Examined

- SEAFDEC. (1978). Fishery Statistical Bulletin for the South China Sea Area 1976. Southeast Asian Fisheries Development Center, Thailand. SEAFDEC SEC/ST/1; 172 p.
- SEAFDEC. (1979). Fishery Statistical Bulletin for the South China Sea Area 1977. Southeast Asian Fisheries Development Center, Thailand. SEAFDEC SEC/ST/2; 162 p.
- SEAFDEC. (1980). Fishery Statistical Bulletin for the South China Sea Area 1978. Southeast Asian Fisheries Development Center, Thailand. SEAFDEC SEC/ST/4; 200 p.
- SEAFDEC. (1981). Fishery Statistical Bulletin for the South China Sea Area 1979. Southeast Asian Fisheries Development Center, Thailand. SEAFDEC SEC/ST/5; 201 p.
- SEAFDEC. (1982). Fishery Statistical Bulletin for the South China Sea Area 1980. Southeast Asian Fisheries Development Center, Thailand. SEAFDEC SEC/ST/6; 227 p.
- SEAFDEC. (1983). Fishery Statistical Bulletin for the South China Sea Area 1981. 227 p., and Catch-Effort Statistics for the South China Sea Area 1981. 47 p. Southeast Asian Fisheries Development Center, Thailand. SEAFDEC SEC/ST/10; 274 p.
- SEAFDEC. (1984). Fishery Statistical Bulletin for the South China Sea Area 1982. p. 1-227., and Catch-Effort Statistics for the South China Sea Area 1982. p. 228-268. Southeast Asian Fisheries Development Center, Thailand. SEAFDEC SEC/ST/11; 268 p.

- SEAFDEC. (1985). Fishery Statistical Bulletin for the South China Sea Area 1983. p. 1-234., and Catch-Effort Statistics for the South China Sea Area 1983. p. 235-275. Southeast Asian Fisheries Development Center, Thailand. SEAFDEC SEC/ST/12; 275 p.
- SEAFDEC. (1986). Fishery Statistical Bulletin for the South China Sea Area 1984. Southeast Asian Fisheries Development Center, Thailand. SEAFDEC SEC/ST/13; 231 p.
- SEAFDEC. (1987). Fishery Statistical Bulletin for the South China Sea Area 1985. Southeast Asian Fisheries Development Center, Thailand. SEAFDEC SEC/ST/14; 178 p.
- SEAFDEC. (1988). Fishery Statistical Bulletin for the South China Sea Area 1986. Southeast Asian Fisheries Development Center, Thailand. SEAFDEC SEC/ST/16; 175 p.
- SEAFDEC. (1989). Fishery Statistical Bulletin for the South China Sea Area 1987. Southeast Asian Fisheries Development Center, Thailand. SEAFDEC SEC/ST/18; 162 p.
- SEAFDEC. (1990). Fishery Statistical Bulletin for the South China Sea Area 1988. Southeast Asian Fisheries Development Center, Thailand. SEAFDEC SEC/ST/20; 183 p.
- SEAFDEC. (1992). Fishery Statistical Bulletin for the South China Sea Area 1989. Southeast Asian Fisheries Development Center, Thailand. SEAFDEC SEC/ST/22; 169 p.

Table 1. Marine capture fishery production of ten countries
in the Southeast Asian Region from 1976 to 1989.

(MT)

Country\Year	1976	1977	1978	1979	1980	1981	1982
Brunei	2,007	2,577	2,662	2,793	3,584	3,455	3,462
Taiwan	672,511	712,680	718,270	742,998	758,625	707,037	703,257
Hong Kong	151,052	153,440	155,943	182,484	186,753	174,558	171,985
Indonesia	1,081,589	1,154,000	1,227,386	1,272,565	1,317,744	1,404,276	1,490,300
Kampuchea	10,800	10,800	10,800	8,000	7,000	6,000	5,500
Malaysia	483,239	569,696	626,912	629,959	612,397	686,446	627,001
Philippines	1,127,342	1,230,679	1,281,772	1,238,334	1,250,883	1,204,757	1,234,289
Singapore	15,776	14,352	15,635	15,906	15,532	15,620	18,830
Thailand	1,388,239	1,915,999	1,837,807	1,690,380	1,544,434	1,756,939	1,949,681
Vietnam	837,200	837,200	837,200	415,000	423,000	427,000	440,000
Total	5,769,755	6,601,423	6,714,387	6,198,419	6,119,952	6,386,088	6,644,305

(continued)

Country\Year	1983	1984	1985	1986	1987	1988	1989
Brunei	4,964	5,165	5,480	4,272	2,050	1,548	1,826
Taiwan	687,291	355,134	342,830	328,889	331,518	367,328	383,592
Hong Kong	180,682	191,807	190,743	205,476	218,532	228,083	233,578
Indonesia	1,682,019	1,712,804	1,821,725	1,922,781	2,017,350	2,169,557	2,272,179
Kampuchea	5,100	5,500	6,000	6,500	6,500	6,500	6,500
Malaysia	686,463	600,473	574,354	563,459	858,807	823,240	874,441
Philippines	1,290,304	1,303,310	1,297,119	1,353,505	1,407,439	1,438,361	1,519,507
Singapore	19,099	25,042	22,761	20,279	15,096	13,151	10,568
Thailand	2,055,225	1,911,485	1,997,165	2,309,480	2,540,052	2,337,216	2,370,548
Vietnam	552,608	553,029	576,860	582,077	620,404	624,000	618,000
Total	7,163,755	6,663,749	6,835,037	7,296,718	8,017,748	8,008,984	8,290,739

Table 2. Catch by type of fishing gear in the Southeast Asian Region from 1977 to 1989. Data from six countries; Taiwan, Hong Kong, Indonesia, Malaysia, the Philippines and Thailand.

							(MT)
Gear\Year	1977	1978	1979	1980	1981	1982	1983
Surrounding net	32,842	524,131	739,605	256,240	410,884	373,073	271,419
Sein net	799,134	313,575	76,660	547,141	456,049	483,284	1,274,425
Trawl	2,161,237	2,152,122	1,862,847	1,739,996	1,743,176	1,798,243	1,829,321
Gill net	153,554	474,014	436,276	440,351	514,836	469,870	936,433
Lift net	19,376	176,867	161,926	214,159	195,294	173,758	397,179
Trap	138,424	73,284	103,124	68,558	82,819	103,882	252,791
Hook-and-line	230,193	469,809	366,845	359,000	385,548	427,678	711,190
Push net	10,523	7,055	14,346	13,989	14,409	10,380	20,397
Shellfish c. g.	2,097	66,451	11,041	2,121	2,231	7,356	62,028
Others	881,674	363,396	439,652	771,215	724,491	860,920	826,348
Total	4,429,054	4,620,704	4,212,322	4,412,770	4,529,737	4,708,444	6,581,531

(continued)

Gear\Year	1984	1985	1986	1987	1988	1989
Surrounding net	1,015,443	1,115,731	1,113,679	1,590,977	1,589,698	1,269,600
Sein net	150,989	239,987	121,891	432,243	461,568	315,091
Trawl	1,720,434	1,694,161	2,030,985	2,379,858	2,167,343	2,132,198
Gill net	487,678	507,133	543,223	1,077,636	1,044,870	831,097
Lift net	167,922	188,024	138,416	383,100	405,505	284,513
Trap	104,212	152,359	98,186	281,573	305,811	244,234
Hook-and-line	443,783	463,610	523,188	870,616	756,885	505,421
Push net	16,144	41,509	31,457	39,116	27,546	15,576
Shellfish c. g.	4,359	16,045	14,227	159,048	134,963	121,642
Others	649,990	425,169	642,961	755,837	469,596	414,966
Total	4,760,954	4,843,728	5,258,213	7,970,004	7,363,785	6,134,338

Shellfish c. g., Shellfish and seaweed collecting gear.

Data was not available from Indonesia in 1977-1982, 1984 - 1986, and from the Philippines in 1989.

Table 3. Catch by species group in the Southeast Asian Region from 1976 to 1989. Data from seven countries; Taiwan, Hong Kong, Indonesia, Malaysia, the Philippines, Singapore and Thailand.

Species\Year	(MT)						
	1976	1977	1978	1979	1980	1981	1982
Trash fish	764,434	1,007,880	1,017,085	974,460	957,945	962,897	965,840
Miscellaneous fish	535,386	506,203	378,829	448,611	429,362	385,457	391,390
Sardine	308,582	474,520	458,211	296,444	380,119	458,195	458,882
Round scad	405,339	419,743	283,006	203,526	192,565	285,981	326,359
Anchovy	177,331	153,769	234,074	130,740	229,182	226,588	251,060
Non-penaeid prawn	168,136	247,189	262,557	153,217	225,793	258,850	340,007
Indian mackerel	83,824	83,035	123,976	88,796	138,476	216,739	210,833
Penaeid prawn	164,825	148,981	185,529	164,375	139,360	202,671	203,453
Eastern little tuna	99,009	132,571	101,396	35,777	106,080	136,091	160,555
Squid	112,756	119,983	133,044	108,441	112,993	132,283	146,759
Indo-Pacific mackerel	156,345	137,334	152,787	108,962	161,167	91,632	111,830
Selar scad	100,989	116,937	157,206	84,948	163,420	155,782	126,801
Skipjack tuna	80,041	90,612	101,626	62,692	98,042	111,012	117,987
Threadfin bream	96,184	99,444	95,630	84,300	93,133	93,538	84,445
Yellowfin tuna	58,469	89,360	100,534	83,347	99,241	107,441	96,592
Pony fish	105,565	101,520	105,357	74,134	103,036	93,246	97,336
Jack-cavalla-trevally	65,082	71,776	118,366	57,774	105,841	79,927	69,711
Frigate tuna	30,374	75,883	50,913	84,477	98,489	80,861	71,829
Drum and croaker	71,711	86,118	68,462	53,206	81,459	76,709	82,123
Narrow-barred king mackerel	62,168	67,451	65,277	57,295	69,861	86,467	83,835
Shark	88,214	83,119	59,909	30,373	60,185	69,481	67,150
Jellyfish	29,680	96,502	65,739	55,393	6,127	34,830	116,378
Others	1,155,304	1,340,916	1,544,212	2,331,338	1,634,492	1,602,955	1,614,188
Total	4,919,748	5,750,846	5,863,725	5,772,626	5,686,368	5,949,633	6,195,343

(continued)

Species\Year	(MT)						
	1983	1984	1985	1986	1987	1988	1989
Trash fish	958,379	877,102	899,554	1,118,524	1,339,000	1,173,326	1,255,397
Miscellaneous fish	616,705	693,011	689,646	547,426	597,103	696,124	666,404
Sardine	508,209	253,491	207,796	405,460	447,121	486,179	539,523
Round scad	321,435	344,189	365,923	414,686	445,607	403,275	464,285
Anchovy	276,869	325,991	339,458	290,658	314,028	344,918	372,251
Non-penaeid prawn	263,281	246,685	264,586	313,245	327,969	174,617	247,920
Indian mackerel	278,913	268,438	282,846	257,197	275,568	262,679	289,693
Penaeid prawn	188,294	167,101	169,086	191,351	161,866	271,066	211,047
Eastern little tuna	196,930	194,722	207,949	215,321	223,775	234,055	245,052
Squid	159,070	194,385	207,796	220,804	139,293	145,964	152,039
Indo-Pacific mackerel	113,362	166,561	159,900	143,762	154,887	175,793	180,185
Selar scad	146,743	148,408	147,322	133,901	153,889	169,914	186,475
Skipjack tuna	149,910	144,523	168,190	204,831	196,529	184,751	180,571
Threadfin bream	86,195	94,040	95,992	115,436	135,193	144,127	140,558
Yellowfin tuna	115,631	86,298	89,313	124,754	132,861	118,510	141,022
Pony fish	97,982	106,608	107,132	106,748	99,946	108,553	107,793
Jack-cavalla-trevally	82,934	85,219	112,357	112,265	121,140	122,511	118,415
Frigate tuna	80,368	87,689	99,375	91,887	102,770	123,041	133,709
Drum and croaker	78,748	88,247	83,267	74,074	89,628	91,658	89,636
Narrow-barred king mackerel	91,935	78,940	77,002	90,268	94,447	93,008	94,963
Shark	70,104	98,837	103,999	104,461	102,520	65,211	72,350
Jellyfish	221,445	26,230	42,410	94,425	74,092	56,592	67,544
Others	1,497,641	1,723,085	1,767,545	1,829,788	2,256,531	1,731,064	1,707,581
Total	6,601,083	6,499,800	6,688,444	7,201,272	7,985,763	7,376,936	7,664,413

Table 4. Summary table of the estimated potentials in the Southeast Asian Region on the basis of the catch from 1976 to 1989.

(MT)						
Country	Maximum catch	(A) Estimated max. potent.	(B) A*0.8	(C) 3-Year mean	A-C	B-C
Brunei	5,480	5,480	4,384	1,808	3,672	2,576
Taiwan	383,592	383,592	306,874	360,813	22,779	-53,939
Hong Kong	273,079	260,508	208,406	226,731	33,777	-18,325
Indonesia	2,704,589	2,523,386	2,018,709	2,158,045	365,341	-139,336
Kampuchea	10,800	10,800	8,640	6,500	4,300	2,140
Malaysia	1,096,477	984,282	787,426	852,160	132,122	-64,734
Philippines	1,836,806	1,853,460	1,482,768	1,455,102	398,358	27,666
Singapore	29,527	26,090	20,872	12,939	13,151	7,933
Thailand	3,202,414	2,842,688	2,274,150	2,459,432	383,256	-185,282
Vietnam	837,200	837,200	669,760	620,801	216,399	48,959
Total	10,379,964	9,727,486	7,781,989	8,154,331	1,573,155	-372,342

Table 5. The balance between the estimated potential yield and the latest three-year-mean of the catch.

(MT)											
Species group	Brunei	Taiwan	Hong Kong	Indonesia	Kampuchea	Malaysia	Philippines	Singapore	Thailand	Vietnam	Total
Trash fish	-	-	-	-	-	-64,170	6,772	1,345	-318,655	-	-374,708
Miscellaneous fish	-	-	-15,586	71,028	-	-1,977	11,206	1,339	-32,839	-	33,171
Sardine	-	-	2,527	-58,162	-	-694	15,065	50	18,307	-	-22,907
Round scad	-	-	4,065	9,674	-	-1,910	252	-	52,143	-	64,224
Anchovy	-	-	-	-33,877	-	1,158	-21,172	8	14,002	-	-39,881
Non-penaeid prawn	-	-	-	22,195	-	9,538	5,536	-	8,907	-	46,176
Indian mackerel	-	-	-	-30,027	-	11,623	-10,128	146	5,484	-	-22,902
Penaeid prawn	-	-	-2,165	-10,473	-	-3,945	9,239	334	19,621	-	12,611
Eastern little tuna	-	-	-	-31,256	-	2,589	-5,524	-	-4,828	-	-39,019
Squid	-	-	764	-4,013	-	-3,400	-2,925	261	-6,951	-	-16,264
Indo-Pacific mackerel	-	-	-	55,216	-	60	2,156	-	-5,485	-	51,947
Selar scad	-	-	-	-20,821	-	6,560	7,847	115	715	-	-5,584
Skipjack tuna	-	-	-	-17,886	-	-	-2,474	-	-	-	-20,360
Threadfin bream	-	-	-4,889	-3,059	-	17	1,066	204	-8,814	-	-15,475
Yellowfin tuna	-	-	-	3,658	-	-	19,913	753	-	-	24,324
Pony fish	-	-	-	-8,711	-	-	2,832	-	-	-	-5,879
Jack-cavalla-trevally	-	-	496	20,793	-	1,313	-6,191	-	-4,113	-	12,298
Frigate tuna	-	-	-	-	-	-	-23,170	-	-	-	-23,170
Drum and croaker	-	-	-140	-3,851	-	-1,130	3,420	-76	-2,455	-	-4,232
Narrow-b. k. mackerel	-	-	-652	-13,690	-	2,202	-2,025	-	-3,455	-	-17,620
Shark	-	-	447	-7,824	-	512	430	42	-	-	-6,393
Jellyfish	-	-	-	8,517	-	-208	-	-	115,678	-	123,987
Others	2,576	-53,939	-3,192	-86,767	2,140	-22,872	15,541	3,412	-32,544	48,959	-126,666
Total	2,576	-53,939	-18,325	-139,336	2,140	-64,734	27,666	7,933	-185,282	48,959	-372,342

Table 6. The balance between the estimated maximum potential yield and the latest three-year-mean of the catch.

											(MT)
Species group	Brunei	Taiwan	Hong Kong	Indonesia	Kampuchea	Malaysia	Philippines	Singapore	Thailand	Vietnam	Total
Trash fish	-	-	-	-	-	-22,495	10,868	2,027	-144,810	-	-154,410
Miscellaneous fish	-	-	6,283	172,745	-	7,369	14,752	1,950	-10,657	-	192,442
Sardine	-	-	3,347	-18,550	-	4,893	45,295	140	55,882	-	91,007
Round scad	-	-	6,128	46,955	-	8,753	48,058	-	75,804	-	185,698
Anchovy	-	-	-	-12,905	-	9,009	3,285	141	36,188	-	35,718
Non-penaeid prawn	-	-	-	46,025	-	18,092	10,943	-	36,296	-	111,356
Indian mackerel	-	-	-	-4,664	-	30,031	-481	224	15,256	-	40,366
Penaeid prawn	-	-	852	4,108	-	12,587	15,968	671	28,225	-	62,411
Eastern little tuna	-	-	-	-7,744	-	4,479	6,520	-	5,438	-	8,693
Squid	-	-	2,003	-1,612	-	1,812	3,169	394	9,014	-	14,780
Indo-Pacific mackerel	-	-	-	70,900	-	835	9,108	-	22,467	-	103,310
Selar scad	-	-	-	-5,842	-	15,682	19,026	263	6,415	-	35,544
Skipjack tuna	-	-	-	6,305	-	-	13,103	-	-	-	19,408
Threadfin bream	-	-	-844	-137	-	6,322	12,403	384	-2,904	-	15,224
Yellowfin tuna	-	-	-	17,051	-	-	39,142	1,032	-	-	57,225
Pony fish	-	-	-	-928	-	-	19,452	-	-	-	18,524
Jack-cavalla-trevally	-	-	794	30,438	-	4,438	2,860	-	7,016	-	45,546
Frigate tuna	-	-	-	-	-	-	-2,211	-	-	-	-2,211
Drum and croaker	-	-	1,706	2,199	-	2,136	6,744	27	487	-	13,299
Narrow-b. k. mackerel	-	-	185	-6,058	-	5,395	1,598	-	-681	-	439
Shark	-	-	783	548	-	1,814	2,388	134	-	-	5,667
Jellyfish	-	-	-	13,164	-	7,490	-	-	150,830	-	171,484
Others	3,672	22,779	12,540	13,343	4,300	13,480	116,368	5,764	92,990	216,399	501,635
Total	3,672	22,779	33,777	365,341	4,300	132,122	398,358	13,151	383,256	216,399	1,573,155

Table 7. Marine capture fishery production from 1976 to 1989 - Brunei.

(MT)							
Country\Year	1976	1977	1978	1979	1980	1981	1982
Brunei	2,007	2,577	2,662	2,793	3,584	3,455	3,462
Year	1983	1984	1985	1986	1987	1988	1989
	4,964	5,165	5,480	4,272	2,050	1,548	1,826
							3,275

Table 8. Marine capture fishery production from 1976 to 1989 - Taiwan.

(MT)							
Country\Year	1976	1977	1978	1979	1980	1981	1982
Taiwan	672,511	712,680	718,270	742,998	758,625	707,037	703,257
Year	1983	1984	1985	1986	1987	1988	1989
	687,291	355,134	342,830	328,889	331,518	367,328	383,592
							557,997

Catches from 1976 to 1983 include outside the South China Sea Area.

Table 9. Catch by type of fishing gear from 1977 to 1989 - Taiwan

(MT)							
Gear\Year	1977	1978	1979	1980	1981	1982	1983
Surrounding net	65	41,105	46,256	13	27	4	87
Seine net	44,318	3,774	1,459	61,734	41,899	54,342	53,838
Trawl	392,522	201,375	95,927	82,704	99,413	138,626	132,587
Gill net	24,425	25,485	17,252	15,675	17,142	31,320	30,137
Lift net	0	0	0	0	0	0	0
Trap	0	2,841	1,944	0	0	0	0
Hook-and-line	192,758	171,737	124,510	114,766	106,759	169,479	173,172
Push net	0	0	0	2,026	0	0	0
Shellfish c. g.	-	-	-	-	-	-	-
Others	58,592	271,953	455,650	481,707	441,797	309,486	297,470
Total	712,680	718,270	742,998	758,625	707,037	703,257	687,291

(continued)

Gear\Year	1984	1985	1986	1987	1988	1989
Surrounding net	20	85,541	85,431	86,623	73,515	56,829
Seine net	62,766	153,013	1,732	1,943	1,005	1,899
Trawl	157,167	162,650	179,530	202,471	142,028	146,920
Gill net	32,411	35,563	84,355	115,393	41,087	44,681
Lift net	0	28,759	0	0	0	0
Trap	0	8,094	0	0	11,001	8,114
Hook-and-line	171,491	172,505	195,706	204,626	67,759	49,190
Push net	0	0	0	0	0	0
Shellfish c. g.	-	-	-	-	-	-
Others	331,024	138,452	279,538	317,431	30,933	75,959
Total	754,879	784,577	826,292	928,487	367,328	383,592

Shellfish c. g., Shellfish and seaweed collecting gear.

Catches from 1977 to 1987 include outside the South China Sea Area.

Table 10. Catch by species group from 1976 to 1989 - Taiwan.

(MT)							
Species\Year	1976	1977	1978	1979	1980	1981	1982
Miscellaneous fish	194,203	176,493	0	271,833	0	0	0
Non-penaeid prawn	58,764	61,443	66,469	76,730	0	64,525	65,208
Albacore	53,003	70,151	64,868	59,004	56,557	49,953	66,622
Squid	22,975	16,836	17,482	16,944	20,088	28,077	27,862
Shark	53,892	50,270	21,883	15,040	25,454	20,719	24,409
Yellowfin tuna	22,242	27,157	30,999	34,123	31,912	25,522	23,564
Cuttlefish	14,036	15,748	15,984	29,986	26,466	31,148	59,761
Hardtail scad	11,862	15,155	14,011	27,458	26,845	18,592	21,995
Skipjack tuna	23,597	4,631	33,474	17,569	23,995	19,020	20,027
Hairtail	20,832	19,714	5,144	5,703	6,435	19,685	16,290
Drum and croaker	18,056	18,822	2,639	20,733	23,657	21,310	16,908
Lizard fish	22,784	24,045	17,543	23,094	19,963	13,913	14,487
King mackerel	15,926	14,063	10,839	0	14,768	11,616	11,495
Bigeye tuna	8,018	11,546	10,737	12,056	14,044	10,490	9,571
Sardine	9,427	11,136	8,219	10,076	8,041	8,405	8,365
Frigate tuna	2,046	32,876	1,598	4,568	1,615	2,613	4,466
Eastern little tuna	10,172	9,487	5,493	5,233	7,026	4,938	7,826
Penaeid prawn	3,262	2,788	3,266	2,904	3,529	2,502	3,941
Anchovy	12,604	6,719	2,936	2,327	1,889	4,557	5,052
Others	94,810	123,600	384,686	107,617	446,341	349,452	295,408
Total	672,511	712,680	718,270	742,998	758,625	707,037	703,257

(continued)

Species\Year	1983	1984	1985	1986	1987	1988	1989
Miscellaneous fish	192,740	0	0	0	0	79,332	68,572
Non-penaeid prawn	72,589	83,370	84,014	82,725	82,334	47,166	44,526
Albacore	58,352	56,066	66,530	93,914	81,746	44	504
Squid	25,874	82,591	94,216	98,440	0	11,333	4,638
Shark	21,576	45,703	53,206	44,080	48,109	8,588	7,771
Yellowfin tuna	27,038	26,957	20,345	27,379	40,217	17,922	12,417
Cuttlefish	52,456	21,376	23,267	14,605	0	4,398	5,889
Hardtail scad	23,558	25,338	26,538	32,301	34,021	25,046	0
Skipjack tuna	15,962	19,113	20,170	29,268	20,203	1,268	2,073
Hairtail	19,552	27,015	29,611	22,215	17,110	12,066	22,373
Drum and croaker	21,295	23,784	20,293	2,892	19,377	11,618	16,823
Lizard fish	13,819	12,476	10,154	11,515	9,607	2,332	2,625
King mackerel	9,681	10,424	12,315	11,225	11,518	0	0
Bigeye tuna	15,261	13,880	15,126	16,859	17,824	1,455	375
Sardine	10,615	11,171	16,379	12,860	12,627	11,684	12,828
Frigate tuna	6,149	7,384	3,650	4,662	4,738	17,463	15,107
Eastern little tuna	8,769	10,299	13,051	7,689	12,897	108	205
Penaeid prawn	5,677	5,092	4,920	4,704	5,097	3,957	5,363
Anchovy	3,979	2,917	1,158	877	973	774	2,092
Others	82,349	269,923	269,634	308,082	510,089	110,774	159,411
Total	687,291	754,879	784,577	826,292	928,487	367,328	383,592

Catches from 1976 to 1987 include outside the South China Sea Area.

Table 11. Marine capture fishery production from 1976 to 1989 - Hong Kong.

							(MT)
Country\Year	1976	1977	1978	1979	1980	1981	1982
Hong Kong	151,052	153,440	155,943	182,484	186,753	174,558	171,985
Year	1983	1984	1985	1986	1987	1988	1989
	180,682	191,807	190,743	205,476	218,532	228,083	233,578
							187,508

Table 12. Catch by type of fishing gear from 1978 to 1989 - Hong Kong.

(MT)							
Gear\Year	1977	1978	1979	1980	1981	1982	1983
Surrounding net	-	0	0	0	0	0	0
Seine net	-	6,278	8,038	7,824	5,310	5,530	5,926
Trawl	-	110,500	126,627	132,113	123,315	119,340	128,029
Gill net	-	19,949	23,451	22,488	21,272	20,537	21,611
Lift net	-	-	-	-	-	-	-
Trap	-	-	-	-	-	-	-
Hook-and-line	-	11,436	14,634	13,316	12,988	12,454	12,507
Push net	-	-	-	-	-	-	-
Shellfish c. g.	-	-	-	-	-	-	-
Others	-	7,780	9,734	11,012	11,673	14,124	12,609
Total	-	155,943	182,484	186,753	174,558	171,985	180,682

(continued)

Gear\Year	1984	1985	1986	1987	1988	1989
Surrounding net	0	6,557	7,417	7,124	7,300	10,360
Seine net	6,362	0	0	0	0	0
Trawl	135,370	139,765	153,145	162,442	171,918	174,832
Gill net	23,755	21,347	20,530	20,289	19,396	16,975
Lift net	-	-	-	-	-	-
Trap	-	-	-	-	-	-
Hook-and-line	13,927	11,866	12,326	13,042	13,296	12,994
Push net	-	-	-	-	-	-
Shellfish c. g.	-	-	-	-	-	-
Others	12,393	11,208	12,058	15,635	16,173	18,417
Total	191,807	190,743	205,476	218,532	228,083	233,578

Shellfish c. g., Shellfish and seaweed collecting gear.

Table 13. Catch by species group from 1976 to 1989 - Hong Kong.

Species\Year	(MT)						
	1976	1977	1978	1979	1980	1981	1982
Miscellaneous fish	42,194	46,657	52,282	60,184	74,948	65,026	69,726
Threadfin bream	13,426	13,796	15,030	18,713	16,785	14,883	13,136
Penaeid prawn	13,575	12,086	10,595	16,307	13,276	11,858	10,997
Bigeye snapper	9,185	6,630	6,823	11,743	14,328	15,055	15,252
Lizard fish	6,049	8,185	7,107	8,603	7,592	7,869	7,189
Round scad	9,726	9,166	9,951	8,246	9,168	7,660	7,255
Drum and croaker	4,530	5,344	5,884	6,280	5,923	5,726	5,662
Sharp-toothed pike, conger eel	4,700	5,032	5,973	4,903	4,291	4,695	4,127
Squid	6,089	4,202	5,002	6,139	4,104	5,407	5,164
Miscellaneous marine molluscs	2,294	1,600	1,148	1,931	2,904	4,689	3,692
Hairtail	5,294	4,048	3,277	2,652	2,383	2,897	3,422
Narrow-barred king mackerel	3,600	0	3,211	3,058	2,136	2,525	2,693
Black pomfret	1,674	1,657	2,753	3,623	3,315	3,089	3,362
Sardine	3,480	4,057	2,489	2,449	1,664	1,452	703
Shark	1,258	1,172	1,118	1,519	1,450	1,787	1,697
Jack-cavalla-trevally	1,377	1,480	969	1,164	1,161	1,107	991
Others	22,601	28,328	22,331	24,970	21,325	18,833	16,917
Total	151,052	153,440	155,943	182,484	186,753	174,558	171,985

(continued)

Species\Year	(MT)						
	1983	1984	1985	1986	1987	1988	1989
Miscellaneous fish	78,003	78,715	80,595	77,255	86,913	106,275	115,999
Threadfin bream	12,371	15,232	15,102	19,256	22,973	21,701	18,536
Penaeid prawn	9,436	11,373	13,293	15,370	15,223	14,617	12,855
Bigeye snapper	13,266	10,150	9,491	12,622	11,397	10,753	15,706
Lizard fish	7,004	9,474	9,361	10,329	10,939	11,962	12,267
Round scad	8,817	8,006	5,682	4,600	4,741	3,871	3,956
Drum and croaker	6,813	9,346	8,730	7,468	6,884	8,115	7,575
Sharp-toothed pike, conger eel	4,173	5,088	4,516	5,285	5,608	4,380	4,947
Squid	4,562	5,533	4,570	4,275	4,526	4,019	4,030
Miscellaneous marine molluscs	5,316	3,784	5,624	6,857	8,114	5,936	3,921
Hairtail	3,233	4,415	4,723	6,002	4,821	3,617	3,832
Narrow-barred king mackerel	2,767	3,290	3,161	3,177	3,490	3,706	4,805
Black pomfret	3,104	3,392	3,845	3,783	3,408	3,243	3,755
Sardine	879	628	327	329	424	1,104	726
Shark	1,325	1,050	906	931	937	980	775
Jack-cavalla-trevally	803	780	597	616	709	835	540
Others	18,810	21,551	20,220	27,321	27,425	22,969	19,353
Total	180,682	191,807	190,743	205,476	218,532	228,083	233,578

Table 14. Estimated potential yield on the basis of the catch from 1976 to 1989 - Hong Kong.

(MT)

Species group	Maximum catch	(A) Estimated max. potent.	(B) A*0.8	(C) 3-year mean	A-C	B-C
Miscellaneous fish	115,999	109,345	87,476	103,062	6,283	-15,586
Threadfin bream	22,973	20,226	16,181	21,070	-844	-4,889
Penaeid prawn	16,307	15,084	12,067	14,232	852	-2,165
Bigeye snapper	15,706	16,165	12,932	12,619	3,546	313
Lizard fish	12,267	10,886	8,709	11,723	-837	-3,014
Round scad	9,951	10,317	8,254	4,189	6,128	4,065
Drum and croaker	9,346	9,231	7,385	7,525	1,706	-140
Sharp-toothed pike, conger eel	5,973	5,683	4,546	4,978	705	-432
Squid	6,139	6,195	4,956	4,192	2,003	764
Miscellaneous marine molluscs	8,114	7,574	6,059	5,990	1,584	69
Hairtail	6,002	5,903	4,722	4,090	1,813	632
Narrow-barred king mackerel	4,805	4,185	3,348	4,000	185	-652
Black pomfret	3,845	3,828	3,062	3,469	359	-407
Sardine	4,057	4,098	3,278	751	3,347	2,527
Shark	1,787	1,680	1,344	897	783	447
Jack-cavalla-trevally	1,480	1,489	1,191	695	794	496
Others	28,328	28,619	22,895	23,249	5,370	-354
Total	273,079	260,508	208,406	226,731	33,777	-18,325

Table 15. Marine capture fishery production from 1976 to 1989 - Indonesia.

(MT)

Country\Year	1976	1977	1978	1979	1980	1981	1982	
Indonesia	1,081,589	1,154,000	1,227,386	1,272,565	1,317,744	1,404,276	1,490,300	
Year	1983	1984	1985	1986	1987	1988	1989	Mean
	1,682,019	1,712,804	1,821,725	1,922,781	2,017,350	2,169,557	2,272,179	1,610,448

Table 16. Catch by type of fishing gear from 1983 to 1989
- Indonesia.

							(MT)
Gear\Year	1977	1978	1979	1980	1981	1982	1983
Surrounding net	-	-	-	-	-	-	0
Seine net	-	-	-	-	-	-	466,153
Trawl	-	-	-	-	-	-	8,902
Gill net	-	-	-	-	-	-	464,510
Lift net	-	-	-	-	-	-	235,924
Trap	-	-	-	-	-	-	151,769
Hook-and-line	-	-	-	-	-	-	266,552
Push net	-	-	-	-	-	-	3,498
Shellfish c. g.	-	-	-	-	-	-	56,198
Others	-	-	-	-	-	-	28,513
Total	-	-	-	-	-	-	1,682,019

(continued)

Gear\Year	1984	1985	1986	1987	1988	1989
Surrounding net	-	-	-	305,814	297,108	378,505
Seine net	-	-	-	269,435	319,493	290,666
Trawl	-	-	-	0	0	0
Gill net	-	-	-	490,070	539,153	562,280
Lift net	-	-	-	241,120	253,228	266,555
Trap	-	-	-	192,471	189,183	191,079
Hook-and-line	-	-	-	347,672	376,284	409,077
Push net	-	-	-	0	0	0
Shellfish c. g.	-	-	-	121,242	119,514	120,858
Others	-	-	-	49,526	75,594	53,159
Total	-	-	-	2,017,350	2,169,557	2,272,179

Shellfish c. g., Shellfish and seaweed collecting gear.

Data was not available from 1977 to 1982, and 1984 to 1986.

Table 17. Catch by species group from 1976 to 1989 - Indonesia.

Species\Year	(MT)						
	1976	1977	1978	1979	1980	1981	1982
Miscellaneous fish	161,261	142,242	182,516	-	259,755	204,243	206,575
Sardine	104,995	96,966	130,411	-	132,097	152,886	160,995
Round scad	68,700	72,887	0	-	0	65,637	84,923
Indian mackerel	0	0	0	-	0	85,787	93,593
Anchovy	66,780	68,532	105,388	-	96,147	99,681	107,837
Eastern little tuna	47,335	52,235	55,244	-	66,582	87,667	78,190
Non-penaeid prawn	18,687	78,451	87,294	-	121,890	68,165	97,072
Skipjack tuna	27,241	30,851	33,515	-	42,834	53,498	47,140
Selar scad	45,576	41,851	69,284	-	78,162	48,189	53,581
Penaeid prawn	39,778	28,226	40,872	-	9,027	63,891	66,342
Narrow-barred king mackerel	29,735	28,013	26,394	-	27,711	37,382	36,781
Indo-Pacific mackerel	70,985	61,647	78,790	-	84,485	0	5,049
Pony fish	21,257	26,702	37,751	-	41,235	34,544	42,119
Yellowfin tuna	0	0	0	-	17,899	25,239	19,530
Blood cockle	2,399	22,975	40,980	-	32,183	37,410	34,871
Shark	17,246	16,911	19,189	-	20,254	29,007	25,871
Marine catfish	11,560	20,228	20,204	-	21,995	26,655	25,291
Red snapper	7,870	14,492	16,698	-	17,806	21,661	0
Drum and croaker	9,594	27,265	25,960	-	26,747	18,641	29,486
Jack-cavalla-trevally	3,804	8,053	46,191	-	47,094	11,324	10,459
Mullet	9,347	14,323	12,685	-	14,430	15,390	20,228
Threadfin	26,247	10,394	11,108	-	9,468	10,879	15,379
Wolf herring	14,825	14,972	8,884	-	11,012	11,375	14,907
Squid	9,835	7,557	8,691	-	12,812	8,867	11,626
Grouper	19,164	5,476	6,085	-	6,087	6,701	9,968
Threadfin bream	5,893	7,004	8,778	-	9,859	8,266	9,869
Jellyfish	5,507	8,886	1,925	-	2,431	2,437	4,041
Others	235,968	246,861	152,549	1,272,565	107,742	168,854	178,577
Total	1,081,589	1,154,000	1,227,386	1,272,565	1,317,744	1,404,276	1,490,300

(continued)

Species\Year	(MT)						
	1983	1984	1985	1986	1987	1988	1989
Miscellaneous fish	236,980	492,689	473,551	323,530	341,391	334,496	331,626
Sardine	195,517	0	0	187,740	179,828	228,720	241,275
Round scad	91,937	135,253	172,534	190,000	145,304	127,191	145,849
Indian mackerel	95,738	114,281	124,988	132,000	121,265	127,505	145,670
Anchovy	104,690	109,299	106,887	111,800	117,995	115,601	119,696
Eastern little tuna	103,878	103,179	111,630	116,975	122,675	117,898	135,332
Non-penaeid prawn	46,650	46,513	53,313	84,440	66,868	80,192	72,322
Skipjack tuna	76,790	30,658	87,448	98,500	102,559	127,543	113,844
Selar scad	64,737	55,811	64,430	67,880	72,977	80,467	88,761
Penaeid prawn	63,971	54,442	53,429	69,520	64,074	72,295	70,022
Narrow-barred king mackerel	47,289	42,293	40,691	44,930	44,805	44,458	43,387
Indo-Pacific mackerel	7,122	6,100	6,796	0	7,522	0	0
Pony fish	36,602	36,940	38,663	39,000	36,203	40,912	42,413
Yellowfin tuna	26,088	0	0	37,410	40,505	42,979	66,254
Blood cockle	43,250	48,926	30,959	42,650	33,255	31,945	32,900
Shark	33,620	36,998	35,562	40,000	36,884	39,055	47,997
Marine catfish	33,369	34,782	34,199	37,670	38,385	39,208	41,112
Red snapper	27,453	26,275	25,665	28,300	31,758	40,652	43,624
Drum and croaker	19,578	20,751	18,853	20,100	26,512	30,530	27,113
Jack-cavalla-trevally	13,988	14,145	13,087	14,670	14,257	18,672	20,427
Mullet	19,289	16,771	17,509	23,510	20,705	20,828	22,662
Threadfin	12,747	12,115	13,897	14,000	19,046	17,928	19,541
Wolf herring	13,345	11,766	15,644	15,350	12,511	14,846	15,692
Squid	10,420	8,615	10,531	10,000	11,164	14,088	15,606
Grouper	9,618	9,285	9,608	10,880	15,364	16,665	14,839
Threadfin bream	10,823	10,282	10,013	11,000	9,529	17,809	16,903
Jellyfish	23,842	442	3,380	6,760	7,792	12,958	9,468
Others	212,688	234,193	248,458	144,166	276,217	314,116	327,844
Total	1,682,019	1,712,804	1,821,725	1,922,781	2,017,350	2,169,557	2,272,179

Table 18. Estimated potential yield on the basis of the catch from 1976 to 1989 - Indonesia.

Species group	Maximum catch	(A) Estimated max. potent.	(B) $A \times 0.8$	(C) 3-year mean	(MT)	
					A-C	B-C
Miscellaneous fish	492,689	508,583	406,866	335,838	172,745	71,028
Sardine	241,275	198,058	158,446	216,608	-18,550	-58,162
Round scad	190,000	186,403	149,122	139,448	46,955	9,674
Indian mackerel	145,670	126,816	101,453	131,480	-4,664	-30,027
Anchovy	119,696	104,859	83,887	117,764	-12,905	-33,877
Eastern little tuna	135,332	117,558	94,046	125,302	-7,744	-31,256
Non-penaeid prawn	121,890	119,152	95,322	73,127	46,025	22,195
Skipjack tuna	127,543	120,954	96,763	114,649	6,305	-17,886
Selar scad	88,761	74,893	59,914	80,735	-5,842	-20,821
Penaeid prawn	72,295	72,905	58,324	68,797	4,108	-10,473
Narrow-barred king mackerel	47,289	38,159	30,527	44,217	-6,058	-13,690
Indo-Pacific mackerel	84,485	78,422	62,738	7,522	70,900	55,216
Pony fish	42,413	38,915	31,132	39,843	-928	-8,711
Yellowfin tuna	66,254	66,964	53,571	49,913	17,051	3,658
Blood cockle	48,926	48,705	38,964	32,700	16,005	6,264
Shark	47,997	41,860	33,488	41,312	548	-7,824
Marine catfish	41,112	36,905	29,524	39,568	-2,663	-10,044
Red snapper	43,624	39,163	31,330	38,678	485	-7,348
Drum and croaker	30,530	30,251	24,201	28,052	2,199	-3,851
Jack-cavalla-trevally	47,094	48,223	38,578	17,785	30,438	20,793
Mullet	23,510	20,296	16,237	21,398	-1,102	-5,161
Threadfin	26,247	26,655	21,324	18,838	7,817	2,486
Wolf herring	15,692	15,153	12,122	14,350	803	-2,228
Squid	15,606	12,007	9,606	13,619	-1,612	-4,013
Grouper	19,164	21,622	17,298	15,623	5,999	1,675
Threadfin bream	17,809	14,610	11,688	14,747	-137	-3,059
Jellyfish	23,842	23,237	18,590	10,073	13,164	8,517
Others	327,844	292,058	233,646	306,059	-14,001	-72,413
Total	2,704,589	2,523,386	2,018,709	2,158,045	365,341	-139,336

Table 19. Marine capture fishery production from 1976 to 1989
- Kampuchea.

(MT)							
Country\Year	1976	1977	1978	1979	1980	1981	1982
Kampuchea	10,800	10,800	10,800	8,000	7,000	6,000	5,500
Year	1983	1984	1985	1986	1987	1988	1989
	5,100	5,500	6,000	6,500	6,500	6,500	7,250

Table 20. Marine capture fishery production from 1976 to 1989
- Malaysia.

(MT)							
Country\Year	1976	1977	1978	1979	1980	1981	1982
Malaysia	483,239	569,696	626,912	629,959	612,397	686,446	627,001
Year	1983	1984	1985	1986	1987	1988	1989
	686,463	600,473	574,354	563,459	858,807	823,240	874,441

Table 21. Catch by type of fishing gear from 1977 to 1989
- Malaysia.

							(MT)
Gear\Year	1977	1978	1979	1980	1981	1982	1983
Surrounding net	0	112,634	139,839	0	159,263	126,081	0
Seine net	123,989	15,676	18,342	172,034	29,529	25,689	207,577
Trawl	317,237	355,945	335,992	293,724	293,385	274,800	269,275
Gill net	45,358	49,718	48,076	55,294	85,906	86,158	81,516
Lift net	19,376	16,251	14,881	10,488	26,110	13,441	16,717
Trap	12,188	10,389	14,796	17,160	15,478	15,938	19,559
Hook-and-line	24,513	21,856	24,330	26,237	35,062	36,907	37,886
Push net	0	0	0	0	0	0	0
Shellfish c. g.	2,097	499	1,186	2,121	2,231	7,356	5,830
Others	24,938	43,944	32,517	35,339	39,482	40,631	48,103
Total	569,696	626,912	629,959	612,397	686,446	627,001	686,463

(continued)

Gear\Year	1984	1985	1986	1987	1988	1989
Surrounding net	190,723	152,434	81,392	174,543	175,015	149,853
Seine net	0	20,375	39,416	48,467	16,776	22,526
Trawl	233,858	229,629	285,232	444,948	449,402	502,094
Gill net	60,246	71,658	62,902	61,430	64,969	72,710
Lift net	15,014	17,190	10,153	11,218	13,401	17,958
Trap	16,601	30,163	16,919	11,946	27,104	17,776
Hook-and-line	28,500	27,390	31,015	34,209	27,701	27,101
Push net	0	0	4,381	8,889	2,005	2,024
Shellfish c. g.	4,359	2,644	836	20,488	1,534	784
Others	51,172	22,871	31,213	42,669	45,333	61,615
Total	600,473	574,354	563,459	858,807	823,240	874,441

Shellfish c. g., Shellfish and seaweed collecting gear.

Table 22. Catch by species group from 1976 to 1989 - Malaysia

	(MT)						
Species\Year	1976	1977	1978	1979	1980	1981	1982
Trash fish	140,356	168,322	161,889	167,282	159,026	158,902	144,805
Penaeid prawn	62,027	68,611	88,741	83,092	78,365	74,727	76,031
Indian mackerel	19,057	30,127	40,933	20,471	86,147	81,831	71,303
Miscellaneous fish	36,686	45,974	33,157	34,378	10,546	31,216	25,256
Selar scad	12,685	18,862	30,451	26,491	22,821	46,860	27,953
Anchovy	14,337	15,758	18,734	37,514	30,487	34,852	35,700
Round scad	18,364	23,645	24,704	21,013	20,272	25,361	15,090
Sardine	22,905	20,331	17,509	15,363	15,332	18,505	23,801
Longtail tuna	0	12,446	12,147	8,902	11,087	17,725	14,603
Squid	13,801	14,642	17,996	17,229	8,831	13,574	10,028
Threadfin bream	5,989	6,822	12,601	12,263	10,685	10,888	12,588
Drum and croaker	13,838	10,775	9,534	8,891	7,636	18,484	11,871
Narrow-barred king mackerel	9,069	11,374	12,655	13,144	15,111	15,974	16,840
Jellyfish	1,423	5,172	1,214	441	932	1,558	10,007
Non-penaeid prawn	9,281	0	0	1,063	1,612	10	23
Hardtail scad	7,554	4,880	11,149	12,807	11,227	8,005	6,300
Miscellaneous marine crustacea	64	11,810	1,672	8,020	10,694	21,337	5,168
Jack-cavalla-trevally	5,791	2,423	2,436	3,060	3,475	4,730	3,342
Shark	5,979	5,123	7,245	5,114	4,400	6,249	4,444
Eastern little tuna	8,779	3,080	3,755	3,088	2,716	1,878	3,106
Indo-Pacific mackerel	2,570	2,080	1,448	2,328	1,050	969	1,138
Others	72,684	87,439	116,942	128,005	99,945	92,811	107,604
Total	483,239	569,696	626,912	629,959	612,397	686,446	627,001

(continued)

Species\Year	1983	1984	1985	1986	1987	1988	1989
Trash fish	146,664	111,975	117,447	133,407	223,822	202,481	266,314
Penaeid prawn	67,541	55,975	60,579	65,214	45,355	71,906	92,960
Indian mackerel	91,478	87,054	83,029	43,993	71,459	57,452	57,120
Miscellaneous fish	31,422	24,954	24,739	22,061	36,070	39,617	42,391
Selar scad	35,628	29,019	30,224	11,276	18,861	33,597	37,333
Anchovy	35,613	23,500	16,776	18,252	28,153	32,065	30,523
Round scad	21,557	25,091	22,307	17,820	55,011	36,717	41,953
Sardine	24,355	14,849	11,071	10,505	28,134	24,129	16,868
Longtail tuna	18,838	17,723	19,151	16,590	25,484	20,730	13,625
Squid	10,481	10,298	9,148	9,704	21,430	20,243	31,068
Threadfin bream	11,621	11,215	8,865	11,217	21,384	30,636	23,584
Drum and croaker	12,854	12,033	12,709	15,789	13,319	15,360	13,906
Narrow-barred king mackerel	14,316	9,268	8,687	12,241	12,798	10,398	8,509
Jellyfish	17,197	14,705	10,007	11,541	25,736	25,227	42,035
Non-penaeid prawn	7,215	7,535	17,659	17,000	48,522	10,601	14,909
Hardtail scad	11,993	15,161	7,486	6,944	8,653	10,551	8,817
Miscellaneous marine crustacea	10,623	15,954	0	0	177	21,891	677
Jack-cavalla-trevally	4,076	4,357	4,212	12,625	18,788	8,376	6,399
Shark	5,016	5,281	4,745	4,820	4,699	5,252	4,142
Eastern little tuna	3,372	6,871	3,315	2,713	4,528	6,322	4,058
Indo-Pacific mackerel	1,765	3,717	3,068	3,731	2,856	3,049	3,218
Others	102,838	93,938	99,130	116,016	143,568	136,640	114,032
Total	686,463	600,473	574,354	563,459	858,807	823,240	874,441

Table 23. Estimated potential yield on the basis of the catch from 1976 to 1989 - Malaysia.

(MT)

Species group	Maximum catch	(A) Estimated max. potent.	(B) A*0.8	(C) 3-year mean	A-C	B-C
Trash fish	266,314	208,377	166,702	230,872	-22,495	-64,170
Penaeid prawn	92,960	82,661	66,129	70,074	12,587	-3,945
Indian mackerel	91,478	92,041	73,633	62,010	30,031	11,623
Miscellaneous fish	45,974	46,728	37,382	39,359	7,369	-1,977
Selar scad	46,860	45,612	36,490	29,930	15,682	6,560
Anchovy	37,514	39,256	31,405	30,247	9,009	1,158
Round scad	55,011	53,313	42,650	44,560	8,753	-1,910
Sardine	28,134	27,937	22,350	23,044	4,893	-694
Longtail tuna	25,484	21,724	17,379	19,946	1,778	-2,567
Squid	31,068	26,059	20,847	24,247	1,812	-3,400
Threadfin bream	30,636	31,523	25,218	25,201	6,322	17
Drum and croaker	18,484	16,331	13,065	14,195	2,136	-1,130
Narrow-barred king mackerel	16,840	15,963	12,770	10,568	5,395	2,202
Jellyfish	42,035	38,489	30,791	30,999	7,490	-208
Non-penaeid prawn	48,522	42,769	34,215	24,677	18,092	9,538
Hardtail scad	15,161	15,030	12,024	9,340	5,690	2,684
Miscellaneous marine crustacea	21,891	21,028	16,822	7,582	13,446	9,240
Jack-cavalla-trevally	18,788	15,625	12,501	11,188	4,438	1,313
Shark	7,245	6,512	5,210	4,698	1,814	512
Eastern little tuna	8,779	9,448	7,558	4,969	4,479	2,589
Indo-Pacific mackerel	3,731	3,876	3,101	3,041	835	60
Others	143,568	123,979	99,183	131,413	-7,434	-32,230
Total	1,096,477	984,282	787,426	852,160	132,122	-64,734

Table 24. Marine capture fishery production from 1976 to 1989 - the Philippines.

(MT)

Country\Year	1976	1977	1978	1979	1980	1981	1982	
Philippines	1,127,342	1,230,679	1,281,772	1,238,334	1,250,883	1,204,757	1,234,289	
Year	1983	1984	1985	1986	1987	1988	1989	Mean
	1,290,304	1,303,310	1,297,119	1,353,505	1,407,439	1,438,361	1,519,507	1,298,400

Table 25. Catch by type of fishing gear from 1977 to 1988
- the Philippines.

(MT)

Gear\Year	1977	1978	1979	1980	1981	1982	1983
Surrounding net	32,777	8,694	260,669	256,227	251,594	246,988	271,332
Seine net	193,683	286,205	48,821	60,927	52,132	64,888	71,456
Trawl	204,468	234,147	191,904	176,305	168,928	171,599	201,600
Gill net	0	287,188	203,246	225,763	269,651	224,127	229,637
Lift net	0	154,582	143,930	203,671	146,739	160,317	144,538
Trap	71,524	16,941	41,713	32,536	46,608	67,634	62,644
Hook-and-line	5,190	253,370	194,493	195,921	222,825	200,798	213,536
Push net	10,523	7,055	14,346	11,963	14,409	10,380	16,899
Shellfish c. g.	0	0	0	0	0	0	0
Others	712,514	33,590	139,212	87,570	31,871	87,558	78,662
Total	1,230,679	1,281,772	1,238,334	1,250,883	1,204,757	1,234,289	1,290,304

(continued)

Gear\Year	1984	1985	1986	1987	1988	1989
Surrounding net	307,766	300,282	337,084	376,872	407,181	-
Seine net	81,861	66,599	80,743	112,398	124,294	-
Trawl	177,402	159,725	159,314	170,224	143,959	-
Gill net	224,319	236,697	243,194	227,103	233,956	-
Lift net	152,908	142,075	128,263	130,762	138,876	-
Trap	67,534	81,269	59,360	51,345	53,330	-
Hook-and-line	221,463	243,436	276,172	263,593	264,121	-
Push net	16,144	14,983	11,583	12,618	14,023	-
Shellfish c. g.	0	13,401	13,391	17,318	13,915	-
Others	53,913	38,652	44,401	45,206	44,706	-
Total	1,303,310	1,297,119	1,353,505	1,407,439	1,438,361	-

Shellfish c. g., Shellfish and seaweed collecting gear.

Data was not available in 1989.

Table 26. Catch by species group from 1976 to 1989
- the Philippines.

Species\Year	(MT)						
	1976	1977	1978	1979	1980	1981	1982
Round scad	224,665	182,698	140,975	146,206	132,161	149,947	183,253
Sardine	61,668	127,721	154,029	106,403	117,348	136,871	147,746
Anchovy	66,117	50,196	96,408	70,489	80,163	72,745	77,495
Frigate tuna	28,328	43,007	49,315	79,909	96,874	78,248	67,363
Pony fish	82,719	72,834	65,762	72,468	60,432	57,210	53,738
Yellowfin tuna	36,227	62,203	69,535	49,224	48,017	94,615	52,913
Skipjack tuna	29,173	55,090	34,597	45,084	31,178	38,439	50,795
Threadfin bream	53,401	51,603	35,129	32,471	37,457	38,622	30,883
Eastern little tuna	23,004	54,744	26,452	23,094	24,730	30,891	45,533
Selar scad	42,478	55,992	57,213	47,027	47,032	33,609	27,232
Jack-cavalla-trevally	31,826	42,664	33,183	32,468	30,680	33,472	42,068
Indian mackerel	38,811	19,469	45,936	38,972	24,305	28,425	24,229
Round herring	44,029	60,768	38,668	23,970	34,128	28,360	21,166
Squid	23,639	25,012	31,416	25,495	27,001	27,980	20,989
Indo-Pacific mackerel	24,650	34,304	27,278	17,914	22,208	18,962	19,507
Grouper	23,631	19,919	18,280	16,844	19,731	26,141	17,467
Goatfish	11,378	15,718	15,589	21,791	15,342	7,683	18,261
Penaeid prawn	33,664	19,435	18,256	17,896	16,446	17,244	18,618
Fusilier	23,809	14,131	13,566	13,909	18,104	17,002	18,361
Blue swimming crab	10,479	9,658	13,916	17,412	14,260	18,871	12,329
Narrow-barred king mackerel	10,915	15,718	13,641	14,821	13,549	16,897	17,269
Non-penaeid prawn	7,351	6,217	10,055	5,844	9,327	19,563	25,947
Lizard fish	16,462	23,465	16,988	14,709	13,679	11,812	10,309
Drum and croaker	15,473	7,186	8,820	5,828	5,953	6,700	6,673
Trash fish	0	0	4,789	19,823	9,197	4,880	5,229
Shark	4,902	4,620	6,421	4,328	4,306	7,989	6,010
Miscellaneous fish	17,001	7,331	13,903	3,244	2,262	4,528	6,581
Others	141,542	148,976	221,652	270,691	295,013	177,051	206,325
Total	1,127,342	1,230,679	1,281,772	1,238,334	1,250,883	1,204,757	1,234,289

(continued)

Species\Year	(MT)						
	1983	1984	1985	1986	1987	1988	1989
Round scad	165,023	131,583	131,708	175,855	184,411	178,687	209,821
Sardine	151,484	109,027	81,927	73,303	98,694	96,405	122,465
Anchovy	91,420	99,545	109,885	99,687	108,373	126,373	122,250
Frigate tuna	74,219	80,305	95,725	87,225	98,032	105,436	117,545
Pony fish	59,191	66,784	65,316	65,415	61,738	65,724	63,475
Yellowfin tuna	62,036	58,924	64,293	59,510	51,809	57,060	62,146
Skipjack tuna	57,151	44,671	60,536	77,031	73,751	55,940	64,652
Threadfin bream	34,348	41,321	43,977	46,276	46,448	43,331	43,060
Eastern little tuna	48,880	41,899	41,060	42,445	46,934	56,266	57,899
Selar scad	22,502	37,513	33,481	34,407	35,461	36,530	38,614
Jack-cavalla-trevally	40,723	45,614	42,350	42,150	44,189	45,710	37,284
Indian mackerel	38,226	33,192	37,445	38,942	42,726	51,768	51,661
Round herring	20,507	35,125	28,839	28,016	31,872	35,624	32,121
Squid	30,741	20,314	24,623	26,632	26,431	28,835	26,639
Indo-Pacific mackerel	24,672	27,650	28,929	26,534	25,327	28,323	23,301
Grouper	20,396	24,403	24,655	28,843	25,217	19,189	23,559
Goatfish	18,652	25,368	30,146	24,355	27,049	25,567	25,622
Penaeid prawn	17,592	15,588	15,497	22,863	17,622	17,813	17,602
Fusilier	17,595	19,817	16,278	15,063	16,051	15,128	18,488
Blue swimming crab	26,047	17,983	15,563	16,687	13,064	16,506	14,145
Narrow-barred king mackerel	18,266	13,725	12,739	15,150	17,852	13,796	17,908
Non-penaeid prawn	10,110	7,792	17,865	18,197	14,670	16,350	17,260
Lizard fish	9,046	9,290	8,684	9,684	10,185	9,863	9,734
Drum and croaker	6,834	10,187	10,065	12,431	9,623	11,779	8,233
Trash fish	5,612	4,449	2,986	6,948	7,866	13,367	7,608
Shark	4,887	5,983	5,801	9,853	6,967	7,134	8,103
Miscellaneous fish	3,356	2,034	2,628	2,877	2,953	3,085	2,900
Others	210,788	273,224	244,118	247,126	262,124	256,772	275,412
Total	1,290,304	1,303,310	1,297,119	1,353,505	1,407,439	1,438,361	1,519,507

Table 27. Estimated potential yield on the basis of the catch from 1976 to 1989 - the Philippines.

(MT)

Species group	Maximum catch	(A) Estimated max. potent.	(B) $A \times 0.8$	(C) 3-year mean	A-C	B-C
Round scad	224,665	239,031	191,225	190,973	48,058	252
Sardine	154,029	151,150	120,920	105,855	45,295	15,065
Anchovy	126,373	122,284	97,827	118,999	3,285	-21,172
Frigate tuna	117,545	104,793	83,834	107,004	-2,211	-23,170
Pony fish	82,719	83,098	66,478	63,645	19,452	2,832
Yellowfin tuna	94,615	96,147	76,918	57,005	39,142	19,913
Skipjack tuna	77,031	77,884	62,307	64,781	13,103	-2,474
Threadfin bream	53,401	56,683	45,346	44,280	12,403	1,066
Eastern little tuna	57,899	60,220	48,176	53,700	6,520	-5,524
Selar scad	57,213	55,894	44,715	36,868	19,026	7,847
Jack-cavalla-trevally	45,710	45,254	36,203	42,394	2,860	-6,191
Indian mackerel	51,768	48,237	38,590	48,718	-481	-10,128
Round herring	60,768	59,574	47,659	33,206	26,358	14,453
Squid	31,416	30,471	24,377	27,302	3,169	-2,925
Indo-Pacific mackerel	34,304	34,758	27,806	25,650	9,108	2,156
Grouper	28,843	27,220	21,776	22,655	4,565	-879
Goatfish	30,146	31,607	25,286	26,079	5,528	-793
Penaeid prawn	33,654	33,647	26,918	17,679	15,968	9,239
Fusilier	23,809	24,183	19,346	16,556	7,627	2,790
Blue swimming crab	26,047	25,636	20,509	14,572	11,064	5,937
Narrow-barred king mackerel	18,266	18,117	14,494	16,519	1,598	-2,025
Non-penaeid prawn	25,947	27,036	21,629	16,093	10,943	5,536
Lizard fish	23,465	22,729	18,183	9,927	12,802	8,256
Drum and croaker	15,473	16,622	13,298	9,878	6,744	3,420
Trash fish	19,823	20,482	16,386	9,614	10,868	6,772
Shark	9,853	9,789	7,831	7,401	2,388	430
Miscellaneous fish	17,001	17,731	14,185	2,979	14,752	11,206
Others	295,013	313,183	250,546	264,769	48,414	-14,223
Total	1,836,806	1,853,460	1,482,768	1,455,102	398,358	27,666

Table 28. Marine capture fishery production from 1976 to 1989
- Singapore.

							(MT)	
Country\Year	1976	1977	1978	1979	1980	1981	1982	
Singapore	15,776	14,352	15,635	15,906	15,532	15,620	18,830	
Year	1983	1984	1985	1986	1987	1988	1989	Mean
	19,099	25,042	22,761	20,279	15,096	13,151	10,568	16,975

Table 29. Catch by species group from 1976 to 1989 - Singapore.

	(MT)						
Species\Year	1976	1977	1978	1979	1980	1981	1982
Trash fish	3,432	2,916	2,986	3,088	2,864	2,368	3,017
Pusillier	3,185	3,344	3,004	2,762	2,402	2,132	2,395
Miscellaneous fish	3,199	1,356	1,225	1,580	929	1,137	1,204
Penaeid prawn	207	1,109	1,187	1,093	1,086	1,193	1,489
Threadfin bream	571	395	414	428	381	483	629
Yellowfin tuna	0	0	0	0	1,413	504	585
Ray	405	340	422	422	292	296	478
Selar scad	250	232	258	301	286	392	575
Drum and croaker	414	324	384	438	337	405	546
Goatfish	195	237	377	332	331	391	383
Squid	254	196	390	347	303	357	507
Shark	232	207	271	295	305	402	437
Anchovy	142	184	166	114	108	168	281
Sardine	415	233	276	261	224	276	374
Indian mackerel	71	68	102	132	140	194	221
Others	2,804	3,211	4,173	4,313	4,131	4,922	5,709
Total	15,776	14,352	15,635	15,906	15,532	15,620	18,830

(continued)

Species\Year	1983	1984	1985	1986	1987	1988	1989
Trash fish	2,766	3,041	2,700	1,933	1,658	1,365	1,131
Pusillier	2,098	1,830	1,308	1,150	813	643	335
Miscellaneous fish	852	1,906	1,646	1,499	1,098	1,244	968
Penaeid prawn	1,667	2,179	1,926	1,838	1,401	908	736
Threadfin bream	756	938	939	886	725	412	408
Yellowfin tuna	469	417	675	455	330	549	205
Ray	538	837	695	631	425	526	433
Selar scad	534	781	769	729	630	438	359
Drum and croaker	486	612	544	563	501	533	435
Goatfish	647	697	800	485	397	287	271
Squid	503	694	712	409	322	270	218
Shark	425	598	533	445	327	358	293
Anchovy	451	592	496	761	567	543	458
Sardine	478	493	350	481	206	398	323
Indian mackerel	224	475	414	371	242	146	115
Others	6,205	8,952	8,254	7,643	5,454	4,531	3,880
Total	19,099	25,042	22,761	20,279	15,096	13,151	10,568

Table 30. Estimated potential yield on the basis of the catch from 1976 to 1989 - Singapore.

(MT)						
Species group	Maximum catch	(A) Estimated max. potent.	(B) $A \times 0.8$	(C) 3-year mean	A-C	B-C
Trash fish	3,432	3,412	2,730	1,385	2,027	1,345
Fusilier	3,344	3,600	2,880	597	3,003	2,283
Miscellaneous fish	3,199	3,053	2,442	1,103	1,950	1,339
Penaeid prawn	2,179	1,686	1,349	1,015	671	334
Threadfin bream	939	899	719	515	384	204
Yellowfin tuna	1,413	1,393	1,114	361	1,032	753
Ray	837	644	515	461	183	54
Selar scad	781	739	591	476	263	115
Drum and croaker	612	517	414	490	27	-76
Goat fish	800	703	562	318	385	244
Squid	712	664	531	270	394	261
Shark	598	460	368	326	134	42
Anchovy	761	664	531	523	141	8
Sardine	493	449	359	309	140	50
Indian mackerel	475	392	314	168	224	146
Others	8,952	6,815	5,452	4,622	2,193	830
Total	29,527	26,090	20,872	12,939	13,151	7,933

Table 31. Marine capture fishery production from 1976 to 1989 - Thailand.

(MT)							
Country\Year	1976	1977	1978	1979	1980	1981	1982
Thailand	1,388,239	1,915,999	1,837,807	1,690,380	1,544,434	1,756,939	1,949,681
Year	1983	1984	1985	1986	1987	1988	1989
	2,055,225	1,911,485	1,997,165	2,309,480	2,540,052	2,337,216	2,370,548
							1,971,761

Table 32. Catch by type of fishing gear from 1977 to 1989
- Thailand.

							(MT)
Gear\Year	1977	1978	1979	1980	1981	1982	1983
Surrounding net	0	361,698	292,841	0	0	0	0
Seine net	437,144	1,642	0	244,622	327,179	332,835	469,475
Trawl	1,247,010	1,250,155	1,112,397	1,055,150	1,058,135	1,093,878	1,088,928
Gill net	83,771	91,674	144,251	121,113	120,865	107,728	109,022
Lift net	0	6,034	3,115	0	22,445	0	0
Trap	54,712	43,113	44,671	18,862	20,733	20,310	18,819
Hook-and-line	7,732	11,410	8,878	8,760	7,914	8,040	7,537
Push net	0	0	0	0	0	0	0
Shellfish c. g.	0	65,952	9,855	0	0	0	0
Others	85,630	6,129	74,372	95,927	199,668	386,890	361,444
Total	1,915,999	1,837,807	1,690,380	1,544,434	1,756,939	1,949,681	2,055,225

(continued)

Gear\Year	1984	1985	1986	1987	1988	1989
Surrounding net	516,934	570,917	602,355	640,001	629,597	674,053
Seine net	0	0	0	0	0	0
Trawl	1,016,637	1,002,392	1,253,764	1,399,773	1,260,036	1,308,352
Gill net	147,947	141,868	132,242	163,351	146,309	134,451
Lift net	0	0	0	0	0	0
Trap	20,077	32,833	21,907	25,811	25,192	27,265
Hook-and-line	8,402	8,413	7,969	7,474	7,724	7,059
Push net	0	26,526	15,493	17,609	11,518	13,552
Shellfish c. g.	0	0	0	0	0	0
Others	201,488	214,216	275,750	286,033	256,840	205,816
Total	1,911,485	1,997,165	2,309,480	2,540,052	2,337,216	2,370,548

Shellfish c. g., Shellfish and seaweed collecting gear.

Table 33. Catch by species group from 1976 to 1989 - Thailand.

Species\Year	(MT)					
	1976	1977	1978	1979	1980	1981
Trash fish	620,646	836,642	847,421	784,267	786,858	796,747
Sardine	105,692	214,076	145,278	161,892	105,413	139,800
Non-penaeid prawn	73,827	100,637	98,304	69,259	92,646	106,465
Miscellaneous fish	80,842	86,150	95,746	77,392	80,922	79,307
Indo-Pacific mackerel	53,771	31,204	45,271	88,720	53,424	71,701
Squid	36,163	51,538	52,067	42,287	39,854	48,021
Jellyfish	22,738	82,439	62,600	54,952	2,164	28,833
Round scad	83,760	131,347	107,376	28,061	30,964	37,376
Miscellaneous marine molluscs	10,179	7,013	8,644	7,285	6,557	5,509
Anchovy	17,296	11,713	10,308	20,214	20,299	14,488
Longtail tuna	0	0	0	12,503	8,671	11,564
Cuttlefish	23,753	35,143	34,484	30,570	26,721	27,275
Indian mackerel	25,885	33,371	37,005	29,221	27,884	20,542
Jack-cavalla-trevally	22,284	17,156	35,587	21,082	23,431	29,294
Sea mussel	858	0	0	3,951	5,382	17,314
Blue swimming crab	19,315	23,250	24,760	27,343	29,334	28,473
Eastern little tuna	9,719	12,932	10,353	4,342	5,012	10,709
Threadfin bream	16,904	19,824	23,678	20,425	18,016	20,396
Penaeid prawn	12,312	16,726	22,612	43,083	17,631	31,256
Selar scad	0	0	0	11,129	15,119	26,732
Bigeye snapper	11,673	31,035	13,861	11,963	16,429	15,414
Hardtail scad	14,984	26,410	15,009	8,726	11,105	4,462
Drum and croaker	9,806	16,402	15,241	11,036	11,206	13,443
Narrow-barred king mackerel	8,849	12,346	9,376	12,233	11,354	13,689
Others	106,983	118,645	122,826	108,444	98,038	158,129
Total	1,388,239	1,915,999	1,837,807	1,690,380	1,544,434	1,756,939

(continued)

Species\Year	(MT)					
	1983	1984	1985	1986	1987	1988
Trash fish	803,337	757,637	776,421	976,236	1,105,654	956,113
Sardine	124,881	117,323	97,742	121,242	127,208	123,739
Non-penaeid prawn	126,492	101,097	91,347	110,488	115,142	88,962
Miscellaneous fish	73,352	92,713	106,487	120,204	128,678	132,075
Indo-Pacific mackerel	79,803	129,094	121,107	113,497	119,182	111,657
Squid	76,489	66,340	63,996	71,344	75,420	67,176
Jellyfish	180,281	10,992	29,018	76,090	40,476	18,352
Round scad	34,101	44,256	33,692	26,411	56,140	31,763
Miscellaneous marine molluscs	44,900	61,338	95,607	117,275	140,996	119,960
Anchovy	40,619	90,087	104,196	58,987	57,769	69,378
Longtail tuna	53,805	44,378	48,000	48,299	65,911	92,925
Cuttlefish	47,319	56,352	42,814	51,625	45,695	45,308
Indian mackerel	53,247	33,436	36,970	41,891	39,876	25,808
Jack-cavalla-trevally	23,344	20,323	52,111	42,204	43,197	48,918
Sea mussel	36,996	48,682	35,113	17,015	37,711	52,672
Blue swimming crab	24,958	22,356	22,233	30,432	34,707	37,102
Eastern little tuna	32,015	32,460	38,881	45,473	36,708	53,450
Threadfin bream	16,271	15,052	17,096	26,801	34,134	29,559
Penaeid prawn	22,410	22,452	19,442	11,842	11,591	20,546
Selar scad	23,342	25,284	18,418	19,609	25,960	18,882
Bigeye snapper	10,908	10,000	12,705	18,190	24,999	22,571
Hardtail scad	21,973	11,217	8,902	19,130	22,248	24,879
Drum and croaker	10,888	11,534	12,073	14,831	13,392	13,723
Narrow-barred king mackerel	9,297	10,364	11,724	14,770	15,502	15,258
Others	84,197	76,718	101,070	115,594	121,756	116,440
Total	2,055,225	1,911,485	1,997,165	2,309,480	2,540,052	2,337,216

Table 34. Estimated potential yield on the basis of the catch from 1976 to 1989 - Thailand.

(MT)

Species group	Maximum catch	(A) Estimated max. potent.	(B) $\lambda \times 0.8$	(C) 3-year mean	A-C	B-C
Trash fish	1,105,654	869,227	695,382	1,014,037	-144,810	-318,655
Sardine	214,076	187,877	150,302	131,995	55,882	18,307
Non-penaeid prawn	151,623	136,947	109,558	100,651	36,296	8,907
Miscellaneous fish	132,075	110,910	88,728	121,567	-10,657	-32,839
Indo-Pacific mackerel	129,094	139,760	111,808	117,293	22,467	-5,485
Squid	76,489	79,826	63,861	70,812	9,014	-6,951
Jellyfish	180,281	175,758	140,606	24,928	150,830	115,678
Round scad	131,347	118,303	94,642	42,499	75,804	52,143
Miscellaneous marine molluscs	140,996	126,918	101,534	130,478	-3,560	-28,944
Anchovy	104,196	110,930	88,744	74,742	36,188	14,002
Longtail tuna	92,925	92,142	73,714	80,320	11,822	-6,606
Cuttlefish	57,033	63,931	51,145	49,345	14,586	1,800
Indian mackerel	53,247	48,860	39,088	33,604	15,256	5,484
Jack-cavalla-trevally	53,765	55,643	44,514	48,627	7,016	-4,113
Sea mussel	81,800	85,166	68,133	40,220	44,946	27,913
Blue swimming crab	37,102	33,626	26,901	35,757	-2,131	-8,856
Eastern little tuna	53,450	51,332	41,066	45,894	5,438	-4,828
Threadfin bream	34,134	29,552	23,642	32,456	-2,904	-8,814
Penaeid prawn	43,083	43,019	34,415	14,794	28,225	19,621
Selar scad	26,732	28,498	22,798	22,083	6,415	715
Bigeye snapper	31,035	31,998	25,598	23,323	8,675	2,275
Hardtail scad	28,177	28,402	22,722	25,101	3,301	-2,379
Drum and croaker	16,402	14,709	11,767	14,222	487	-2,455
Warrow-barred king mackerel	15,502	13,872	11,098	14,553	-681	-3,455
Others	212,196	165,482	132,386	150,131	15,351	-17,745
Total	3,202,414	2,842,688	2,274,150	2,459,432	383,256	-185,282

Table 35. Marine capture fishery production from 1976 to 1989
- Viet Nam.

							(MT)
Country\Year	1976	1977	1978	1979	1980	1981	1982
Vietnam	837,200	837,200	837,200	415,000	423,000	427,000	440,000
Year	1983	1984	1985	1986	1987	1988	1989
	552,608	553,029	576,860	582,077	620,404	624,000	618,000
							Mean
							595,970